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MARIPOSA ENERGY PROJECT

Staff Assessment

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DISCLAIMER

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MARIPOSA ENERGY PROJECT (MEP)
(09-AFC-3)
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INTRODUCTION

Craig Hoffman

PURPOSE OF THIS REPORT

This Staff Assessment (SA) is the California Energy Commission staff's independent analysis of the proposed Mariposa Energy Project (MEP) which would be a natural-gas fired, simple cycle peaking facility with a generating capacity of 200 megawatts (MW), located in northeastern Alameda County, approximately 2.5 miles west of the community of Mountain House in San Joaquin County. For clarity, this SA is a staff document. It is neither a California Energy Commission Committee document nor a draft decision. The SA describes the following:

- The proposed project;
- The existing environment;
- Whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations, and standards (LORS);
- The environmental consequences of the project including potential public health and safety impacts;
- The potential cumulative impacts of the project in conjunction with other existing and known planned developments;
- Mitigation measures proposed by the applicant, staff, interested agencies, local organizations, and interveners which may lessen or eliminate potential impacts;
- The proposed conditions under which the project should be constructed and operated, if it is certified; and
- Project alternatives.

The analyses contained in this SA are based upon information from the: 1) Application for Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations, and individuals, 4) existing documents and publications, 5) independent research, 6) comments at workshops and 7) Committee public hearings. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of verification that the condition of certification has been met. The SA presents final conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation, and closure of the facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq.; California Code of Regulations, title 20, section 1701 et seq.; and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

ORGANIZATION OF THE STAFF ASSESSMENT

The SA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 20 technical areas. Each technical area is addressed in a separate chapter. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report including their declarations and resumes.

Each of the 20 technical area assessments includes a discussion of:

- Laws, ordinances, regulations, and standards (LORS);
- The regional and site-specific setting;
- Project specific and cumulative impacts;
- Mitigation measures;
- Closure requirements;
- Conclusions and recommendations; and
- Conditions of certification for both construction and operation (if applicable).

ENERGY COMMISSION SITING PROCESS

The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. 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). The Energy Commission must review power plant AFCs to assess potential environmental and public health and safety impacts, potential measures to mitigate those impacts (Pub. Resources Code, §25519), and compliance with applicable governmental laws and standards (Pub. Resources Code, §25523 (d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts it contains is complete, and whether additional or more effective mitigation measures are necessary, feasible and available (Cal. Code Regs., tit. 20, §§ 1742 and 1742.5(a)). Staff's independent review is presented in this report (Cal. Code Regs., tit. 20, §1742.5).

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1743(b)). Staff is required to coordinate with other agencies to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the

Secretary of the Natural Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission is the CEQA lead agency and is subject to all portions of CEQA applicable to certified regulatory activities.

Staff typically prepares both a preliminary and final staff assessment. However, to adhere to agreed upon timelines for this project, staff has prepared a SA only. The SA presents for the applicant, interveners, agencies, other interested parties, and members of the public, the staff's final analysis, conclusions, and recommendations.

Staff provides a 30-day comment period to resolve issues between the parties and to narrow the scope of disputed issues presented at evidentiary hearings. During the comment period that follows the publication of the SA, staff will conduct one or more workshops to discuss its findings, proposed mitigation, and proposed compliance-monitoring requirements. Based on the workshops and written comments received, staff may refine its analysis, correct errors, and finalize conditions of certification to reflect areas where agreements have been reached with the parties and will then publish a Supplemental Staff Assessment (SSA). The SSA will be a limited document representing revisions and additions rather than a document including each technical section.

The SA is only one piece of evidence that will be considered by the Committee (two Commissioners who have been assigned to this project) in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the public hearings, all parties will be afforded an opportunity to present evidence and to cross examine the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated for 30 days in order to receive public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD will be circulated for a comment period to be determined by the Committee. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any intervener may request that the Energy Commission reconsider its decision.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the SA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD. The Energy Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission.

AGENCY COORDINATION

As noted above, 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, California Coastal Commission, 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.

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). The Hearing Officer sent a public notice to appropriate parties on August 26, 2009 for an October 1, 2009 Informational Hearing and Site Visit. The Project Manager sent a public notice to appropriate parties on November 30, 2009 for a December 15, 2009 Data Response Workshop and June 17, 2010 for a June 30, 2010 Data Response Workshop. Staff's ongoing public and agency coordination activities for this project are discussed under the Public and Agency Coordination heading in the **EXECUTIVE SUMMARY** section of the SA.

The Energy Commission's outreach efforts are an ongoing process that, to date, has involved the following efforts:

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, the public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

PUBLIC OUTREACH EFFORTS

The Energy Commission staff provided notification by letter and enclosed notice of the October 1, 2009 Informational Hearing and Site Visit to the proposed site of the MEP. 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 San Joaquin County, Alameda County and Contra Costa County were similarly notified of the hearing and site visit.

DATA RESPONSE AND ISSUE RESOLUTION WORKSHOPS

The Energy Commission staff provided notification by letter and enclosed notice of December 15, 2009 and June 30, 2010 Data Response and Issue Resolution Workshops. 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 and will therefore be receiving 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.

ENVIRONMENTAL JUSTICE

Executive Order 12898, "Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency (USEPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

For all siting cases, Energy Commission staff conducts an environmental justice screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in USEPA's National Environmental Policy Act (NEPA) Compliance Analysis" dated April 1998. The purpose of the screening analysis is to determine whether a minority or low-income population exists within the potentially affected area of the proposed site.

California Statute, Section 65040.12 (c) of the Government Code, defines "environmental justice" to mean "fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." Staff's specific activities, with respect to environmental justice for the MEP project, are discussed in the **EXECUTIVE SUMMARY**.

PROJECT DESCRIPTION

Craig Hoffman

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 4 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 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 4-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 6-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 a 4-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 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).

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.

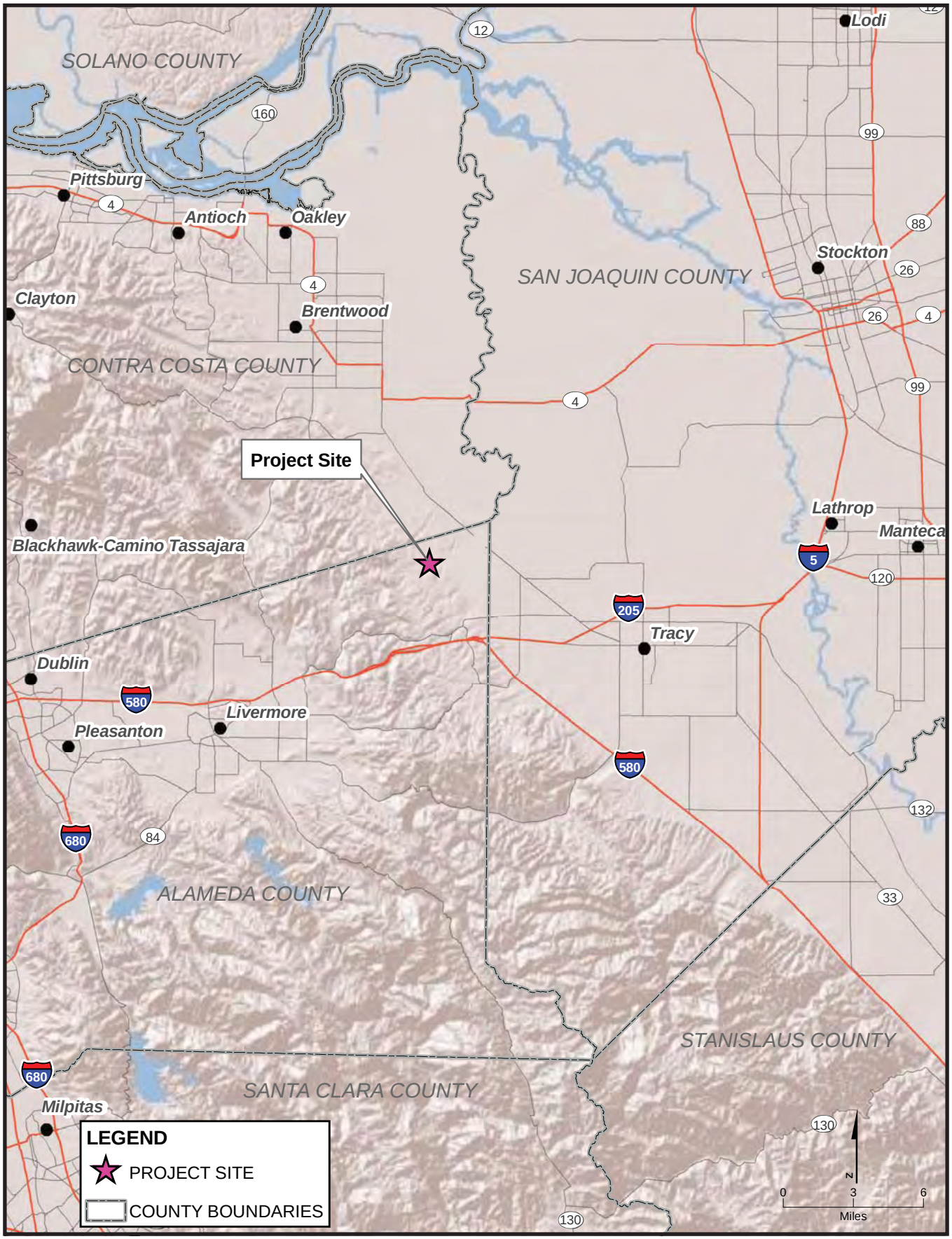
CH2M 2010d - CH2M Hill / D. Urry (TN 55797). Applicant's Supplement B Additional Laydown Area Analysis, dated 3/5/2010 Submitted to CEC on 3/8/2010.

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.

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

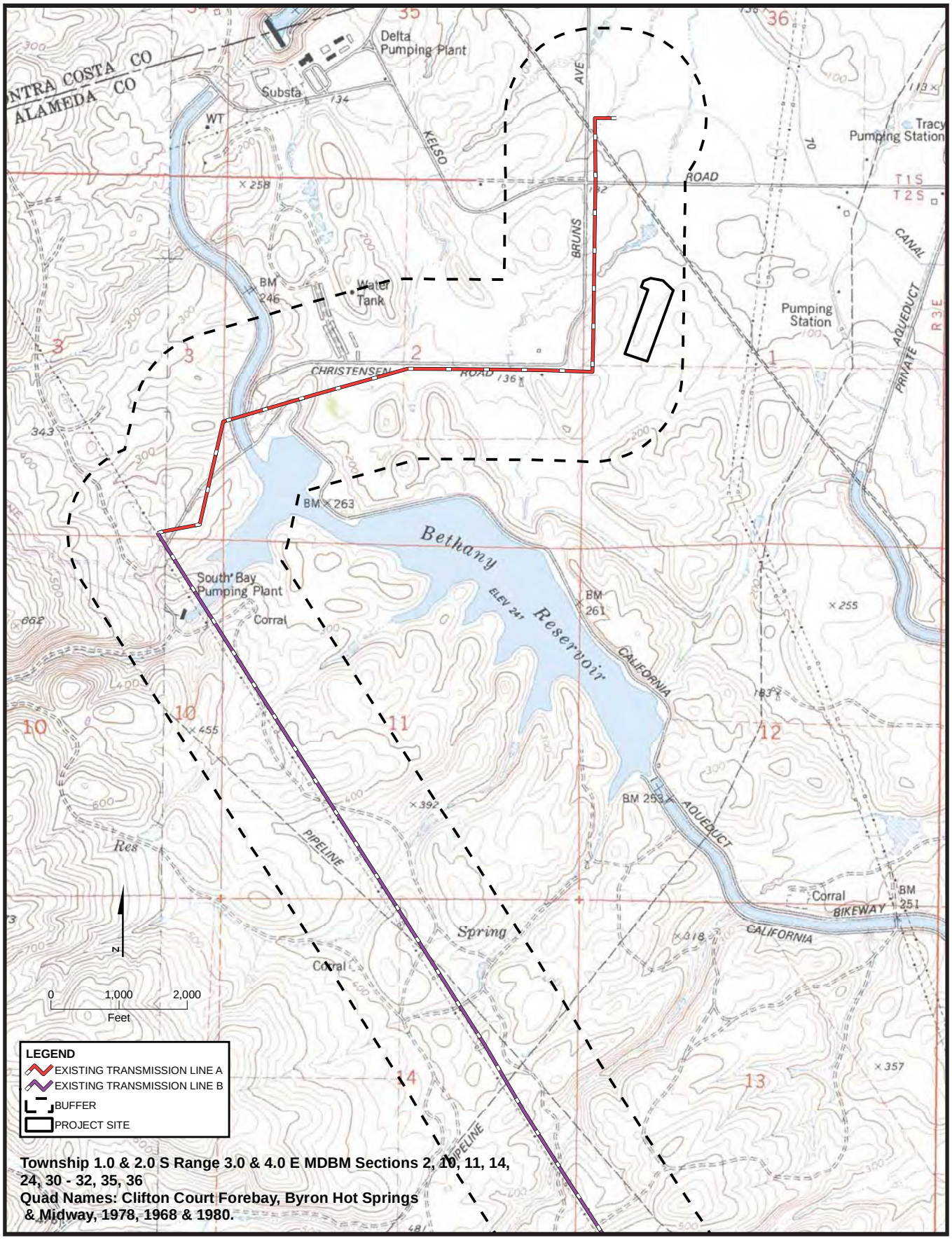
Mariposa Energy Project - Architectural Rendering

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

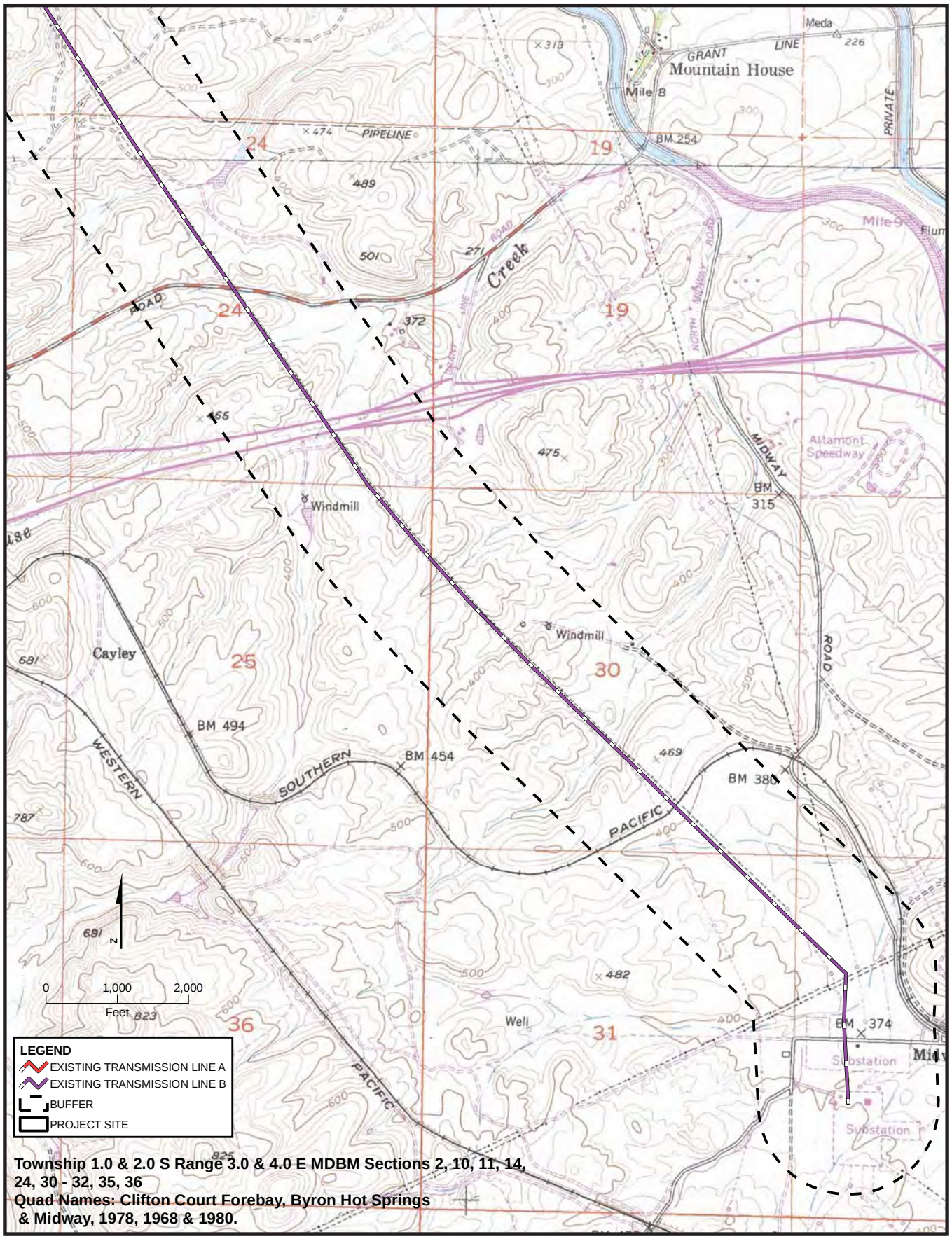


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

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

Testimony of Brewster Birdsall, P.E., QEP and Jacquelyn Leyva

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.
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.

Applicable Law	Description
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.
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.

Applicable Law	Description
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).

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 µg/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 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).

[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.

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 the 15 acres of the MEP site, which includes approximately 4.2 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	6.18	0.0565	0.0029	0.86	0.00088
Motor Vehicles Fugitive (onsite)	--	--	9.9	0.99	--	--
ONSITE CONSTRUCTION TOTAL	**60.04**	**13.58**	**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**	**17.28**	**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 2010b):

- **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% 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% 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% 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 2010b).

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)	884	63.36	50	589.6	18.2
Each CTG Total Commissioning (ton)	16.8	1.0	1.0	8.7	0.36

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

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% O2 for any 1-hour period;
- PM10 emissions at 3.0 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 and annually averaging 0.25 gr/100 scf (BAAQMD 2010b);
- 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-15**, BAAQMD 2010b).

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	0.612	2.5	2.14	1.35
Each CTG (during hour with startup)	18.5	1.7	2.5	18.1	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); PDOC Table 2 and Table 3 and **AQ-17**, **AQ-18** (BAAQMD 2010b).

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% 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	60	51.4	32.4
Total Four CTGs (steady state)	422.4	58.8	240	205.4	129.6
Total Four CTGs (startups)	835.2	62.4	90	816.2	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**	**241.4**	**1,171.5**	**178.3**

Source: PDOC Table 11 and Table 12 and **AQ-19** (BAAQMD 2010b).

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	21.13	29.98	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**	**21.1**	**30.1**	**2.9**

Source: PDOC Table 10 and **AQ-20** (BAAQMD 2010b).
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%, 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%, 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	2.55
Total Four CTGs Expected (startups)	10.4	0.8	1.1	10.2	0.4
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**	**2.96**

Source: Response to DR set 1C Table 5.1B-3R (CH2M 2010b); PDOC **AQ-20** with CTGs at 300 startups with a capacity factor of 16% or 1,400 hours annually.

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% of all comparable peaking facilities operate with an annual capacity factor of less than 16% 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 BAAQMD conducted a dispersion modeling impact assessment in preparation of the Preliminary Determination of Compliance (PDOC) (BAAQMD 2010b). The worst-case results of the applicant’s and BAAQMD’s analyses are shown in this Staff Assessment.

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, unless specifically noted. 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 3-year average concentration of the eighth highest 1-hour NO_2 concentrations in each year, which would be comparable to 3-year average of the 98th percentile value; guidance on conducting a more-refined analysis is being developed by air management agencies.[2] 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 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**

[2] Relevant NO_2 modeling guidelines include options from SJVAPCD in draft guidelines for use of AERMOD and OLM, dated 8/19/2010. 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 revise this assessment 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.

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 Table **AQ-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	129.3	105.7	234.9	339	69
	1 hr Federal		73.0		188	
	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: AFC Table 5.1-26 (MEP 2009a) with Independent Staff Assessment for NO_2.
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 fire water pump engine would cause a highest 1-hour NO_2 modeled impact of 265 µg/m^3. 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.

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 used for a full hour at the proposed ARB Tier 3 emission rate. If use 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 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 requiring installation of an engine certified to emit no more than 0.74 pounds per hour NOx (or compliant with ARB Tier 4 standards), which would be a level that would not be likely to cause a new violation of the federal 1-hour NO_2 standard, as in **AQ-SC10**. Additional restrictions of simultaneous non-emergency use of the engine with the remainder of the power plant are recommended in **AQ-SC9**.

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.

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 recommends that this limit be adopted as it is reflected in the Bay Area Air Quality Management District's determination of compliance (BAAQMD 2010b).

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 recommends that no more than two of the four CTGs undergo commissioning simultaneously. 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 recommends limiting commissioning to no more than two of the four CTGs simultaneously (highest 1-hour NO_2 modeled impact of 155 µg/m^3) as in **AQ-SC9**.

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 PDOC 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 PDOC would require MEP to achieve emission levels lower than those originally proposed in the AFC, which reduces the BAAQMD requirements. However, according to public records, MEP owns or controls offsets at the original levels that exceed the reduced 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	21.13	29.98	2.87
Diesel Fire Water Pump Engine	0.3	0.02	0.02	0.1	< 0.01
MEP Potential to Emit	**46.0**	**5.62**	**21.1**	**30.1**	**2.9**
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**	**---**	**2.96**
Fully Offset?	**Yes**	**Yes**	**Yes**	**---**	**Yes**

Source: Independent Staff Assessment; Condition **AQ-20** (BAAQMD 2010b); 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. Applying this ratio to the BAAQMD-required offset of 52.44 tons per year results in an effective mitigation 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), approved by the Energy Commission in August 2003, for a site 1.9 miles (3.0 kilometers) northeast of MEP that 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.

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. Air quality management agencies address this growth through regional air quality management plans, noted above.
- 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.
- Byron Power Company, Ridgewood Power at 4901 Bruns Road (Facility 10437), 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 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 appears to under-predict PM2.5 impacts by adjusting the emission rates of the proposed cooling tower at EAEC

(Response to DR13, CH2M 2009f). To compensate for the under-prediction of cooling tower PM2.5 by the MEP applicant, 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.

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	158.2	105.7	263.8	339	78
	1 hr Federal	119.1	73.0	**192.0**	188	**102**
	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), 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, and the ambient ratio method (ARM) is applied for annual NO_2, using national default 0.75 ratio.
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 EAEC sources. Adjacent to EAEC, the proposed MEP would contribute less than 7 µg/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 staff expects a Final Determination of Compliance (FDOC) will be released sometime before December 2010. Compliance with all District Rules and Regulations was demonstrated to the BAAQMD's satisfaction in the PDOC, and the PDOC conditions are presented in the proposed Conditions of Certification of this Staff Assessment.

FEDERAL

40 CFR 51, Nonattainment New Source Review. The PDOC 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 2010b).

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 PDOC (BAAQMD 2010b) and the Energy Commission staff's Conditions of Certification enable staff's affirmative finding.

LOCAL

The Preliminary Determination of Compliance (BAAQMD 2010b) summarizes how the proposed MEP project would comply with BAAQMD requirements. Staff expects the BAAQMD to issue a Final Determination of Compliance sometime before December 2010.

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.

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 conduct initial commissioning on no more than two CTGs of the four CTGs simultaneously.
- Staff recommends Condition of Certification **AQ-SC10** to ensure that the fire pump engine meets certain aggressive air quality-based emission limits and to ensure planned use of the fire pump engine is limited to no more than 30 minutes per test 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 owner/operator 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 2.96 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 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 surrender PM10 and/or SOx ERCs from the northern region of the San Joaquin Valley Air Pollution Control District in the amount and seasons 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 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 no more than two combustion turbines will 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 by the Air Resources Board to achieve an air quality-based emission

limit of 0.74 pounds per hour of nitrogen oxides (NOx) emissions or certified as meeting ARB Tier 4 or Interim Tier 4 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 lasting more than 30 minutes shall occur only during times when the combustion turbines are not operational.

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 2010b). This Staff Assessment reflects the BAAQMD Preliminary Determination of Compliance conditions, from August 2010. These conditions may be modified when the Final Determination of Compliance is released.

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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 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 owner/operator 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 owner/operator 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 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). (Basis: BACT, Regulation 2, Rule 2, Section 409)

NO_x (as NO_2):	3536 pounds per calendar day	204 pounds per hour
CO:	2358 pounds per calendar day	180 pounds per hour
POC (as CH_4):	254 pounds per calendar day	
PM_{10}:	200 pounds per calendar day	

SO_2: 73 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, the Owner/Operator shall conduct District and CEC approved source tests 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 Owner/Operator 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 Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CEC CPM comments into the test plan. The Owner/Operator shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. The owner/operator 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 owner/operator 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 owner/operator 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: BACT)

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 owner/operator 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: 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 owner/operator 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: 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-15 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 4,225 hours per year (excluding operations necessary for maintenance, ~~tuning,~~ testing, startup and shutdown). (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 owner/operator 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 owner/operator 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)

h) Particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.5 pounds per hour. (Basis: BACT for PM_{10})

i) Total particulate matter mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.5 pounds per hour.
(Basis: 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-18 The owner/operator 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	18.1	2.9
POC (as CH4)	1.1	1.7	0.2

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

AQ-19 The owner/operator 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) 1129.7 pounds of NO_x (as NO_2) per day (Basis: Cumulative Increase)

(b) 1171.5 pounds of CO per day (Basis: Cumulative Increase)

(c) 120.82 pounds of POC (as CH_4) per day (Basis: Cumulative Increase)

(d) 241.44 pounds of PM_{10} per day (Basis: Cumulative Increase)

(e) 178.26 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 owner/operator 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) 29.98 tons of CO per year (Basis: Cumulative Increase)

(c) 5.90 tons of POC (as CH_4) per year (Basis: Cumulative Increase)

(d) 21.13 tons of PM_{10} per year (Basis: Cumulative Increase)

(e) 2.87 tons of SO_2 per year (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-21 The owner/operator 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 owner/operator 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 owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The owner/operator 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 owner/operator 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 owner/operator 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-17**(h), **AQ-17**(i), **AQ-19**(c), **AQ-19**(d), **AQ-19**(e), **AQ-20**(c), **AQ-20**(d), **AQ-20**(e), the owner/operator 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 owner/operator 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 owner/operator 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 owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, and Specified PAHs. The owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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), **AQ-17**(h), and **AQ-17**(i) 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 owner/operator 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 owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (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 owner/operator 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 owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator 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 Owner/Operator shall measure the contribution of condensable PM (back half) to any measurement of the total particulate matter or PM_{10} emissions. However, the Owner/Operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator must utilize air dispersion modeling to determine the impact (in $\mu g/m^3$) 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 owner/operator 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 owner/operator shall test for (as a minimum) SO_2, SO_3, and H_2SO_4. The owner/operator 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 owner/operator 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 owner/operator shall ensure that the stack height of emission points P-1, P-2, P-3 and P-4 is 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 Owner/Operator 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 Owner/Operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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 owner/operator 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, heat recovery steam generators, steam turbine, 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

Testimony of Brewster Birdsall, P.E., QEP

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:

- 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

[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.

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

[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).

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 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

[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.

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 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*

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

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 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.

[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.

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	1,141
Onsite construction equipment, gasoline	271
Onsite construction motor vehicles	4
Offsite motor vehicle use	419
Construction Total	1,835

Source: AFC Appendix 5.1A (MEP 2009a).
Notes:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. The vast majority of the CO2E emissions from construction sources, over 99%, is 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	57
Worker Commutes (Off-Site)	86
Material Deliveries (Off-Site)	10
Equipment Leaks (SF6)	2
Total Project GHG Emissions, excluding Off-Site Emissions (MTCO2E/yr)	**432,907**
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 2010b).
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 2010b).

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 2010b). 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.

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

[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.

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 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%

[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.

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.

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.

[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.

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 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

[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.

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).

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

Testimony of Sara Keeler

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; final burrowing owl survey results are pending.

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 would result in direct mortality to California tiger salamanders and California red-legged frogs within the disturbance area. These impacts would be minimized through 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) and the state Endangered Species Act (CESA), and the feasibility of mitigation for this project is still uncertain. A USACE Nationwide #12 permit is required to comply with the Clean Water Act. A Biological Opinion (BO) with Incidental Take Statement from the U.S. Fish and Wildlife Service (USFWS) is required to comply with the federal ESA, and the applicant has not provided adequate information for the USACE to complete formal consultation with the USFWS. In addition, the applicant is still working with the California Department of Fish and Game (CDFG) and the Energy Commission staff to identify appropriate mitigation for project impacts.

Staff will continue to work with the applicant, CDFG, and USFWS to resolve any outstanding information needs. The following information is needed from the applicant so that staff is able to complete this analysis:

- Survey Results: The applicant needs to submit final burrowing owl surveys results, before staff can complete the impact analysis and mitigation requirements associated with this species.
- Adequate information provided to USFWS to complete formal consultation: The applicant needs to address comments provided by USFWS (September 29, 2010).

These comments include the need for further details delineating permanent versus temporary impacts, more discussion of construction impacts and aquatic habitat impacts, and a complete compensation and mitigation plan.

- Consultation with the USFWS Migratory Bird Office (MBO): The applicant must consult with the USFWS MBO to determine whether project construction would affect nesting golden eagles, and, if this potential exists, appropriate measures to avoid this impact.
- Streamed Alteration Notification: If the alternative water supply pipeline route is selected, the applicant would need to prepare a draft Streambed Alteration Notification and submit the notification to the CDFG. Energy Commission staff would use CDFG's comments to complete analysis of impacts and mitigation requirements for the alternative water supply pipeline.
- Compensatory Mitigation: Details of a feasible compensation plan for the Mariposa Energy Project need to be finalized in coordination with the Energy Commission staff, CDFG, and USFWS.

The following information is pending from agency personnel:

- Streambed Alteration Notification: The applicant submitted a draft Streambed Alternation Notification for the proposed project. The CDFG will be providing comments on this notification, which Energy Commission Staff will use to complete the impact analysis and mitigation requirements for state waters.

Modifications to the impact analysis, additional conditions of certification, and modifications to currently proposed conditions of certification are likely based on further consultation with agency personnel and information provided after publication of this Staff Assessment (SA). Without the information described above, staff is unable to conclude whether impacts from this project would be mitigated below a level of significance.

INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's 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),

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 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	Designates certain species as fully protected and prohibits take of

Applicable Law	Description
and Game Code, sections 3511, 4700, 5050, and 5515)	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 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 4-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 address the effects of the project including 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, or along an agricultural road. This is not sensitive habitat, and impacts would be mitigated with the rest of the Mariposa Energy Project impacts. Therefore, the segment of the water supply pipeline within Contra Costa County is not subject to the ECCCHCP/NCCP (Hinojosa, pers. comm.).

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 west.

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	USACE

Feature	Acreage	Description	Jurisdiction[1,2] (Federal/State)
		the National Wetland Inventory Map.	
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
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 west; blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE
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 (D-1a)	0.006	Weakly expressed drainage swale characterized by 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.	USACE
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

Feature	Acreage	Description	Jurisdiction[1,2] (Federal/State)
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 (*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.	USACE
Wetlands/Waters Along the Alternate Water Supply Pipeline[2]			
Canal 70	0.046	Constructed and routinely maintained irrigation canal.	USACE/?
Canal W1D	0.309	Large excavated diversion canal off of the Old River, routinely maintained and devoid of vegetation.	USACE/?
Drainage Ditch (Ditch-2)	0.006	Small drainage channel, approximately 3 feet wide, filled with annual grasses (*Lolium* spp.) Flows north under Kelso Road through a 14-inch diameter cement culvert.	USACE/?
Drainage Ditch (Ditch-3)	0.050	Agricultural drainage ditch characterized by dense patch of giant reed (*Arundo donax*) and patches of Himalayan blackberry (*Rubus discolor*). Flows north through a 24-inch diameter culvert under Kelso Road.	USACE/?
Drainage Ditch (Ditch-4)	0.036	Excavated agricultural drainage ditch.	USACE/?
Mt. House Creek	0.184	Mountain House Creek – channel within the project study area is entirely within existing culverts. Adjacent channel is characterized by emergent vegetation such as *Typha* spp.	USACE/?
Seasonal Wetland (SWL-3)	0.247	Seasonal wetland characterized by dense cattail (*Typha* spp.) along agricultural drainage ditch. Flows north through 24-inch diameter culvert under Kelso Road.	USACE/?

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.
2 – Features within the alternate water supply route have not been evaluated for state jurisdiction.

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). There is a fourth seasonal wetland (SWL-3) located along the alternate water supply pipeline route that is also considered 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.

Three additional ditches (Ditch-2, Ditch-3, and Ditch-4) are located along the alternate water supply pipeline route. One ditch is characterized as a small drainage channel which flows under Kelso Road via a culvert and is vegetated with annual grasses. The other two ditches are agricultural drainages. These features were all determined to be potentially USACE-jurisdictional features (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination).

Canals and Creeks

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. BBID Canal 70 is a constructed and maintained irrigation canal located adjacent to the alternate water supply pipeline route. Canal W1D, located adjacent to the alternate water supply pipeline route, is a large diversion canal that is routinely maintained and devoid of vegetation. Mountain House Creek passes through the alternate water supply pipeline route entirely within existing culverts. All four are considered potentially USACE-jurisdictional features (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination).

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, SCE, CSC	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	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	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 (forging)
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	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 2010, 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 Endangered)

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, Federal 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 needs to provide further information, described in the impact analysis below, in order for USACE to complete Section 7 consultation with USFWS. Also, the applicant is still developing a compensatory mitigation plan, which needs to be approved by USFWS, CDFG, and the Energy Commission. Modifications to the staff’s impact analysis and compensatory mitigation ratios and acreages, as well as additional conditions of certification and modifications to currently proposed conditions of certification are likely based on further consultation with agency personnel and additional information expected from the applicant, CDFG, and USFWS, after publication of this Staff Assessment (SA).

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 (Grefsrud pers. comm.).

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, 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 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 (Grefsrud, pers. comm.). Because it is unclear whether the proposed conservation bank would be finalized within the required

timeframe, the applicant must provide a feasible alternative mitigation and compensation plan that is acceptable to the CDFG, USFWS, and the California Energy Commission, such as land acquisition, enhancement, and long-term management endowment.

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 long-term land management (see **Biological Resources Table 5)**. Financial assurance can be provided in the form of an irrevocable letter of credit, a pledged savings account, or another form of security ("Security") approved by the CDFG, USFWS, and Energy Commission. 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. 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 and provides the option to either purchase credits in approved mitigation banks or to mitigate through acquisition, enhancement, and a long-term management endowment. The applicant would need to provide a feasible compensation and mitigation plan, which may include a plan for acquisition, one-time enhancement, and long-term acquisition. Energy Commission staff will revise **BIO-16** based on a feasible, agency-approved mitigation plan.

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 (Grefsrud, pers. comm.).
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**	**0.54**
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 (Jenson, pers. comm.). With implementation of conditions of certification **BIO-16** and **BIO-9,** permanent impacts to this wetland would be minimized.

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, with the exception of D-2 and Canal 45, 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.

For impacts to state waters (D-2, Canal 45), implementation of the measures described above would help avoid and minimize impacts. The applicant submitted a *Notification of Lake Streambed Alteration* to the CDFG. CDFG will be providing comments on this notification. Whether these impacts would be mitigated below a level of significance, and what additional measures will be added to the conditions described above, will be determined after receipt and review of these comments.

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. 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; implementation of **BIO-9**, as well as **BIO-16** and **BIO-17** would minimize impacts to federally listed branchiopods. However, the USFWS has requested further information from the applicant before they can complete consultation with the USACE for federally listed species. This request includes questions about potential indirect impacts to seasonal wetlands from construction, construction during the wet season, and mitigation for impacts to federally listed branchiopods. Until complete information is provided, staff cannot determine whether impacts would be reduced below a level of significance.

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 could 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.

The USFWS has requested further information from the applicant before they can complete consultation with the USACE for federally listed species, including more details on permanent impacts versus temporary impacts. In addition, the applicant needs to provide a feasible compensation and mitigation plan to the CDFG, USFWS, and Energy Commission, which is necessary to complete this analysis. Until complete information is provided, staff cannot determine whether impacts would be reduced below a level of significance.

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 and potential breeding

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.

The USFWS has requested further information from the applicant before they can complete consultation with the USACE for federally listed species. This includes more information regarding impacts to aquatic habitat, and further discussion of how impacts were categorized as temporary versus permanent. In addition, the applicant needs to provide a feasible compensation and mitigation plan to the CDFG, USFWS, and Energy Commission, which is necessary to complete this analysis. Until complete information is provided, staff cannot determine whether impacts would be reduced below a level of significance.

California Tiger Salamander (Federally Threatened, State Endangered)

There are multiple California tiger salamander breeding sites in close proximity to the proposed project, including a site within approximately 100 feet of the proposed access road and water supply pipeline disturbance area (CH2M 2010i). In addition, the proposed water supply pipeline route crosses drainages that may provide suitable breeding, 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.

The USFWS has requested further information from the applicant before they can complete consultation with the USACE for federally listed species. This includes more information regarding impacts to aquatic habitat, and further discussion of how impacts were categorized as temporary versus permanent. In addition, the applicant needs to provide a feasible compensation and mitigation plan to the CDFG, USFWS, and Energy Commission, which is necessary to complete this analysis. Until complete information is provided, staff cannot determine whether impacts would be reduced below a level of significance.

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. Construction of this project would result in disturbance of suitable aquatic habitat present along the water supply pipeline route. 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.). Protocol-level survey reports have yet to be finalized, so the total number of burrowing owls within the disturbance area is still unknown. The applicant will need to provide this information before this analysis can be completed.

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 (Grefsrud, pers. comm.).

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). In order to fully mitigate impacts, a project's impacts and mitigation must not result in a net loss to this species. Therefore, the following compensatory mitigation would be recommended for this species:

- <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. However, the applicant needs to provide further information to the CDFG, USFWS, and Energy Commission (such as a feasible compensation and mitigation plan and final survey results) which is necessary to complete this analysis. Until complete information is provided, staff cannot determine whether impacts would be reduced 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 minimize impacts to this species. However, the applicant needs to provide further

information to the CDFG, USFWS, and Energy Commission (such as a feasible compensation and mitigation plan) which is necessary to complete this analysis. Until complete information is provided, staff cannot determine whether impacts would be reduced 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 (Beeler, pers. comm.). The applicant has indicated that there is no golden eagle nest habitat in the project area (MEP2009a), but this assessment does not encompass the 2-mile area of interest to the USFWS MBO. Staff concluded that project construction activities could potentially injure or disturb golden eagles if nests were established sufficiently close to project boundaries to be affected by construction activities.

The applicant would need to consult with the USFWS MBO to determine the appropriate buffer and mitigation measures to reduce impacts if golden eagles are nesting within the buffer. Staff proposes Condition of Certification **BIO-19** (Golden Eagle Inventory and Monitoring); however, this condition may change based on the guidance the Energy Commission staff and the applicant receive from the USFWS MBO. **BIO-19** directs the project owner to conduct golden eagle nest surveys in accordance with USFWS guidelines to verify the status of golden eagle nesting territories within 2 miles of the project boundaries. If active nests are detected, **BIO-19** recommends monitoring guidelines, performance standards, and adaptive management measures to avoid adverse impacts to golden eagles from project construction. Implementation of **BIO-19** would reduce potential impacts of project construction on nesting golden eagles. Whether these impacts would be reduced below a level of significance cannot be determined until consultation with the USFWS MBO is completed.

In addition to construction impacts, this project contributes 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, and therefore implementation of this condition would minimize impacts to this species. However, until the applicant provides a feasible compensation and mitigation plan, staff cannot determine if this impact would be reduced below a level of significance.

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 minimize impacts from loss of habitat for these species. However, until the applicant provides a feasible compensation and mitigation plan, staff cannot determine if this impact would be reduced 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.

Alternate Water Supply Pipeline Route

After both the AFC (MEP 2009a) and wetland delineation report (CH2M 2009e) were submitted, an alternative water supply pipeline route was identified. This alternative route would extend from the proposed project site northeast to Kelso Road, east to the Byron Highway, southeast along Byron Highway to Wicklund Road, north along Wicklund Road to the Mountain House Waste Water Treatment Plant (CH2M 2009g). The survey area for this route is approximately 75 acres, and this route would affect

approximately 0.88 acres of wetland and water features. These features include drainage ditches, seasonal wetlands, a creek, and canals, and include state waters, USACE potentially-jurisdictional waters, and potential habitat for special-status species. Because of this, these impacts would be considered significant. Implementation of staff's proposed conditions of certification **BIO-7**, which minimizes habitat disturbance and off-road access, and **BIO-17**, which includes provisions to protect water quality and wetlands, would minimize impacts to these resources. The applicant currently does not propose this alternative, and has not prepared a Streambed Alteration Notification for this alternative. If this alternative is selected, the applicant would need to submit a draft Streambed Alternation Notification to the CDFG for comment. Energy Commission staff would complete impacts, significance, and mitigation analysis based on CDFG's comments.

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 (Coltrane, pers. comm.), and discussed these topics with other Energy Commission Staff with experience with both thermals and airport issues (Walters, pers. comm.) and with CDFG personnel (Waitman, 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 (Coltrane, pers. comm.). 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.

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 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 wet-season monitoring (**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, this impact would be reduced 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 recommended compensatory mitigation to minimize impacts to these species. More information is needed, including a feasible compensation and mitigation plan, before staff can determine whether this mitigation would reduce the proposed project's contribution to cumulative effects below a cumulatively considerable level.

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,

Applicable LORS	In Compliance	Discussion
		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 (e.g., 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 has provided comments outlining what further analysis and information is needed before the UFWS can provide a Biological Opinion.
Eagle Act (Title 50, Code of Federal Regulations, sections 22.26 and 22.27) and Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Undetermined	Condition of Certification **BIO-16** requires protection of compensation habitat for California tiger salamander, California red-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. The applicant needs to consult with the USFWS MBO to evaluate the potential for construction of the proposed project to affect nesting golden eagles. This consultation must be completed before staff can determine compliance with this act.
Migratory Bird Treaty Act (Title 16, United	Yes	Condition of Certification **BIO-8** provides for pre-construction nest surveys, protective

Applicable LORS	In Compliance	Discussion
States Code, sections 703–711)		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.)	Undetermined	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 minimize impacts to these species, but more information is needed before staff can determine whether impacts would be reduced below a level of significance.
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 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

Applicable LORS	In Compliance	Discussion
		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.)	No	Condition of Certification **BIO-17** includes measures to minimize, avoid, and compensate for impacts to jurisdictional waters of the State. The applicant has provided a Streambed Alteration Notification to CDFG for comments. Energy Commission staff will use these comments to finalize staff's impact analysis and proposed Condition of Certification **BIO-17**.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	Undetermined	Implementation of Staff's proposed conditions of certification **BIO-1** through **BIO-19** would serve to minimize the projects impacts to biological resources. More information is needed before staff can determine if these impacts would be reduced below a level of significance as defined in 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. Implementation of staff's proposed conditions of certification would minimize impacts to special-status species and sensitive resources. The USACE permit is still pending, as is the Biological Opinion and Incidental Take Statement. The applicant has not yet provided sufficient information about impacts to the USFWS for the USFWS to complete Section 7 consultation with USACE. Also, the applicant is still working with the USFWS, CDFG, and the Energy Commission to identify appropriate mitigation for impacts to special-status species, including details of a compensatory mitigation plan.

Before staff can complete the analysis of impacts and mitigation requirements, the applicant must provide the following information:

- Survey Results: The applicant needs to submit final burrowing owl surveys results, before staff can complete the impact analysis and mitigation requirements associated with this species.
- Adequate information provided to USFWS to complete formal consultation: The applicant needs to address comment provided by USFWS (September 29, 2010). These comments include the need for further details delineating permanent versus temporary impacts, more discussion of construction impacts and aquatic habitat impacts, and a complete compensation and mitigation plan.
- Consultation with the USFWS Migratory Bird Office (MBO): The applicant must consult with the USFWS MBO to determine whether project construction would affect nesting golden eagles, and, if this potential exists, appropriate measures to avoid this impact.
- Streamed Alteration Notification: If the alternative water supply pipeline route is selected, the applicant would need to prepare a draft Streambed Alteration Notification and submit the notification to the CDFG. Energy Commission staff would use CDFG's comments to complete analysis of impacts and mitigation requirements for the alternative water supply pipeline.
- Compensatory Mitigation: Details of a feasible compensation plan for the Mariposa Energy Project need to be finalized in coordination with the California Energy Commission, CDFG, and USFWS.

The following information is pending from agency personnel:

- Streambed Alteration Notification: The applicant submitted a draft Streambed Alternation Notification for the proposed project. The CDFG will be providing comments on this notification, which Energy Commission Staff will use to complete the impact analysis and mitigation requirements for state waters.

Modifications to the impact analysis, additional conditions of certification, and modifications to currently proposed conditions of certification are likely based on further consultation with agency personnel and information provided after publication of this Staff Assessment. Without the information described above, staff is unable to conclude whether impacts from this project would be mitigated below a level of significance.

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;
4. Be in possession of current Scientific Collecting Permit from the California Department of Fish and Game.

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 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.

5. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;

6. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), to be submitted by the project owner;
7. Be available to 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;
8. Clearly mark sensitive biological resource areas, if present, and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
9. 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;
10. Notify the project owner and the CPM of any non-compliance with any biological resources conditions of certification;
11. Respond directly to inquiries of the CPM regarding biological resource issues;
12. 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
13. 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 a current Scientific Collecting Permit from the California Department of Fish and Game.

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, of 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 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, in consultation with other appropriate agencies, 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 MBO 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 CDFG- and USFWS-approved site. Only biologists with the appropriate permits 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 temporary reinforced with pvc pipe (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 than 1/2 foot deep 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 of the project linears shall be scheduled to occur during the dry summer months between April 15 and October 15.

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: Road surveys will be required during wet-season construction if there will be construction traffic after dusk or before dawn. Biological monitors shall walk along either side of Bruns Road from Canal 45 to the project site access road, and along the access road, to detect and move any California tiger salamander or California red-legged frogs. This shall be completed prior to the expected construction traffic arrival time before dawn, and prior to departure after dusk.

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 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-, CPM-, and 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 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 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 kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed. Potential, Known, and/or Occupied kit fox dens shall not be destroyed unless the applicant 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 kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If 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 kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a 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 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 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 kit fox is discovered, the procedures under item “m” below must be followed.

e. 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 kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a 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 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 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 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 kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in 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 kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; 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 and CDFG should be contacted for advice.

m. The CPM, USFWS, and CDFG will be notified immediately 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 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 The project owner shall survey for Swainson's hawk within 1/2 mile of construction activities. If active nests are found within 1/2 mile of a project disturbance area, minimization measures consistent with the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFG 1994), such as timing restrictions and protective buffers, shall be included in the BRMIMP and implemented.

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).

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, observations, and, if required, updates to the BRMIMP based upon findings.

COMPENSATORY MITIGATION FOR IMPACTS TO SPECIAL-STATUS WILDLIFE SPECIES AND WETLANDS

BIO-16 To fully 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	1:1	1.1:1
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	0.54
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 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, in consultation with CDFG and USFWS, for each species;

   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, in consultation with 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, in consultation with 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, in consultation with the USFWS and CDFG, contain potential California tiger salamander breeding habitat and be within 1 mile (with a barrier-free connection qualifying as dispersal habitat) of known 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, in consultation with the 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, in consultation with CDFG and the 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, in consultation with CDFG and the 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, in consultation with CDFG and the 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, in consultation with 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). If an approved non-profit organization holds title to the compensation lands, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If an approved non-profit holds a 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. 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 in consultation with 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 long-term maintenance and management fee in the amount determined through the PAR or PAR-like analysis conducted for the compensation lands. At the time of acquisition, long-term maintenance and management fees will be determined through a PAR or PAR-like analysis. The project owner must cover the full amount of the fee for 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, in consultation with 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 and the CPM, in consultation with 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 long-term operation, management, and protection 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 in consultation with 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, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG and the 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 (Grefsrud, pers. comm.); 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 Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with 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 actual costs for acquisition and administrative costs and fees are less than the Security described in **BIO-16 Table 3**, the excess money shall be returned to the project owner. Money deposited for the initial protection and improvement of the compensation lands shall not 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, in consultation with 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, in consultation with 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, in consultation with 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 within 180 days of the land or easement purchase, as determined by the date on the title. The CPM shall review and approve the plan, in consultation with CDFG and the USFWS.

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 CDFG for review and comment and the CPM for approval 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 in consultation with CDFG and 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.

GOLDEN EAGLE ASSESSMENT, INVENTORY, AND MONITORING PLAN

BIO-19 The project owner shall implement the following measures to avoid or minimize project-related construction impacts to golden eagles.

1. Inventory. Prior to construction, the project owner will conduct an inventory to determine if golden eagle territories occur within 2 miles of the construction boundaries. Survey methods for the inventory shall be as described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS.
2. Inventory Data: Data collected during the inventory shall include at least the following: territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful); nest location and elevation; age class of golden eagles observed; nesting chronology; number of young at each visit; digital photographs; and substrate upon which nest is placed.
3. Determination of Unoccupied Territory Status: A nesting territory or inventoried habitat shall be considered unoccupied by golden eagles ONLY after completing at least 2 full surveys in a single breeding season. In circumstances where ground observation occurs rather than aerial surveys, at least 2 ground observation periods lasting at least 4 hours or more are necessary to designate an inventoried habitat or territory as unoccupied as long as all potential nest sites and alternate nests are visible and monitored. These observation periods shall be at least 30 days apart for an inventory, and at least 30 days apart for monitoring of known territories.
4. Monitoring and Adaptive Management Plan: If an occupied nest[1] is detected within 2 mile of the project boundaries, the project owner shall prepare and implement a Golden Eagle Monitoring and Management Plan

[1] An occupied nest is one used for breeding by a pair of golden eagles in the current year. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current years' mutes (whitewash) also indicate site occupancy. Additionally, all breeding sites within a breeding territory are deemed occupied while raptors are demonstrating pair bonding activities and developing an affinity to a given area. If this culminates in an individual nest being selected for use by a breeding pair, then the other nests in the nesting territory will no longer be considered occupied for the current breeding season. A nest site is considered occupied throughout the periods of initial courtship and pair - bonding, egg laying, incubation, brooding, fledging, and post - fledging dependency of the young.

for the duration of construction to ensure that project construction activities do not result in injury or disturbance to golden eagles. The monitoring methods shall be consistent with those described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS. The Monitoring and Management Plan shall be prepared in consultation with the USFWS. Triggers for adaptive management shall include any evidence of project-related disturbance to nesting golden eagles, including but not limited to: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The Monitoring and Management Plan shall include a description of adaptive management actions, which shall include, but not be limited to, cessation of construction activities that are deemed by the Designated Biologist to be the source of golden eagle disturbance.

Verification: No less than 30 days from completion of the golden eagle inventory the project owner shall submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory.

If no occupied nests are detected during the inventory and a Plan is not warranted, a letter from USFWS MBO documenting this determination shall be submitted to the CPM no less than 10 days prior to the start of any pre-construction site mobilization.

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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CULTURAL RESOURCES

Testimony of Sarah M. Allred

SUMMARY OF CONCLUSIONS

A cultural resources inventory was conducted for the Mariposa Energy Project (MEP), including: literature/background research of the California Historic Resources Information System (CHRIS); consultation with the Native American Heritage Commission, local Native American representatives, and local historic preservation interest groups; an archaeological and built-environment field survey of the project area of analysis; and a geoarchaeological assessment of buried site potential within the project area of analysis. Staff identified no significant cultural resources that 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. Therefore, no direct, indirect, or cumulative impacts are anticipated for the MEP. Conditions of Certification **CUL-1** through **CUL-8** would address any potential inadvertent archaeological discoveries during the construction and/or operation of the MEP.

INTRODUCTION

This cultural resources assessment discusses the potential for the Mariposa Energy Project (MEP) to affect cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

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

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

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state historic preservation law, cultural resources must be at least 50 years old to have the potential to be of sufficient historical importance to

merit consideration of eligibility for listing in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing in the CRHR.

For the Mariposa Energy Project, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the project's potential impacts to significant cultural resources, using criteria from the California Environmental Quality Act (CEQA).

If cultural resources are identified, staff determines which are historically significant (defined as eligible for the CRHR) and whether the project would have a significant impact on those that are CRHR-eligible. Staff's primary concern is to ensure that all potentially CRHR-eligible cultural resources are identified, that all potential impacts to those resources are accounted for and assessed, and that conditions of certification are established to ensure that all unavoidable significant impacts are mitigated to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Projects licensed by the Energy Commission are reviewed to ensure their compliance with all applicable laws (Cultural Resource Table 1). For this project, in which there is no federal involvement,[1] the applicable laws are primarily state laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures the project's compliance with local laws, ordinances, regulations, standards, plans, and policies.

CULTURAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
State	
Public Resources Code 5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance (Alameda County 2000).
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner (Contra Costa County 2005).
Local	
County of Alameda – East County Area Plan	States a general goal to protect cultural resources from development. Policies include identifying and preserving significant archaeological and historical resources and requiring development to avoid cultural resources, or if avoidance is infeasible, to implement appropriate mitigation measures to offset impacts.

[1] Cultural resources in California are also protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431, et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

Applicable Law	Description
Contra Costa County General Plan	States a general goal to identify and preserve important archaeological and historical resources within the county. Policies include the preservation of significant archaeological and historic resources, the protection of buildings/structures that have historic value/visual merit, compatible design of any development surrounding areas of historic significance, and in the Southeast County area, applicants for land use permits to allow non-residential uses shall provide information to the County on the nature and extent of the archaeological resources that exist in the area. The County Planning Agency shall be responsible for determining the balance between the multiple use of the land with the protection of resources.

SETTING

Information provided regarding the setting of the proposed Mariposa Energy Project places it in its geographical and geological context and provides a description of current and past land uses with a focus on those factors most pertinent to identifying and understanding potential past human occupation and/or uses of the area.

REGIONAL SETTING

The proposed MEP area is located along the border between the physiographic provinces of the Central Valley to the east and the Mount Diablo area of the Coast Range to the west (Norris and Webb 1976). The project area is situated at an elevation of approximately 125 feet above mean sea level (amsl) within very gently rolling terrain on the leeward side of the Diablo Range just above the Central Valley floor. The Sacramento San Joaquin River Delta region lies to the north of the project area, and the San Francisco Bay area lies to the west on the windward side of the Diablo Range. The project site is located in an unincorporated area of northeastern Alameda County with portions of the project's linear facilities (water pipeline) extending into the adjacent southeastern Contra Costa County. The San Joaquin County line and the community of Mountain House lie just to the east of the project area (MEP 2009a, p. 5.6-11).

The climate of the project area is best characterized as a moderate Mediterranean climate with hot dry summers and mild winters. Most of the yearly precipitation falls between October and May with peak rainfall occurring in December and January. Due to the rain shadow effect (orographic lift) created by the Coast Range to the west, the project area is arid to semi-arid and only receives an average of about 12 inches of annual precipitation (MEP 2009a, p. 5.15-1). Intermittent and ephemeral drainages occur in the project area; however, since little surface runoff reaches the local drainages, there are no permanent or semi-permanent natural watercourses in or near the project area. Vegetation of the project area and vicinity consists mainly of non-native annual grasslands (MEP 2009a, pp.5.2-1–5.2-2), and the project area is treeless except for a few landscaping trees located on adjacent properties.

The project site and most of the surrounding vicinity is zoned for Large Parcel Agriculture by the Alameda East County Area Plan, and cattle grazing occurs on the majority of land within a 1-mile radius of the project site (MEP 2009a, p. 5.6-1). In addition to grazing, other current land uses and developments in the project area and vicinity include power generation, power transmission, natural gas compression, water

management facilities, the Bethany Reservoir State Recreation Area, and the Byron Airport. A buried Pacific Gas & Electric (PG&E) natural gas pipeline and remnants of a former wind turbine development, including concrete foundations, wood poles, and dismantled wind turbine housings, exist within portions of the project area. The closest structure to the project site is the Byron Power Cogeneration Plant, which occupies approximately 2 acres directly adjacent to the north side of the project site. An existing 1,100-foot-long graded gravel road provides access to the Byron Power Cogeneration Plant (MEP 2009a, p. 5.6-1).

PROJECT, SITE, AND VICINITY DESCRIPTION

Mariposa Energy, LLC (applicant), owned by Diamond Generating Corporation, a wholly owned subsidiary of Mitsubishi Corporation, filed an Application for Certification with the California Energy Commission (Energy Commission) to construct and operate a natural gas-fired, simple cycle peaking facility with a generating capacity of 200 megawatts. The project site would occupy a 10-acre area in the southeastern portion of a 158-acre parcel, known as the Lee Property (assessor parcel 099B-7050-001-10), in northeastern Alameda County. Portions of the project's linear facilities extend north into adjacent southeastern Contra Costa County. The project area is depicted on the U.S. Geological Survey (USGS) Clifton Court Forebay, California 7.5-minute series topographic quadrangle (northwest corner of Section 1, Township 2 South, Range 3 East). The project site is located just southeast of the intersection of Bruns Road and Kelso Road (MEP 2009a, p. 5.6-1).

Primary equipment for the generating facility would include four natural gas-fired combustion turbine generators and associated equipment within the 10-acre project site. Power would be transmitted to the grid through a proposed new 0.7-mile-long transmission line that would connect to the existing Kelso Substation, located north of the project site. A proposed 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 just northeast of the project site. Service and process water would be provided from a new connection to the Byron-Bethany Irrigation District (BBID) via a proposed new 1.8-mile long water pipeline, including a new pump station and turnout structure. All domestic wastewater would be routed to an onsite septic system and either discharged to an onsite leach field 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. In addition, the existing access road serving the adjacent 6.5-MW cogen facility would be improved from a 10-foot-wide gravel road to a 20-foot-wide asphalt paved road and extended to the plant entrance (MEP 2009a, p. 5.2-32).

Temporary construction facilities would include: a 5-acre worker parking and laydown area immediately adjacent to the east side of the MEP site; a one-acre parking and laydown area located at the BBID headquarters facility to serve water pipeline construction needs; and a 0.6-acre laydown area near the northern end of the transmission line route to serve transmission line construction needs (MEP 2009a, p. 2-1).

The topography of the proposed MEP site varies in elevation between 148.2 feet and 117.9 feet amsl (CH2M 2009f, Data Response 26-1). In order to begin constructing the site facility, cut and fill activities would be employed to establish a uniform finished grade of 125.5 feet amsl within the 10-acre MEP site area. In addition, further excavation would occur for the installation of some site facilities to a maximum depth of 6.5 feet below the finished grade. Thus, the amount of subsurface excavation within the 10-acre MEP site would range from 0.1 feet to a maximum of 28.7 feet below the current grade (CH2M 2009f, Data Response 26-1).

The new supports for the proposed overhead interconnection transmission line (gen-tie) would consist of eight steel monopoles, 85–95 feet tall. The diameter of the poles at the base would be approximately 25–30 inches, and the foundation footings would be 10 feet in diameter. The depth of excavation for the gen-tie foundation footings would be a maximum of four feet. No access roads, spur roads, or pull sites would be graded for the construction of the MEP gen-tie line. Construction vehicles would drive overland along the 100-foot wide construction corridor from the MEP site or Kelso Road to access the transmission line work areas (MEP 2009a, p.3-1; CH2M 2009f, Data Responses 33–37).

Project Area of Analysis

A project's potential to affect cultural resources is analyzed in terms of the maximum area of disturbance that would occur as a result of the project's construction and operation. Therefore, staff's project area of analysis for cultural resources includes all temporary and permanent construction areas and ultimate proposed rights-of-way established for the project. The vertical extent of potential project effects is also taken into consideration, including the depths of project excavation (for buried archaeological deposits), as well as the height of any permanent project facilities (which may affect the setting for built environment and/or ethnographic resources).

The inventory of cultural resources within what staff defines as the appropriate area for the analysis of a project's potential impacts is the first step in the assessment of whether the proposed project may cause a significant impact to an important cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to historical resources, referred to as the "project area of analysis", is usually defined as the area within and surrounding the project site and associated linear facility corridors. This area is sufficiently large to facilitate considerations of archaeological, ethnographic, and built-environment resources.

Staff's archaeological area of analysis for the MEP is, therefore, a composite geographic area that encompasses the following project construction and/or operation areas:

- The 10-acre area of the MEP site, including excavation depths ranging from 0.1 to 28.7 feet below existing grade;
- The 5-acre construction laydown/parking area adjacent to the MEP site (this area will remain at current grade and will not be excavated for the project);

- A 200-foot buffer around the perimeter of the MEP project site to accommodate construction of the project facility;
- A 0.7-mile long x 100-foot-wide transmission line corridor including a maximum excavation depth of 4 feet;
- A 0.6-acre laydown area for the transmission line, which is included within the 100-foot wide transmission line corridor;
- A 580-foot long x 50-foot-wide natural gas pipeline corridor, including a maximum excavation depth of 4.5 feet;
- A 1.8-mile long x 50-foot-wide water pipeline corridor, including a maximum excavation depth of 4 feet for the pipeline and a maximum of 6 feet deep for the associated pump station and turnout structure;
- A one-acre water pipeline parking and laydown area; and
- The gravel access road from Bruns Road to the project site, which would be subject to improvements (e.g., grading) as a part of the MEP.

Additionally, staff established a 0.5-mile radius around the project site and linear facilities as the area of analysis for the investigation of potential built-environment and/or ethnographic resources.

Environmental Setting

Because the prehistoric inhabitants of California were entirely dependent upon the natural resources available to them, their lifeways can only begin to be understood with reference to the land and climate in which they lived. Thus, knowledge of the project's environmental setting, as well as how the setting has changed over the span of human occupation, is essential to the understanding of prehistory. While some parts of the landscape have remained relatively stable over the span of human occupation in California (approximately 13,000 years), many other portions were either removed by erosion (mainly upland areas), or buried by the deposition of sediments (mainly lowland areas).

As described in the Geoarchaeological Assessment prepared for the MEP (CH2M 2009f, Attachment DR47-1), the landscape in eastern Alameda and Contra Costa Counties has been altered and shaped by a complex sequence of region-wide environmental changes, including sea level rise, climatic fluctuations, and repeated flooding, all contributing to the erosion of upland areas and deposition of lowland areas. Several geoarchaeological studies conducted in the eastern Diablo Range (Rosenthal and Meyer 2009) suggest that major episodes of alluvial deposition occurred in the area between 13,000 and 7500 cal[2] BC, 7500 and 2000 cal BC, and again after 500 cal AD, separated by prolonged periods of landform stability. Buried archaeological sites are,

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

therefore, confined to those portions of the landscape where sediments were deposited during the span of human occupation (i.e., during the latest Pleistocene and Holocene). Thus, the search for buried sites can generally be narrowed to Holocene-age depositional landforms, allowing the older portions of the landscape to be confidently excluded from consideration.

Prehistoric Background

The MEP area is located near the border between two distinct archaeological regions: the San Francisco Bay archaeological region, and the Delta subregion of the Central Valley archaeological region (Moratto 1984, p.228). The key archaeological sites with dated components that are critical to the interpretations of prehistory in both the San Francisco Bay area and the Sacramento-San Joaquin Delta area are more centrally located within each respective archaeological region, relative to where the MEP is located. Thus, given its location just above the valley floor at the eastern (leeward) base of the Diablo Range away from any major waterways, the MEP site is somewhat peripheral to both major archaeological regions, though it technically lies within the limits of the Central Valley Delta region.

According to Rosenthal, et al. (2007, p. 147), well-grounded chronologies for large portions of the Central Valley are still lacking, and few recent studies have sought to rectify past errors in interpretation or synthesize the body of archaeological information available for this region. Recognizing that the Central Valley archaeological record is biased by both sampling techniques and the natural processes of landscape evolution, Rosenthal, et al. (2007, pp.150–159) propose a simple classification system with which to explain culture change in the Central Valley, as follows: Paleo-Indian (11,550–8850 cal BC); Lower Archaic (8550–5550 cal BC); Middle Archaic (5550–550 cal BC); Upper Archaic (550 cal BC–cal AD 1100); and Emergent (cal AD 1100–Historic period). The following summary of Central Valley prehistory is derived from Rosenthal et al. (2007, pp.147–163).

Erosion and deposition have removed or buried most of the Late Pleistocene landscape in which the earliest evidence of human occupation in California might have been found. Currently, the earliest accepted evidence of human occupation within the Central Valley during the Paleo-Indian period comes from isolated finds of distinctive basally-thinned and fluted projectile points recovered from remnant features of the Pleistocene landscape at only three locations in the Central Valley.

Similarly, evidence from the Lower Archaic period within the valley is also represented by mostly isolated finds, including distinctive flaked stone artifacts, such as fluted or stemmed points and crescents. Given the occurrences of large heavily reworked projectile points in Lower Archaic sites, large game (artiodactyls) hunting is thought to be a focus of early archaic economies. Milling implements and evidence of plant processing are largely absent from Lower Archaic sites down in the valley; however, such remains have been found in Lower Archaic sites in the foothills, including abundant millingstone equipment and other indicators of a reliance on plant foods.

During the Middle Archaic, archaeological evidence suggests that there were two distinct settlement-subsistence adaptations occurring in central California, one in the

foothills and the other on the valley floor. Early in the Middle Archaic, cultural deposits are more abundant in the foothills, but rare down in the valley; however, in the latter part of the Middle Archaic (post-2250 cal BC), cultural deposits are well represented down in the southern Sacramento Valley, the Delta, and the northern San Joaquin Valley. Artifact assemblages of the foothill tradition almost exclusively include flaked and ground stone tools used for food procurement and processing, although a few bone and shell artifacts, beads, or ornaments have also been recovered. Valley tradition assemblages in the latter Middle Archaic contain an elaborate material culture, including diverse technological and dietary assemblages, reflecting the emergence of logistically organized subsistence practices and increasing residential stability along the river corridors of the Sacramento and San Joaquin Valleys. Extended residential settlement at these sites is indicated by refined and specialized tool assemblages and features, a wide range of nonutilitarian artifacts, abundant trade objects, and plant and animal remains indicative of year-round occupation. Mortars and pestles, fishing implements, and several other technologies common in later time periods first appear in the archaeological record of the northern San Joaquin Valley and southern Sacramento Valley during the Middle Archaic period. Faunal assemblages, including elk, deer, pronghorn, fish, rabbits and hares, water birds, raptors, and rodents, reflect a heavy reliance on marshes, riparian forests, and grasslands in the valley. Evidence also suggests that the exchange of commodities, such as obsidian and shell beads and ornaments, was widespread during the Middle Archaic.

The Upper Archaic archaeological record is better represented and understood than previous time periods. Many specialized technologies emerged during the Upper Archaic, including new types of bone tools and implements, as well as widespread manufactured goods, such as saucer and saddle-shaped Olivella beads, Haliotis ornaments, obsidian bifacial rough-outs, well-made ceremonial blades, and polished and ground stone plummets are common in regions surrounding the rivers and marshlands of the delta and southern San Joaquin Valley. Large mounded villages developed in the delta region of the lower Sacramento Valley beginning around 700 BC and contain extensive accumulations of habitation debris and features, including heaps of fire-affected rock, shallow hearths, rock-lined ovens, house floors, and flexed burials, all reflecting long-term residential occupation. In addition, people living in the valley during the Upper Archaic also remained important consumers of obsidian obtained from the east side of the Sierra (Bodie Hills, Casa Diablo, Coho), and the North Coast Ranges (Borax Lake), as well as sources in northeastern California (Tuscan, Medicine Lake).

During the Emergent Period, cultural traditions similar to those observed at the time of Euroamerican contact developed. The archaeological record for the Emergent Period is the most substantial and comprehensive available for any period, and the assemblages and adaptations represented are the most diverse. It is during the Emergent Period that many of the archaic technologies and cultural traditions disappear throughout the Central Valley. Notably, the dart and atlatl are replaced by the bow and arrow as the preferred hunting implement between cal AD 1000 and 1300. An increased variation in burial type and furnishings suggests a movement toward more complex social forms. Emergent Period economies appeared to be regionally variable; however, fishing and plant harvesting appears to have increased throughout the Central Valley. Large villages developed along rivers and streams, especially where fish weirs were

constructed. After about AD 1000, mortars and pestles appear to predominate. A shift in obsidian production occurred after about AD 1200, in which bifaces were no longer commonly manufactured at centralized quarry workshops; rather raw obsidian cobbles and flake blanks were provided to consumers, creating changes in manufacturing residues at Emergent Period sites. In addition, between AD 1200 and AD 1500, there was a decentralization in the production of shell beads and the development of local bead making industries. The abundance of clam shell manufacturing waste and bead blanks almost exclusively in lower Sacramento Valley Upper Emergent sites may reflect the adoption of a monetized system of exchange.

Ethnographic Background

Information regarding the traditional lifeways of Native Americans has generally been drawn from the accounts of early explorers, fur trappers, military men, and/or missionaries, who were among the first to encounter native groups during the contact period, as well as from the later ethnographic accounts of anthropologists, usually well after the influences of Euroamerican contact had begun to alter traditional lifeways. The following summary has been derived mainly from Kroeber (1925) and Wallace (1978).

The MEP area lies within the ethnographic territory attributed to the Northern Valley Yokuts near where it borders the territories of the Costanoan people to the west and the Miwok groups to the north and east (Kroeber 1925, p. 486; Wallace 1978, p. 462). According to Kroeber (1925, p. 476), the area along the west side of the San Joaquin Valley, where the MEP is located, appears to have belonged to the Yokuts, but has variably been attributed to the Costanoans or to the Miwok. Kroeber suggests that this uncertainty of affiliation indicates an area of unimportant occupation shared with one or more other tribes, and the number of residents in the area were likely very few.

The Yokuts belong to the Yokutsan family of the California Penutian linguistic stock (Shipley 1978, pp. 82–84). The word Yokuts is an English rendering of the general term for ‘Indian people’ in the Valley Yokuts dialects (Silverstein 1978, p. 446). Because of their rapid disappearance from disease, missionization, and the influx of Euroamericans during the California Gold Rush period beginning in 1848, very little is known ethnographically about the Yokuts people (Wallace 1978, p. 462).

The Yokuts general mode of life was closely tied to their unique lake-slough-marsh environment. The Northern Yokuts had greater access to both salmon and acorns than did the Southern Yokuts and, therefore, relied more heavily on these resources. Fishing and fowling, as well as the harvesting of wild plant foods were important subsistence means, while big game hunting was probably of marginal importance (Wallace 1978, p. 464). Dwellings were primarily small lightly built structures covered with tule stalks that were woven into mats. Archaeological evidence suggests that sweathouses and ceremonial assembly chambers may also have been constructed among the Yokuts. Settlements tended to be sedentary and situated primarily atop low mounds on or near the banks of large watercourses. Little is known of the technologies and crafts of the Yokuts. The essential tools and implements used by the Yokuts are thought to include a wide range items crafted from stone, including mortars and pestles, millingstones, arrowpoints, knives, scraping tools, hand-held hammers, and choppers. In addition, basketry containers and other items were likely crafted, as were bone tools, such as the

awl. Marine shells, obtained either from trade with coastal tribes or picked up during excursions to the seashore, were favored for personal adornment. Trade relations were maintained with other peoples, including the Miwoks and the Costanoans. The burial practices of the Yokuts involved cremation or burial in a flexed position.

The closest known aboriginal Yokuts village to the project area is located on Union Island near Bethany. The village was observed during Spanish expeditions in 1810 and 1811 and was named *Pescadero* ("fishermen"[3]) because of the Indians catching fish there (Hoover et al. 1990, p. 349). Following the Spanish-Mexican period (1769–1846), Yokuts culture and population began to progressively decline. The onset of the American Period and the California Gold Rush resulted in near total destruction of native culture. What little is known about Yokuts lifeways has been gleaned from the writings of military men and missionaries who provided only a small insight into the culture. Due to the cultural devastation during the contact period, ethnographers have been unable to supplement the information derived from contact period sources (Wallace 1978, p. 470).

Historic Background

This brief historical summary has been derived from the following previous cultural resources investigation conducted in the project vicinity: Bard et al. (2001); Beck and Haase (1974); Fong et al. (1991); Garaventa, et al. (1991); Greenway and Soule (1977); Gudde (1959); Hart (1978); Jensen & Associates (1986); Killam (1987); Hoover, et al. (1990); and MEP (2009).

During the Spanish Period (1769–1821), the policy of the Spanish government was focused on the establishment of presidios, missions, and towns with the lands held by the Spanish crown. Spanish exploratory parties reached the vicinity of the MEP by 1772, and by the 1790s, the process of missionization and displacement of native lifeways in the area was well under way. Mexico achieved independence from Spain in 1821, and the policy of the newly-created Mexican government focused on secularization of the missions and individual ownership of land. Between 1834 and 1846, more than 800 land patents, comprising more than 12 million acres, were issued to individuals by the Mexican government. The MEP is situated in ungranted lands; however, Rancho El Pescadero or Paso del Pescadero (named after the aboriginal Yokuts village at Union Island) is located just east of the project area, primarily within San Joaquin County, but portions of it extend into Contra Costa and Alameda Counties. In addition, the Cañada de los Vaqueros is located just to the north of the MEP, primarily in Contra Costa County, but portions of it extend south into Alameda County.

Throughout the Spanish and Mexican Periods, land was abundant and settlers were few in number, so land had a minimal value at the time. It was not until the American period that land began to be coveted and valued. The United States officially obtained California from Mexico in 1848. That same year, the discovery of gold at Captain Sutter's saw mill near Sacramento marked the onset of the California Gold Rush. Reclamation and agricultural land use patterns in the project vicinity and surrounding areas intensified during the late nineteenth century. The San Joaquin/Sacramento Delta

[3] Although the literal translation of *Pescadero* is "fishmonger" or "fish seller," the source cited translates it as "fisherman."

area was the focal point of much activity during the early American Period, including themes such as farming/agriculture, levee building, land reclamation, and water/flood control projects. Alameda County was first established in 1853 from portions of Contra Costa and Santa Clara Counties. Alameda County expanded rapidly following the completion of the Central Pacific Railroad terminus at Oakland in 1868.

CULTURAL RESOURCES INVENTORY

A project-specific cultural resources inventory is a necessary step in staff's effort to determine whether the proposed project may cause significant impacts to historically significant cultural resources and would therefore, under CEQA, have an adverse effect on the environment.

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally, the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on previously unidentified cultural resources in the vicinity of the proposed project, assessing the results of any geotechnical studies or environmental assessments completed for the proposed project site, and compiling recommendations or determinations of historical significance (see "Determining the Historical Significance of Cultural Resources," below) for any cultural resources that are identified.

This subsection describes the research methods used by both the applicant and Energy Commission staff for each phase and provides the results of the research, including literature and records searches, archival research, Native American consultation, and field investigations.

Background Inventory Research

Various repositories in California hold compilations of information on the locations and descriptions of cultural resources older than 45 years that have been identified and recorded in past cultural resource surveys. The Energy Commission's Data Regulations require applicants to acquire information specific to the vicinity of their project from certain repositories and to provide it to staff as part of the AFC. Additionally, to acquire further information on potential cultural resources in the vicinity of a proposed project, the applicant is required to consult with knowledgeable individuals in local agencies and organizations and with Native Americans who have expressed an interest in being informed about development projects in areas to which they have traditional ties.

Summary of Literature Research

The pre-field literature review and background research conducted by the applicant's cultural resources consultant, CH2MHill, consisted of: a search of the California Historical Resources Information System (CHRIS) at the Northwest Information Center (NWIC); consultation with the California Native American Heritage Commission (NAHC) and members of the local Native American community; and consultation with local historic preservation interest groups. The literature search indicated that no archaeological sites or potentially CRHR-eligible built-environment resources have been recorded within the project's area of analysis. The NAHC indicated that a search of their Sacred Lands File failed to indicate the presence of important Native American cultural

resources in the immediate project area. Inquiry letters sent to local Native American representatives, as well as to local historic preservation interest groups, yielded no responses regarding concerns for cultural resources within the project area.

CHRIS Records Search

The CHRIS is a federation of 11 independent cultural resources data repositories overseen by the California State Office of Historic Preservation. These centers are located throughout the state, and each holds information about the cultural resources of several surrounding counties. Qualified cultural resources specialists obtain data on known resources from these centers and, in turn, submit new data from their ongoing research to the centers.

CHRIS Results

On January 30, 2009, CH2MHill requested a literature search of the CHRIS from the staff of the NWIC for the MEP area of analysis, as well as for a one-mile buffer area around the project site and a 0.25-mile buffer area around its proposed linear components. The CHRIS research included checking the listings in both the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR), as well as all other state and local listings for the presence of historic buildings, structures, landmarks, points of historical interest, or other cultural resources.

The results of the records search revealed that 23 previous cultural resources investigations had been conducted within the one-mile search radius of the project site, and in fact, the entire one-mile search radius has received full survey coverage by one or more of the previous investigations. Four of these prior surveys occurred within the limits of the project's area of analysis, resulting in complete prior survey coverage of all components of the MEP area, as well.

No previously recorded cultural resources were identified within the project's area of analysis as a result of the past surveys. Eight previously recorded cultural resources are present within the one-mile search radius of the project facility, all of which are historic built-environment resources, including the following:

1. Delta-Mendota Canal (P-01-010435)
2. Jess Property (P-01-10436)
3. Clark Ranch (P-01-10437)
4. Griffith Property (P-01-10438)
5. Peterson Ranch (P-01-10439)
6. Tracy Pumping Plant (P-01-10442)
7. Byron Bethany Irrigation District Main Canal (P-01-10445).

Archival Research

Detailed resource-specific information needed by staff may entail research in various archives, holding such sources as historic aerial photography, historic maps, city directories, and assessors' records. The applicant may include archival information as

part of the information provided to staff in the AFC or may undertake such research to respond to staff's Data Requests. Staff may also undertake such research to supplement information provided by the applicant.

Archival Research Results

As a part of the built-environment survey, CH2MHill reviewed the Alameda and Contra Costa County assessor's data to confirm dates of construction for built-environment resources observed during the windshield survey. In the absence of conclusive dates of construction from the assessor's data, CH2MHill reviewed historical maps and aerial images to help establish general time frames for construction. Thus, the 1914, 1916, and 1968 historical topographic maps and the 1940, 1950, 1959, and 1965 historical aerial images were all consulted. The outcome of CH2MHill's effort resulted in the identification of four properties within 0.5 miles of the MEP that meet the age criteria for consideration as potential historical resources.

Local Agency and Organization Consultation

California counties and cities may recognize particular cultural resources as locally historically important by ordinance, in general plans, or in specific lists. The Energy Commission's Data Adequacy Regulations require applicants to acquire information on locally recognized cultural resources specific to the vicinity of their project by consulting local planning agencies and local historical and archaeological societies.

Results of Inquiries to Local Agencies and Organizations

In an effort to determine whether any local agencies and organizations recognize any additional cultural resources on or near the MEP site, CH2MHill, on April 10, 2009, contacted local historic preservation organizations in both Alameda and Contra Costa Counties, including: the East Contra Costa Historical Society and Museum; the Tracy Historical Museum; the Alameda County Historical Society; and the Amador Livermore Valley Historical Society. No cultural resources were identified in the MEP area as a result of these consultations.

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist cultural resources professionals in identifying cultural resources of specific concern to California Native Americans. The NAHC's Sacred Lands database contains information regarding places and/or objects that Native Americans consider sacred or otherwise important, such as cemeteries or gathering places for traditional foods and materials. The NAHC also maintains a Contacts database, which contains the names and contact information for local Native Americans, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified geographic areas. Both the applicant and staff submit written requests to the NAHC for information regarding the presence of both sacred lands in the vicinity of a proposed project and a list of local Native Americans to whom inquiries may be made to identify additional cultural resources and/or any concerns the Native American community may have about the potential effects of a proposed project.

Results of Inquiries Made to Native Americans

The applicant's cultural resource consultant, CH2MHILL, contacted the NAHC by letter on January 7, 2009, requesting a search of the Sacred Lands File and a list of local Native American representatives who could be contacted regarding the proposed MEP. A response was received from the NAHC on February 5, 2009, indicating that a search of the Sacred Lands File failed to indicate the presence of Native American cultural resources in the immediate project area. The NAHC also provided a list of eight individuals/tribal groups who may have knowledge of cultural resources in the project area. 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. CH2MHILL has received no responses from the Native American representatives as of this time.

Staff also contacted the NAHC by letter on January 14, 2010, to request information about sacred lands in the project vicinity and to obtain contact information for local Native Americans having heritage ties in the region of the MEP. The NAHC responded to staff by fax on February 3, 2010, with a negative report on the presence of Native American cultural resources in the project vicinity. The NAHC also provided staff a list of Native Americans interested in development projects in the region of the MEP. Staff sent a letter requesting input regarding the proposed project to each of the individuals/groups on March 11, 2010; however, no responses have been received to date.

Field Inventory Investigations

The pre-field literature and background research are described above. This section describes the results of the field investigations for the MEP. The Energy Commission's Data Adequacy Regulations require applicants to conduct surveys to identify previously unrecorded cultural resources in or near their proposed project areas. These surveys include a pedestrian archaeological survey and a built-environment windshield survey. The applicant includes the acquired new survey information as part of the information provided to staff in the AFC and may undertake additional field research, including geoarchaeological studies and site testing, to respond to staff's Data Requests. Staff may also undertake additional field research to supplement information provided by the applicant.

CH2MHill's archaeological field survey did not yield surface evidence of archaeological deposits within the proposed MEP area. Four historic architectural properties, which met the age criteria for consideration as potential historical resources, were identified within a half-mile of the project site and its linear facilities, as detailed below.

Results of Pedestrian Archaeological Survey

CH2MHill conducted an archaeological field survey of the project's area of analysis (as described in detail above) on March 18, 2009. Pedestrian survey transects were spaced no more than 10 meters apart. The only portion of the water pipeline corridor that was surveyed was the 1000-foot section from the northern terminus south to the BBID facilities and the southern section where it leaves Bruns Road and follows the access

road into the project area. The portions of the proposed water pipeline corridor that were not surveyed include the segment along Bruns Road, due to the high level of disturbance, and the inaccessible agricultural field outside the roadway right-of-way. Ground visibility within the plant location and all facilities south of Kelso Road was poor, with less than 10% visibility, due to thick vegetation. The transmission line and associated laydown area north of Kelso Road had a better ground visibility of approximately 70%. No cultural resources were identified within the project's area of analysis as a result of the pedestrian field survey.

Results of Subsurface Investigations

No subsurface investigations were conducted for the proposed project; however, the applicant's consultant prepared a geoarchaeological assessment of the sensitivity for subsurface archaeological deposits within the project area (CH2M 2009f, Attachment DR47-1). The results of the study (detailed below) concluded that the potential for buried archaeological deposits to exist within the project area are low to very low. Other factors contributing to the low probability of encountering intact buried archaeological sites include the construction and demolition of a wind farm that once existed at the site of the proposed new facility (remnants of which are still evident on the surface), as well as the local topography and lack of proximity to major stream drainages and other archaeologically sensitive features.

Results of Geoarchaeological Investigations

The objectives of the geoarchaeological assessment were to: (1) provide information about landscape evolution and known buried sites in the region; (2) distinguish landforms in the project area that may contain buried archaeological sites from those that may not; (3) assess the potential for buried sites in specific segments of the project area; and (4) offer recommendations about the need for further geoarchaeological work.

As a part of the geoarchaeological assessment prepared for the MEP, a depositional landform map was created using the Soil Survey Geographic digital soil database from the Natural Resources Conservation Service (2008). The only known Holocene-age depositional landform identified in the project area consists of a small area of Rincon-series soils found at the project site. The geoarchaeological assessment concluded that, while there is a small possibility that archaeological deposits could be buried within the area of early Holocene-age Rincon soils at the project site, the likelihood that a site is actually buried there is considered to be low for the following reasons: (1) the early Holocene sediments were deposited only a few thousand years after the region was first occupied by people; and (2) there is no viable water source (e.g., spring or stream channel) located within the swale/valley in which the project site is situated, nor does there appear to have been one in the past. The fact that a previous wind farm development was constructed, operated, and then subsequently demolished at the same site as the proposed new facility also contributes to the low probability that intact buried archaeological deposits could be encountered at this location.

Upon review of the geoarchaeological assessment, as well as consideration of other factors affecting the overall archaeological sensitivity of the area (e.g., prior wind farm development), staff concluded that further geoarchaeological investigation (i.e.,

mechanical trenching) was unnecessary, given the low probability that buried archaeological deposits would be encountered during the construction of the proposed MEP.

Results of Windshield Survey for Built-Environment Resources

The present built environment in the vicinity of the MEP is a mix of residential and agricultural properties, dominated by a variety of utility facilities, including the Tracy Substation, the Tracy Pumping Station, the Delta-Mendota Canal, the California Aqueduct, and the Delta Substation and Pumping Station. In addition, a number of transmission lines pass through or around the project area, and several wind farms exist in the nearby hills.

A historic architecture field survey of a 0.5-mile radius of the MEP site area and linear facilities was conducted by CH2MHILL staff on March 23, 2009. Based on the field survey, as well as an examination of historic maps and aerial photos, it was determined that four properties within the 0.5-mile built-environment area of analysis met the age criteria for consideration as potential historical resources, as follows:

1. The Jess Property (P-01-10436);
2. The Clark Ranch (P-01-10437);
3. The Byron-Bethany Irrigation District (BBID) Main Canal (P-01-010445; referred to as ‘Canal 70’ by CH2MHill) ; and
4. The Former Reese Property (no primary number)

Updated California Department of Parks and Recreation (DPR) forms were prepared for the Jess Property and the Clark Ranch, and new DPR forms were prepared for the Reese Property and the BBID Main Canal. A description of each property is provided below.

The Jess Property (P-01-10436)

The Jess Property is a residential/agricultural property located at 15547 Kelso Road, more than 2000 feet to the east and northeast of the project site and between 1500 and 3000 feet from the proposed transmission line. This property was first documented in 2001 by PAR Environmental Services, Inc. (PAR); however, restricted access did not allow entry to the property at that time. Based on CHMHill’s review of historic maps (USGS 1911, 1952, 1978), it appears there were no buildings on the property in 1911, but by 1952, there were two barns/storage structures, and by 1978, there was one building (possibly a house) and one barn. CH2MHill suggested that the property may have included at least two more buildings (probably a house and a barn) that were depicted on the 1978 Clifton Court Forebay 7.5’ USGS map. In 2001, the property included at least one building (which appeared to be a shed) that could be viewed from Kelso Road. Dense groupings of trees obstructed any other buildings from view. During the current recordation effort, access to the property was also denied; however, CH2MHill’s communication with the property owners indicated that the buildings on the property have burned down and/or have fallen down due to neglect.

The Clark Ranch (P-01-10437)

The Clark Ranch is a residential/agricultural property located at 15685 Kelso Road, more than 3000 feet northeast of the project site and 2000 feet east of the proposed transmission line. This property was initially documented by PAR in 2001. Due to restricted access, CH2MHill viewed and photographed the property from Kelso Road only. The property consists of a complex of at least four buildings, including a house, a heavily renovated barn, and two storage buildings. According to PAR, construction of the extant structures on the property began in 1942. Modern post and rail fencing borders the north boundary of the property. The west side of the property includes a fenced pasture for horses. The BBID Canal forms the south and west boundaries of the property. CH2MHill's current recordation effort observed no changes to the property or buildings since first documented by PAR in 2001.

The Byron-Bethany Irrigation District Main Canal (P-01-010445)

The BBID Canal is a linear facility located within 1750 to 3000 feet from the proposed project site and transmission line. The proposed underground water pipeline terminates just south of the BBID canal. For the current project, CH2MHill indicated that previous surveys did not note the presence of this canal; however, this segment of the BBID was, in fact, previously recorded by PAR in 2001. The Northwest Information Center has assigned it three primary numbers (P-01-010445, P-39-004312, and P-07-002547) and two trinomials (CA-ALA-594H and CA-CCO-738H). As recorded by PAR in 2001, the north end of the canal segment begins at the California Aqueduct in southeastern Contra Costa County; it then meanders through the northeastern corner of Alameda County and terminates at Mountain House Creek in San Joaquin County. According to the Primary Record and Linear Feature Record prepared by PAR in 2001, the BBID was first constructed in 1919 as an earthen ditch and then subsequently modified in 1968 as part of a system-wide renovation program, whereby all original pumps and turnout gates were replaced and sections of the canal were improved and/or lined with concrete. For the current project, CH2MHill prepared a new Primary Record, as well as a Building, Structure, and Object Record for a smaller segment of the resource, referring to it as the '70 Canal'. Communications with the BBID have revealed that the proper designation for this canal is "Canal 45" (BBID 2010).

The Former Reese Property (No primary number)

The former Reese Property is a residential/agricultural property located northwest of the intersection of Christensen and Bruns Roads, approximately 2500 feet southwest of the project site, laydown area, and linear features. This property had not previously been recorded; however, it was briefly described in a letter report (Holman 1984) for an archaeological field reconnaissance conducted in 1984 by Holman and Associates. The 1984 letter report stated that the property contained a turn-of-the-century farmhouse, which had been extensively stripped of siding and interior walls, as well as water tanks and the remains of several other small farm-related buildings. As a part of the current inventory effort, CH2MHill prepared a new Primary Record and a Building, Structure, and Object Record. The two water towers, several varieties of mature vegetation, and the remains of the house were noted by CH2MHill; however, no evidence of the associated farm buildings were visible during the current recordation effort. The 1916,

1948, and 1978 Clifton Court Forebay USGS maps all show the presence of a building at this location. Based on the Official Historical Atlas Map of Alameda County (1878), CH2MHill suggests that the property may have been owned by H. Reese.

Summary of Identified Cultural Resources

The literature research and archaeological field survey failed to identify any prehistoric or historic-period archaeological sites within the MEP area of analysis. A geoarchaeological assessment of buried site potential concluded that there is a low likelihood that buried archaeological deposits would be encountered within the MEP area during project construction. To date, local Native American representatives, who were contacted about the proposed project, have provided no input regarding concerns for ethnographic resources on or near the MEP area of analysis, nor have any historic preservation interest groups/organizations identified any resources of concern. CH2MHill identified four built-environment cultural resources within a 0.5-mile radius of the MEP area that met the age criteria for consideration as a potential historical resource, including three historic ranch properties and one irrigation canal, as summarized in Table 2. The significance of these resources is discussed below.

CULTURAL RESOURCES Table 2
Known Cultural Resources Located in the Vicinity of the Proposed Project

Resource Type and Designation	Resource Description	Previously Known/New	Information Source
Residential/Agricultural Jess Property (P-01-10436)	Circa 1940s residential/agricultural property	Previously recorded 2001	NWIC
Residential/Agricultural The Clark Ranch (P-01-10437)	1942 residential/agricultural property	Previously recorded 2001	NWIC
Agricultural Infrastructure The Byron-Bethany Irrigation District Main Canal (P-01-010445)	Irrigation Canal, constructed in 1919	Previously recorded 2001	NWIC
Residential/Agricultural The Former Reese Property (No primary number)	Late nineteenth century residential/agricultural property	Newly recorded 2009	MEP Built-environment field survey

Determining the Historical Significance of Cultural Resources

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a “historical resource, which is a “resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR”, or “a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code,” or “any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency’s determination is

supported by substantial evidence in light of the whole record" (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, "historical resource," therefore, indicates a cultural resource that is historically significant and eligible for the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[4] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

Historical resources must also possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance (Cal. Code Regs., tit. 14, § 4852(c)).

Additionally, cultural resources listed in or formally determined eligible for the National Register of Historical Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and up are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

The assessment of potentially significant impacts to historical resources and the mitigation that may be required of a proposed project to ameliorate any such impacts depend on CRHR-eligibility evaluations.

CRHR Evaluations

Under CEQA, only CRHR-eligible cultural resources that the proposed project could potentially affect need be considered in staff's recommendations for mitigation measures for project impacts. Consequently, staff seeks CRHR eligibility recommendations for those cultural resources subject to possible project impacts. The existing documentation for previously known cultural resources may include CRHR eligibility recommendations, and the applicant's cultural resources specialists often make CRHR eligibility recommendations for newly identified cultural resources they

4 The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a potential five-year lag in the planning process.

discover and record in their project-related surveys. Staff considers these prior CRHR eligibility evaluations and may accept them or conclude that additional information is needed before making its own recommendations.

CH2MHill identified four built-environment cultural resources, each of which met the age criteria for consideration as a potential historical resource, within the 0.5-mile radius established for the built environment area of analysis. CH2MHill conducted archival research at the NWIC and the Tracy Branch of the Stockton-San Joaquin County Library in an effort to assess potential eligibility for the CRHR under Criteria 1, 2, 3, and 4, as detailed below.

Results of Built-Environment Resources Archival Research

Jess Property (P-01-10436)

The literature research conducted at both the NWIC and the Tracy Branch of Stockton-San Joaquin County Library revealed no information linking the Jess property to any events that have made a significant contribution to local, state, or national history. Similarly, the property was not found to be associated with any known person considered significant in local, California, or national history. Therefore, the applicant concludes that the property does not appear eligible for the CRHR under Criteria 1 or 2.

Although access to the Jess Property for the proposed project was denied, communications with the property owners revealed that the other buildings on the property have burned down and/or have fallen down due to neglect since the property was last documented in 2001. Assuming this is correct, there are either no buildings remaining on the property or the buildings are in a state of deterioration and have no integrity. Therefore, the property does not appear to be eligible under Criterion 3 of the CRHR. The applicant also concludes that the Jess Property does not meet the parameters for consideration under Criterion 4 of the CRHR.

The Clark Ranch (P-01-10437)

The Clark Ranch was previously recorded in 2001, but was not evaluated at the time for CRHR eligibility. During the physical and visual inspection of the property for the current project, there were no apparent significant changes to the buildings since the 2001 recordation. The literature research at the NWIC and the Tracy Branch of Stockton-San Joaquin County Library for the MEP revealed no information linking the Clark Ranch to any events that have made a significant contribution to local, state, or national history. Similarly, the applicant found the property was not associated with any known person considered significant in local, state, or national history. Therefore, the property does not appear to be eligible for the CRHR under Criteria 1 or 2.

The house appears to be a minimal traditional style residence with an irregular footprint and varying roof styles, suggesting that it has been added to over the years. The barn appears to have been converted from agricultural use. The house does not embody the distinctive characteristics of a type, period, region, or method of construction. It does not possess high artistic value, and there is no evidence that this is the work of a master;

therefore, the house does not meet Criterion 3 for inclusion in the CRHR. The applicant also concludes that the Clark Ranch does not meet the parameters for consideration under Criterion 4 of the CRHR.

Byron-Bethany Irrigation Canal 45 (P-01-010445)

Based on PAR's 2001 Linear Feature Record, the integrity of the BBID Canal (referred to by CH2MHill as Canal 70) with respect to setting, feeling, design, workmanship, and materials has been compromised. The setting and feeling have changed, as the rural undeveloped farmland surrounding the canal is dominated by utility developments related to the Central Valley Project, including the Delta-Mendota Canal, the Tracy Pumping Plant and Switching Stations, and numerous high-profile electric transmission towers and lines, all of which have significantly altered the historic landscape. The design, materials, and workmanship have been altered by the major reconstruction of the system in 1968. Only the canal's integrity of location remains intact. The canal was not found to be associated with any significant persons, technology, or historic trends in local, state, or national history. While it is associated with the early development of irrigated farming in the region, the nearby Westside Irrigation District system retains a far higher degree of integrity and predates the Byron-Bethany system by three years. As a result, the BBID Canal does not meet Criteria 1, 2, or 3 for eligibility in the CRHR. In addition, it does not meet the parameters for consideration under Criterion 4 of the CRHR.

Former Reese Property (No primary number)

During the recordation effort for the proposed project, CH2MHill discovered that the buildings and structures associated with the Reese property no longer exist, and only the ruins of a building and two tanks remain. The literature research at the NWIC and the Tracy Branch of Stockton-San Joaquin County Library for the MEP revealed no information linking the former Reese Property to any events that have made a significant contribution to local, state, or national history. Similarly, the applicant found the property was not associated with any known person considered significant in local, state, or national history. Therefore, this property does not meet Criteria 1, 2, or 3 for eligibility in the CRHR. The applicant also concludes that the Reese Property does not meet the parameters for consideration under Criterion 4.

All CRHR-Eligible Resources Subject To Potential Project Impacts

No historic or prehistoric archaeological resources and no ethnographic resources were identified within the MEP area of analysis. Staff concurs with the applicant's recommendation that the four built-environment resources identified within the 0.5-mile built-environment area of analysis do not meet the eligibility criteria for inclusion in the CRHR. Therefore, no impacts to CRHR-eligible cultural resources, as defined under CEQA, would occur as a result of the construction and operation of the proposed project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

No significant archaeological, ethnographic, or built-environment cultural resources were identified within the MEP area of analysis. In addition, a geoarchaeological assessment of buried site potential concluded that there is a very low probability that

buried archaeological deposits would be encountered in the MEP area. The MEP would, therefore, have no direct, indirect, or cumulative impacts to significant cultural resources.

Construction Impacts and Mitigation

CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and a project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of an unexpected discovery (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)).

As discussed above, the likelihood that the proposed MEP would affect as-yet-unknown buried archaeological deposits during construction-related ground-disturbing activities is low; however, a very slight possibility exists that such resources could be encountered. In order to address the possibility of inadvertent discoveries during construction, staff recommends the following conditions of certification to ensure that cultural resources are properly identified, evaluated, and if necessary, mitigated to below the level of significance, if inadvertently encountered during construction activities. Due to the low sensitivity of the project area to contain buried archaeological deposits, staff is not recommending monitoring by a Cultural Resource Specialist (CRS) as a condition of certification, *unless significant archaeological materials are unearthed during construction*. The below Conditions of Certification detail the circumstances under which cultural resource monitoring would be necessary. The applicant would be required to implement a Worker Environmental Awareness Program, and construction personnel would be required to halt all earth-moving activities, if they were to encounter cultural materials during project construction. In such a case, the applicant would notify the CRS to inspect the findings and make an evaluation as to the significance of the remains. Should the CRS determine that the remains are significant, full-time monitoring of all earth-moving activities would then become necessary, as described in the below Conditions of Certification. Monitoring, if it becomes necessary, would require observance of both the excavation and disposal of project soils. Therefore, a minimum of two monitors would be necessary where excavation equipment is actively removing soil and hauling the excavated material to a distance greater than 50 feet from the location of active excavation. If the distance between excavation and disposal is less than 50-feet, then one archaeological monitor would be sufficient to observe both the excavation and disposal of project soils. Staff established the distance of 50 feet as a maximum for one monitor to ensure adequate effectiveness in the ability of the monitor to identify cultural materials and for the overall safety of the monitors.

Applicant and staff recommendations are incorporated into the proposed Conditions of Certification **CUL-1** through **CUL-8**, below, which are intended to provide for the contingency of discovering archaeological resources during MEP construction and related activities. Staff's proposed **CUL-1** requires a Cultural Resources Specialist (CRS) to be retained and available on an on-call basis during MEP construction-related excavations to evaluate any potential inadvertent discovery of buried archaeological resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. **CUL-2** requires that the project owner provide the CRS with all relevant cultural resources information and maps. **CUL-3** requires that the CRS

write, and submit for Compliance Project Manager (CPM) approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), if determined to be necessary, to address the treatment of any buried archaeological deposits inadvertently encountered during construction; the CRMMP shall include data recovery plans for any evaluated archaeological deposits determined CRHR-eligible by the CPM. **CUL-4** requires the submittal of a final Cultural Resources Report (CRR) to the CPM for approval, if preparation of a CRR becomes necessary. **CUL-5** requires the project owner to train project construction workers to recognize cultural resources and instruct them to halt construction if any cultural resources are discovered during MEP construction activities. **CUL-6** requires that the project owner ensure that the CRS, alternate CRS, or CRM monitor full-time all ground disturbing activities in the area where a CRHR-eligible cultural resource has been discovered, if applicable. **CUL-7** requires that the project owner halt ground-disturbing activities in the area of an archaeological discovery until it can be evaluated by a qualified CRS and, if necessary, to fund data recovery, if it is evaluated as a CRHR-eligible resource. **CUL-8** would cover the possibility that the proposed project would need to make use of a soil borrow site that had not been surveyed for cultural resources in the past five years.

Operation Impacts and Mitigation

During operation of the proposed power plant, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole and the possible disturbance of previously undisturbed soils and sediments. Such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The measures proposed for mitigating impacts to previously unknown CRHR-eligible archaeological resources discovered during the original project-related ground disturbance at the main project site and along linear facilities, proposed conditions of certification **CUL-1** through **CUL-8**, would continue to apply and also serve to mitigate impacts from repairs occurring during the later operation of the plant.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in the MEP vicinity could occur if any other existing or proposed projects, in conjunction with the proposed MEP, had or would have impacts on cultural resources that, considered together, would be significant.

The cultural resources investigation for the proposed MEP identified no CRHR-eligible resources within the project’s area of analysis. Based on the literature and records search conducted for the MEP, the entire project area, as well as the one-mile radius and beyond, has been previously surveyed for cultural resources multiple times; yet no archaeological sites were identified as a result of those prior survey efforts. In addition, the geoarchaeological investigation conducted for the MEP concluded that the likelihood

of encountering as-yet-unknown buried archaeological sites within the MEP area during construction is low to very low. It is, therefore, unlikely that the project has any potential to compound or contribute to a cumulative impact to cultural resources in the area.

In the unlikely event that any buried archaeological deposits are encountered during construction, any impacts from the proposed MEP project would be mitigated to a less-than-significant level by the project's compliance with proposed Conditions of Certification **CUL-1** through **CUL-8**. Since similar protocols could be applied to other projects in the area, staff does not expect any incremental effects on cultural resources of the proposed MEP to be cumulatively considerable when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If the cultural resources conditions of certification (below) are properly implemented, the proposed MEP would result in a less-than-significant impact on known and newly found cultural resources. The project would therefore be in compliance with the applicable state laws, ordinances, regulations, and standards listed in Table 1 above.

The General Plans for the Counties of Alameda and Contra Costa have language promoting the general countywide preservation of cultural resources. The conditions of certification require specific actions not just to promote but also to effect historic preservation and mitigate impacts to all cultural resources in order to ensure CEQA compliance. Consequently, if the MEP implements these conditions, its actions would be consistent with the general historic preservation goals of Alameda and Contra Costa Counties.

CONCLUSIONS AND RECOMMENDATIONS

Based on the cultural resources inventory conducted for the proposed MEP, staff has determined that the project would have no impact on known CRHR-eligible archaeological resources, ethnographic resources, individual built-environment resources, or historic districts. The MEP would be consistent with the general historic preservation goals of Alameda and Contra Costa Counties and would be in compliance with the applicable state laws, ordinances, regulations, and standards listed in Table 1. Based on a geoarchaeological assessment of the project area, the potential for the project to encounter as-yet-unknown buried archaeological deposits is low; however, conditions of Certification **CUL-1** through **CUL-8** would address any potential inadvertent archaeological discoveries during the construction and/or operation of the MEP should they occur.

With the adoption and implementation of Conditions of Certification **CUL-1** through **CUL-8**, the MEP would have a less-than-significant impact on any CRHR-eligible archaeological resources, if inadvertently discovered during construction-related excavation activities. Staff thus recommends that the Commission adopt these conditions. These measures are intended to facilitate the identification and assessment of potential unknown archaeological resources encountered during construction and to mitigate any significant impacts from the project on any newly found resources

evaluated as eligible for the CRHR. To accomplish this, the conditions provide for the following: the hiring of an on-call Cultural Resources Specialist; cultural resources awareness training for construction workers; the recovery of data from inadvertently discovered CRHR-eligible archaeological deposits; the writing of a technical archaeological report(s) on any archaeological activities and findings; the curation of any recovered artifacts and other data. When properly implemented and enforced, staff believes that these conditions of certification would reduce any impacts to as-yet-unknown CRHR-eligible cultural resources encountered during construction or operation to a less-than-significant level. Additionally, with the adoption and implementation of these conditions, the MEP would be in conformity with all applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization," "construction ground disturbance," and "construction grading, boring and trenching," as defined in the General Conditions for this project) the project owner shall obtain the services of an on-call Cultural Resources Specialist (CRS), and one or more alternate CRSs, if alternates are needed. The CRS shall manage all evaluations, mitigation, curation, and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in potential evaluation, monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to CPM (Compliance Project Manager) approval of the CRS and alternates, unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other Energy Commission projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61). In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;
2. At least three years of archaeological and/or historical (as appropriate per the nature of predominant cultural resources on the project site) resource identification, evaluation, and mitigation field and reporting experience in California; and

3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a B.S. or B.A. degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or
2. an A.S. or A.A. degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or
3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.
2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved monitor may serve in place of a CRS so that project-related ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.
3. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.

4. At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to their qualifications.
5. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.
6. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 40 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, and confidential cultural resources documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.
2. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.
4. Weekly. during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.
5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. the following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."
2. a proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. A specific mitigation plan shall be prepared for any unavoidable impacts to any CRHR-eligible (as determined by the CPM) resources. A prescriptive treatment plan may be included in the CRMMP for limited data types.
3. specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance analysis phases of the project.

4. identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.
5. a description of the manner in which Native American observers or monitors, if needed, will be included, the procedures to be used to select them, and their role and responsibilities.
6. a description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas identified during construction ground disturbance. The description shall address how these measures would be implemented once sensitive areas are identified and how long they would be needed to protect the resources from project-related effects.
7. a statement that all encountered cultural resources over 50 years old shall be recorded on a DPR form 523 and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, monitoring, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.
8. a statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.
9. a statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively..
10. a description of the contents and format of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. Upon approval of the CRS proposed by the project owner, the CPM will provide to the CRS an electronic copy of the draft model CRMMP.

2. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

At least 30 days prior to the start of ground disturbance, a letter shall be provided to the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, monitoring, testing, data recovery).

CUL-4 The project owner shall submit the final Cultural Resources Report (CRR) to the CPM for approval, if preparation of a CRR becomes necessary. The final

CRR shall be written by or under the direction of the CRS and shall be provided in the Archaeological Resource Management Report (ARMR) format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.
2. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.
3. Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.
4. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of project-related reports.

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer

questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes. The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;
5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;
6. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;
7. An informational brochure that identifies reporting procedures in the event of a discovery;
8. An acknowledgement form signed by each worker indicating that they have received the training; and
9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.
10. No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.
2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.
3. Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 At the direction of the CPM, the project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all ground disturbances in the area where a CRHR-eligible (as determined by the CPM) cultural resources discovery has been made. The level, duration, and spatial extent of

monitoring shall be determined by the CPM. In the event that the CRS believes that a current level of monitoring is not appropriate, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

Full-time archaeological monitoring for the project, if deemed necessary, shall be the archaeological monitoring of all earth-moving activities in the areas specified in the previous paragraph, for as long as the CPM requires. Where excavation equipment is actively removing dirt and hauling the excavated material to a location farther than fifty feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the disposal of the excavated soil. For excavation areas where the excavated soil is disposed of no farther than fifty feet from the location of active excavation, one monitor is sufficient to observe both the excavation and soil disposal.

An effort shall be made to obtain a Native American representative to monitor ground disturbance in areas where Native American artifacts may be discovered. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered during archaeological monitoring.

If monitoring should be needed, as determined by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS on forms provided by the CPM. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

Verification:

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.
2. Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.
3. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.
4. Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.
5. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.
6. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.
7. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

CUL-7 The project owner shall grant authority to halt project-related ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance shall be accomplished under the

direction of the construction supervisor in consultation with the CRS. Employees are to halt work on their own in the vicinity of a potential cultural resource discovery and shall contact their supervisor and the CRS or CRM. Redirection of work would be determined by the construction supervisor and the CRS;

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting as provided in other conditions shall continue during the project's ground-disturbing activities elsewhere. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.
2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.
3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary" form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.
4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

2. Within 48 hours of the discovery of an archaeological or ethnographic resource, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.
3. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

CUL-8 If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, unless less-than-five-year-old surveys of these sites for archaeological resources are documented to and approved by the CPM, the CRS shall survey the borrow and/or disposal site/s for cultural resources and record on DPR 523 forms any that are identified. When the survey is completed, the CRS shall convey the results and recommendations for further action to the project owner and the CPM, who will determine what, if any, further action is required. If the CPM determines that significant archaeological resources that cannot be avoided are present at the borrow site, other conditions shall apply. The CRS shall report on the methods and results of these surveys in the final CRR.

Verification:

1. As soon as the project owner knows that a non-commercial borrow site and/or disposal site will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.

2. In the absence of documentation of recent archaeological survey, at least 30 days prior to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site/s for archaeological resources. The CRS shall notify the project owner and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

CULTURAL RESOURCES ACRONYM GLOSSARY

MARIPOSA ENERGY PROJECT

AD	After the Birth of Christ in the *Anno Domini* dating system
AFC	Application for Certification
ARMR	Archaeological Resource Management Report
BBID	Byron-Bethany Irrigation District
BC	Before the Birth of Christ in the *Anno Domini* dating system

CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Conditions of Certification
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
LORS	laws, ordinances, regulations, and standards
Mariposa Energy	Mariposa Energy, LLC (Applicant's name)
MCR	Monthly Compliance Report
MEP	Mariposa Energy Project
MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
NWIC	Northwest Information Center (CHRIS), Sonoma State University
OHP	Office of Historic Preservation
Project Area Of Analysis	The project site (see below) plus what additional areas staff defines for each project that are necessary for the analysis of the cultural resources that the project may impact.
Project Site	The bounded area(s) identified by the applicant as the area(s) within which they propose to build the project.
SA	Staff Assessment

SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
WEAP	Worker Environmental Awareness Program

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HAZARDOUS MATERIALS MANAGEMENT

Testimony of Rick Tyler

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-8,500 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, 4-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 8,500 gallons (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 vapor cloud of hazardous materials that could move off site and affect residents and workers in the surrounding community. 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 an updated Business Plan, an updated Spill Prevention, Control, and Countermeasure Plan (SPCC), and an updated 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 updated Business Plan, updated SPCC Plan, and updated 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 updated Business Plan and updated 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 updated 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 revise the existing or prepare a new 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;

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	26,960 pounds	Inlet air chiller system (21)	Liquid
Cleaning chemicals/detergents	Periodic cleaning of combustion turbine	Varies (less than 25 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	150 gallons	Onsite 55-gallon drums (9)	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)	400 gallons	Onsite 55-gallon drums and 200-gallon waste oil storage tank (5)	Liquid
Mineral insulating oil	Transformers/ switchyard	28,800 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)	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

Testimony of Lisa Worrall

SUMMARY OF CONCLUSIONS

This section of the Staff Assessment (SA) 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 SA.

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 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).

[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.

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 SA 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 SA 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 SA 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 SA 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.
-Special Land Uses; Windfarms *Policy 173*	This policy addresses the uses and structures not compatible with wind energy operations within with Wind Resource Area.

[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
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 a 4-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, six inches in diameter. The majority of the pipeline would be located within Bruns Road right-of-way. 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, within the airport's influence area, and over one mile from visual and instrument flight paths (including the runway approach surface). 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.
- 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.

[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 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 SA.

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 six-inch diameter pipeline, a cover of three feet six 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 land. The proposed Condition of Certification **LAND-1** would ensure the pipeline is constructed in conformance with BBID standards and construction is timed appropriately.

[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).

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 SA 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 SA.

As discussed in detail in the **Noise and Vibration** section of this SA, 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 SA 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 SA 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 SA 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 2009a). 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 SA 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 SA 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 SA 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 SA 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 SA 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 SA. 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.						

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 SA 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 SA 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 SA 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 SA 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.

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 SA, 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 SA 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 construction, 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: At least 30 calendar days prior to start of construction, 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 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. Documentation to the CPM shall include comments from the Director of Contra Costa County Airports.

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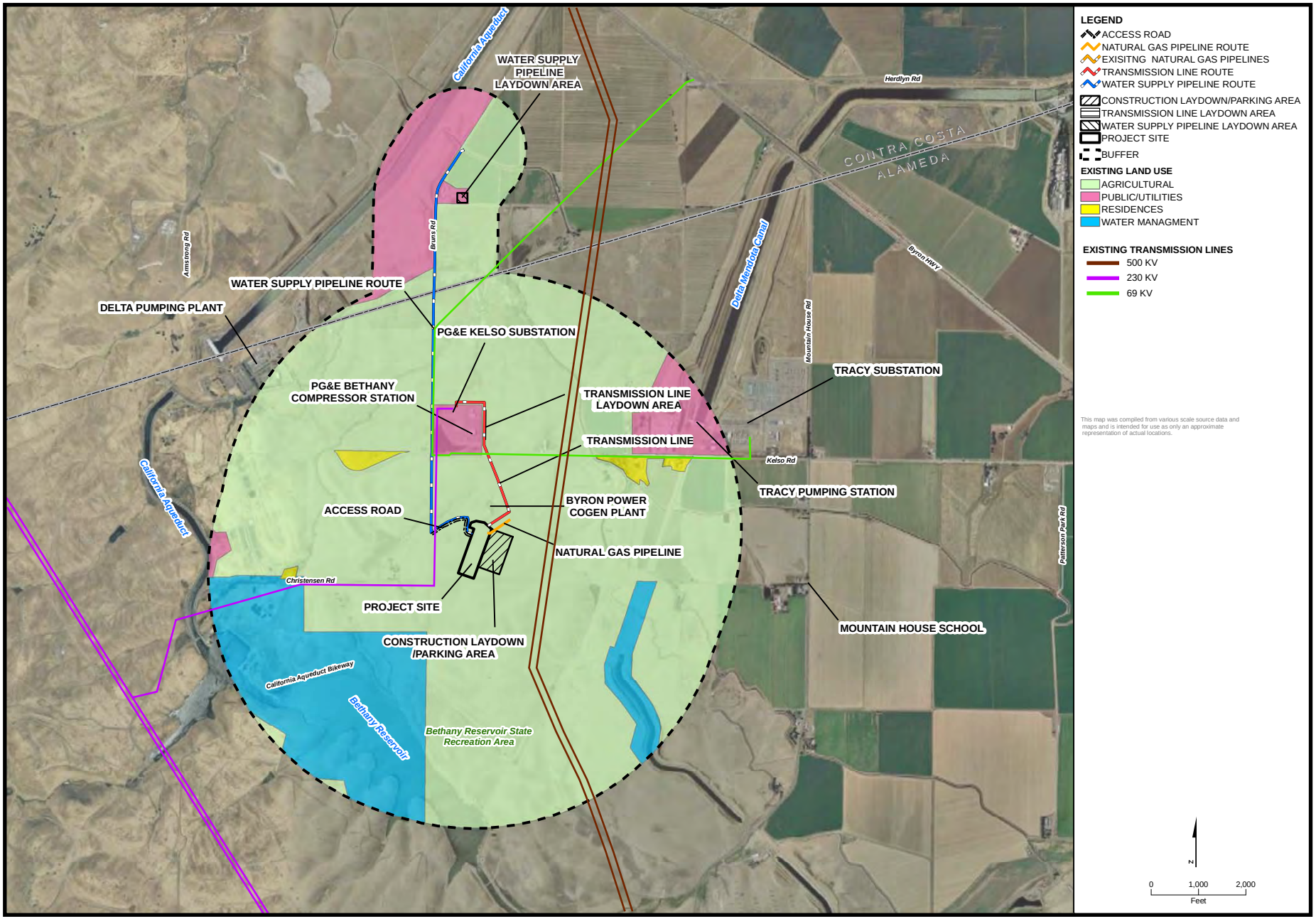
StateParks& Rec 1973- State Parks and Recreation. Bethany Reservoir State Recreation Area Resource Management Plan and General Development Plan. October 1973. http://www.parks.ca.gov/?page_id=21299

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

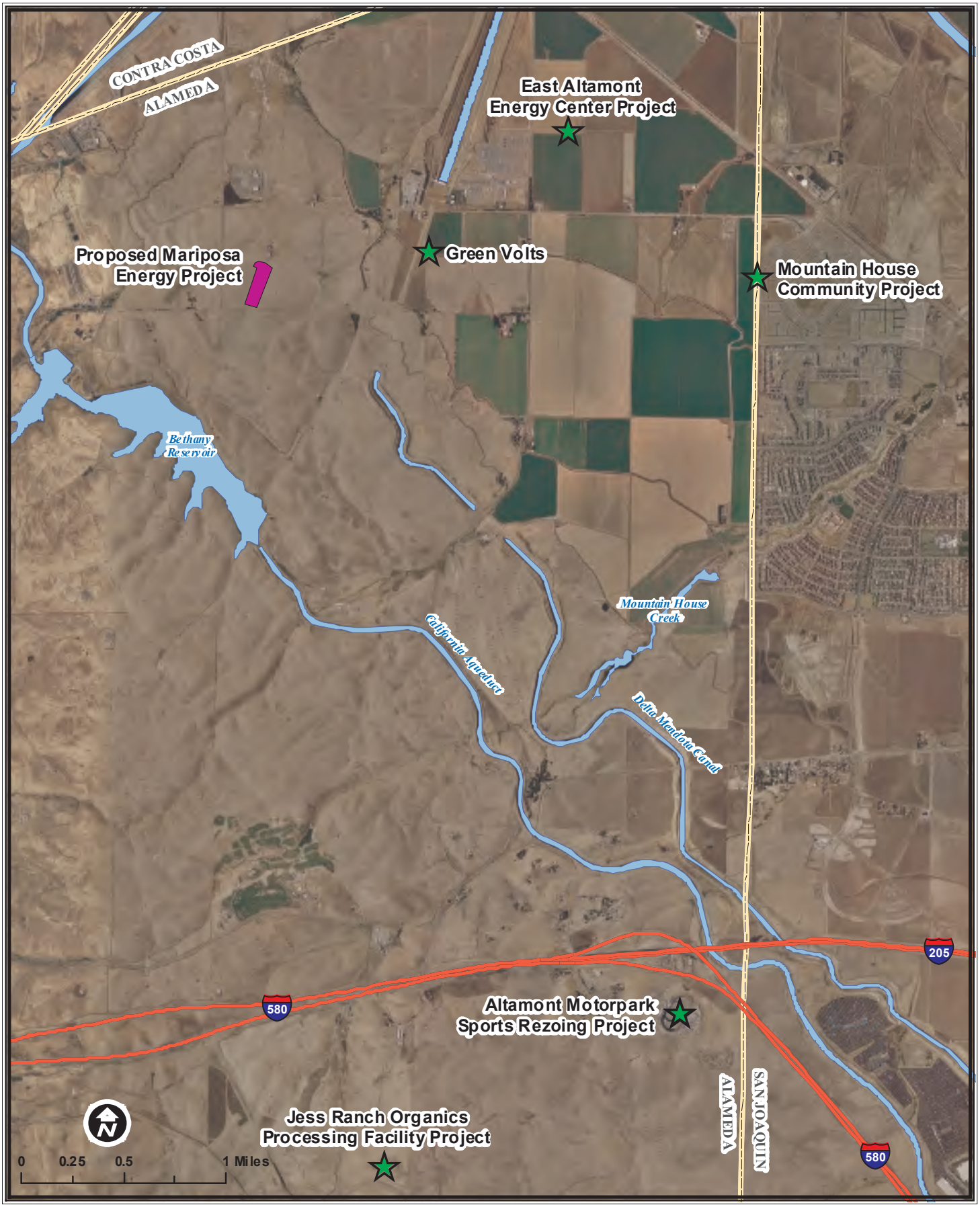
Mariposa Energy Project - Pump Station, Turnout and Water supply Pipeline Laydown Area Locations

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

Testimony of Shahab Khoshmashrab

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.

[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)

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
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.

.[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.

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.

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.

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 a special permit has been issued by Alameda County:

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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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

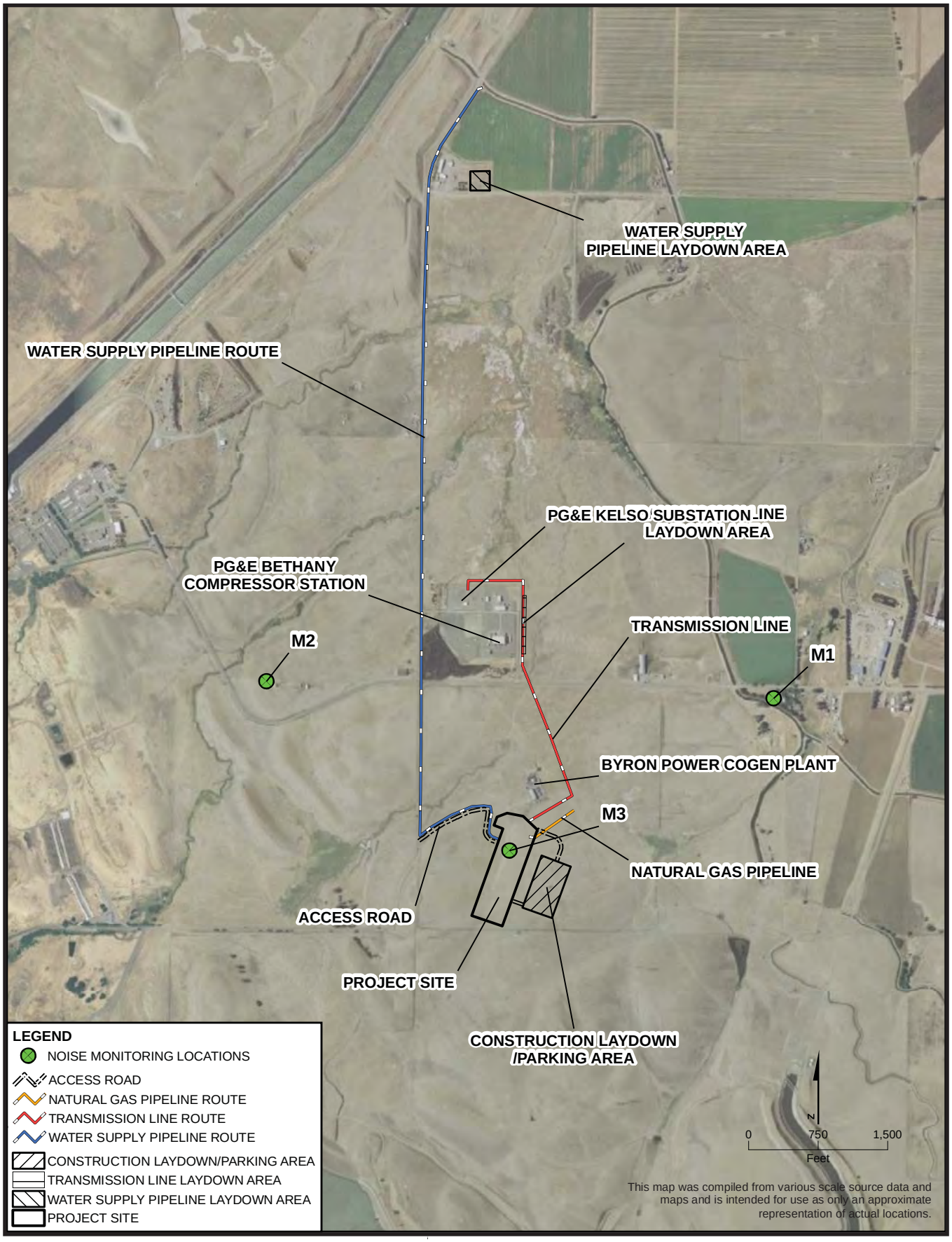
OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

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

Testimony of Obed Odoemelam, Ph.D.

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 project area. 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 maximally exposed individual. 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 10×10^{-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 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 no hazard determinations (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.

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

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.

Staff's 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.

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. Since the potential impacts would be at insignificant levels in all the areas around the project (including the Mountain House community of specific concern), 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.

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.

California Air Resource Board (CARB). 2002. California Air Quality Data, http://www.arb.ca.gov/aqd/aqd.htm.

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.

CAPCOA (California Air Pollution Control Officers Association) 1993. Air Toxics "Hot Spots" Program, Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee, October 1993.

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

Testimony of Kristin Ford

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 for the current population is not available. The present population (2008) of Mountain House is estimated to be 7,996 based on the number of occupied dwelling units. The following information regarding minority populations and below-poverty-level populations does not include the Mountain House community (MHCSD, 2008).

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 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**).

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				X
Police protection				X
Schools				X
Parks				X
Other public facilities				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?				X
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

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) is 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, Livermore, and Tracy, which are 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

Staff has received no agency or public socioeconomic comments on this project.

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 project would not cause significant direct or cumulative adverse impacts to emergency services. Staff also 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

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

East Bay Regional Park District, http://www.ebparks.org/parks

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.

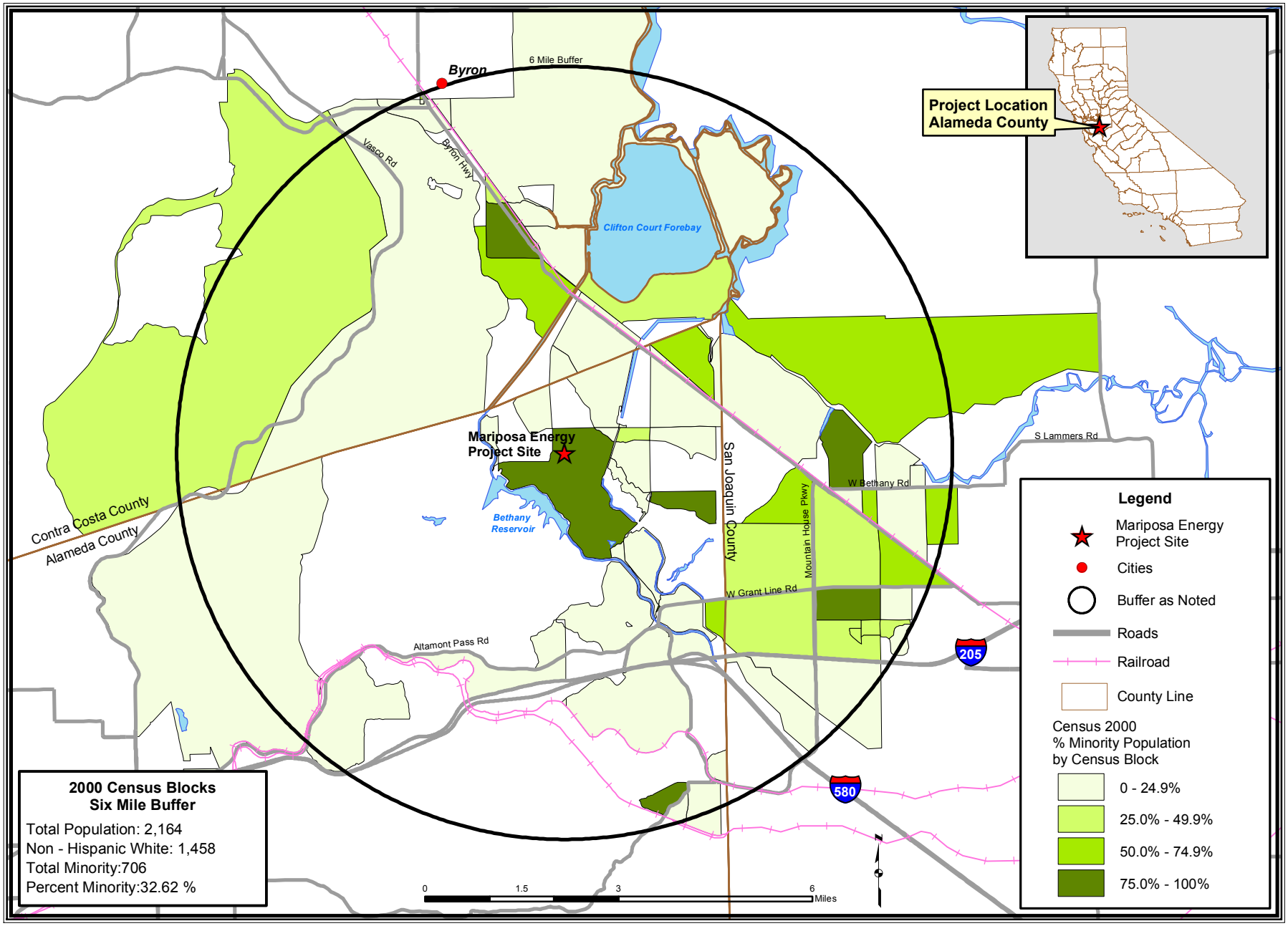
State of California, Employment Development Department (EDD) 2009. Labor Market Information, Occupational Employment Projections 2006-2016 Vallejo-Fairfield, Sacramento-Arden Arcade-Roseville, Oakland-Fremont-Hayward, and Stockton Metropolitan Statistical Areas.

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

Testimony of Mark Lindley, PE, Rachel Cancienne, EIT, and Paul Marshall

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 proposed fresh water supply for the project would not cause a significant adverse environmental impact on current or future users of the water supply with the implementation of a mitigation fee for each acre-foot of fresh water used, and paid to a water conservation program that would reduce impacts to other users to less than significant levels.
- With 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.
- 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 water for process water, safety showers, fire protection, service water, and domestic water for the MEP site via Canal 45. A new 6 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 beneath the Bruns Road paved right-of-way

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, and an electrical cabinet with instrumentation.

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 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-mounted ion exchange (IX) system, which would include: two cation resin vessels, three strong base anion resin vessels, and one mixed bed ion exchanger vessel. 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). The raw surface water supplier, Byron Bethany Irrigation District (BBID), is a public agency operating under the California Water Code. BBID is a multi-county special district encompassing approximately 19,000 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 bought by BBID in 1921 (pers. Comm. Rick Gilmore). 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).

BBID obtains their water supply from the State Water Project (SWP) Harvey O. Banks Pumping Plant Intake Channel in the San Joaquin and Sacramento River Delta. Because of pumping restrictions in the Delta, staff believes that other water users would be impacted by the use of fresh water for MEP construction. Staff proposes that MEP mitigate for construction water use through the implementation of a water conservation program.

Staff recommends in 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 to mitigate for the use of fresh water for construction purposes. The establishment of this program is needed prior to site operations to ensure conservation efforts begin simultaneously with operational water use (CEC 2010q, CEC 2010r).

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's proposes to obtain raw water from BBID via a proposed 6-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.

BBID receives raw water from the Sacramento-San Joaquin Delta via the State Water Project (SWP) Harvey O. Banks Pumping Plant Intake Channel. In drought years, while both the CVP and SWP limit allocations to irrigation districts throughout California, BBID services in the vicinity of MEP remain unaffected by means of pre-1914 water rights acquired by BBID in 1921 and an agreement with the California Department of Water Resources (DWR) for a consistent 50,000 AFY supply (pers. Comm.. Rick Gilmore). Staff is concerned that water supply for MEP through BBID's pre-1914 water rights could increase limitations for other Delta-source water users during drought years. Additionally, the Delta water supplies may be further curtailed in the future to address requirements to support endangered fisheries and other environmental needs.

Staff is recommending Condition of Certification **SOIL&WATER-4** to limit the MEP facility to maximum water use of 187 acre-feet per year. **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 fresh water from the Sacramento-San Joaquin Delta. 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 would need to identify specific projects that would be funded (in-part or wholly) by the water conservation fee, and would need to quantify the water savings resulting from the funded projects and the costs per acre-foot to determine the appropriate fee. Funding of current and future improvements within BBID as part of a water conservation program would offset water used by the plant during operations.

Alternatively, if BBID cannot develop a verifiable, cost effective water conservation program, the water conservation fee could be paid to local water agencies including the Contra Costa Water District or Alameda Zone 7. These agencies are currently developing plans to meet the water conservation goals of SBx7-7, a statewide 20% reduction in urban per capita water use by 2020.

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.

The Mariposa project would use about two acre-feet of fresh water for construction, assuming average daily use, during the entire eight to nine month construction period. MEP would use a maximum or peak of 187 AFY of fresh water supplied from the BBID, while averaging 34.8 AFY when operating at 600 hours annually with 200 startup and shutdown events in normal years. Staff does not consider the project’s use of the BBID water in combination with other uses of this water to be a cumulatively significant impact.

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.

The fresh water would be provided by BBID which receives its water allocations for the MEP area from a pre-1914 water rights agreement (pers. Comm. Rick Gilmore). During periods of shortage while CVP and SWP users will receive reduced allocations, BBID will receive its entire 50,000 acre-feet entitlement. A condition of shortage results from over-drafting of the normal water supply, which may be precipitated by drought conditions. Fewer allocations during a condition of shortage would reduce impacts to other users. Fewer allocations could also reduce Delta ecosystem and water quality impacts caused by excessive withdrawals from the Delta.

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 project also proposes to use approximately 6 to 18 AFY of potable water for CTG water spray intercooling (SPRINT) that is integrated into the GE LM6000PC SPRINT combustion turbine. Staff considers the SPRINT technology water use to be power plant cooling because it uses water to cool the temperature of the air in the combustion turbine compressor to increase output of the unit, especially during warm or hot weather. In addition to intercooling the air in the compressor, an inlet air chiller with a refrigeration cycle is also used to lower the temperature at the engine's compressor inlet to increase the efficiency and output of the CTG.

Staff would consider the project to be substantially 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 potable water equivalent to the volume used by the project for SPRINT intercooling. Staff, therefore, recommends adoption of Condition of Certification **SOIL&WATER-4** requiring the project owner to fund a local water conservation program to offset the fresh water used throughout the

MEP facility. The water conservation program would allow a local water agency such as BBID to implement improvements in its water distribution network resulting in conservation of local fresh water supplies sufficient equal to the water used at MEP.

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

No written public comments from agencies or the public (non-intervenors) were submitted in reference to Soil & Water Resources.

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 proposed fresh water supply for the project would not cause a significant adverse environmental impact on current or future users of the water supply with the implementation of a mitigation fee for each acre-foot of fresh water used, and paid to a water conservation program that would reduce impacts to other users to less than significant levels.
- With the inclusion of facility-specific water conservation measures and the implementation of a regional water conservation program, 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 there is no other economically feasible or environmentally desirable alternative.
- 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 fund a local water conservation program to comply with Energy Commission Water Policy and mitigate for the volume of BBID water consumed annually (potable water for personnel consumption, eyewash stations, showers, and sanitary needs not included). The local water conservation program shall be developed by a local water agency to conserve a volume of water equivalent to the annual water use reported by MEP. 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 fee (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 fees. The water conservation program(s) shall be provided to the CPM for review and approval. An initial water conservation fee payment shall be made to the selected program to offset fresh water used for construction and initiate the water conservation program. Water conservation fees 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 computed.
b. Verification that the water conservation methods that have been funded by MEP have been successfully 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, water conservation shall be allocated based on the portion of funding provided by MEP.

The project owner shall provide proof that the initial water conservation fee 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

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

CEC 2010r - California Energy Commission/V Geronimo (tn: 58012) Record of Conversation with Alameda County Zone 7 Water Agency re: water conservation. August 6, 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.

Swartz 2010- Contra Costa County (CCC) / David Swartz, CCC Public Works Department. Pers. comm. 05/03/2010.

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.

Reclamation 2005- U.S. Bureau of Reclamation, Long Term Renewal Contract Between the United States and Byron-Bethany Irrigation District, Signed July 25, 2005.

TRAFFIC AND TRANSPORTATION

Testimony of Andrea Koch, Shaelyn Strattan, and William Walters

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). Staff will address all comments on this Staff Assessment (SA) in the Traffic and Transportation section of the Supplemental Staff Assessment (SSA).

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 MEP site 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	663	**B**	336	999	**B**	**LOS D[4]**

	North Great Valley Parkway						
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 Staff Assessment (SA).

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 SA, 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 Staff Assessment (SA).

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 SA.

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 document.

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 SA 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

[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.

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 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 preclude the airport from continued 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 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 SA.) 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.

[10] "Operation" pertains to aircraft operating in the traffic pattern or within sight of a tower, aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.

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: Section 25160 et seq.	Pertains to operators of vehicles transporting hazardous materials; promotes safe transportation of hazardous materials.	**Consistent.** 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 SA 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 SA for more information on transmission lines.) • The MEP would not attract birds which could be hazardous to aircraft. (See the **BIOLOGICAL RESOURCES** section of this SA 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]

[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.

		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 West Grant Line Road and Midway Road, where existing, pre-project

[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.

		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 written.

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 written.
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 1.5 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 near the centerline of the instrument approach to the Byron Airport. It could potentially combine with the MEP to adversely impact aviation, as aircraft would have two hazards to avoid on their approach to Runway 30. Aircraft avoiding the East Altamont site could deviate farther west, increasing the potential for inadvertent overflight of the MEP site. As discussed earlier, it appears unlikely that the East Altamont Energy Center will be constructed; however, it is still a possibility. Staff will collect further information on this issue for evaluation in the Supplemental Staff Assessment (SSA). 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 further south and closer to the MEP, the extension would not force overflight of the project. Therefore, siting of the MEP at the proposed location would not significantly contribute to the impacts of the proposed runway expansion. 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.

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 2.65 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 within 0.65 mile of 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.
>
> However, aircraft using Runway 5/23 would not usually pass over the MEP site. 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 usually would be flying 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 possibly do so at altitudes of 1,000 feet AGL or below. Planes such as ultralights and gliders would be more likely to fly over the MEP at low altitudes if they deviated from airport traffic patterns and FAA-recommended procedures; 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). These 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 flying over the MEP site. Staff has included conditions of certification **TRANS-7** and **TRANS-8** to 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.

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. 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:** Staff plans to meet with Mr. Cathey to discuss the project and may include further information in the Supplemental SA. Staff believes that 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 a chiller radiator, which condenses exhaust steam from the steam turbine and returns condensate to the boiler. It would not emit publicly visible water vapor plumes. See the **VISUAL RESOURCES** section of this SA 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 SA 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: 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.

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 SA 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 SA, 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. However, if the FAA releases their findings during the MEP review process, staff would incorporate them into the impact analysis in the Supplemental Staff Assessment (SSA) for the Energy Commission's consideration.

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 SA 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 SA 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 SA 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 SA 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 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.

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.

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the proposed MEP's impacts to the nearby traffic and transportation system. See the list of preliminary conclusions provided below. Staff will continue to investigate impacts and potential mitigation and will provide a complete analysis in the Supplemental Staff Assessment (SSA).

1. With implementation of the proposed mitigating 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.
2. 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

1) 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 consider using 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.
- 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), Category D, 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.[13] 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.

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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

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

[13] 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.

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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.

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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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APPENDIX TT-1: PLUME VELOCITY ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Mariposa Energy Project (MEP) gas turbine and chiller radiator 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 radiator 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 radiator. The ambient and exhaust conditions for the gas turbine and radiator, operating at full load, are provided below in **Plume Velocity Table 1**.

Plume Velocity Table 1
Gas Turbine and Radiator Exhaust Parameters

	Gas Turbine	**Radiator**
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 radiator 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 Chiller Radiator Worst-Case Predicted Plume Velocities

	Gas Turbine Plume Velocity (m/s)		Chiller Radiator Plume Velocity (m/s)
Height (ft)	**Single Turbine 46°F**	**Combined Turbines 46°F**	**Combined Radiator 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 chiller radiator the plume average velocity is never calculated to exceed 4.3 m/s for the 80°F operating case. The radiator 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 chiller radiator plume velocity analysis agree with the Katestone Environmental analysis results that determined the chiller radiator exhaust plume average velocity would not exceed 4.3 m/s at any height above the chiller radiator.

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[14].
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 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.

[14] 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.

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 chiller radiator 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

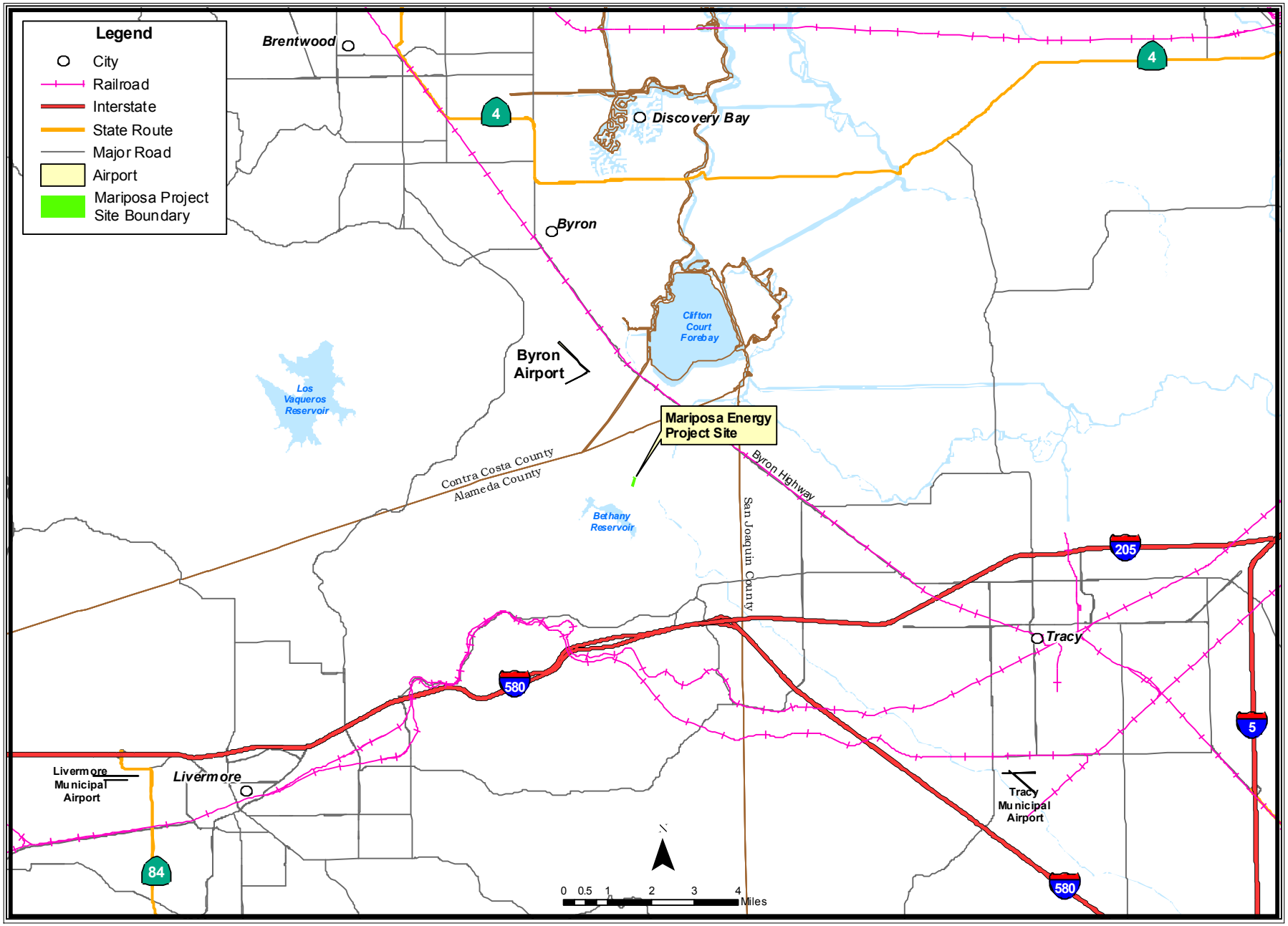
TYPE OF FACILITY	MEASURE OF EFFECTIVENESS (MOE)
Basic Freeway Segments	Density (pc/mi/ln)
Ramps	Density (pc/mi/ln)
Ramp Terminals	Delay (sec/veh)
Multi-Lane Highways	Density (pc/mi/ln)
Two-Lane Highways	Percent-Time-Following Average Travel Speed (mi/hr)
Signalized Intersections	Control Delay per Vehicle (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

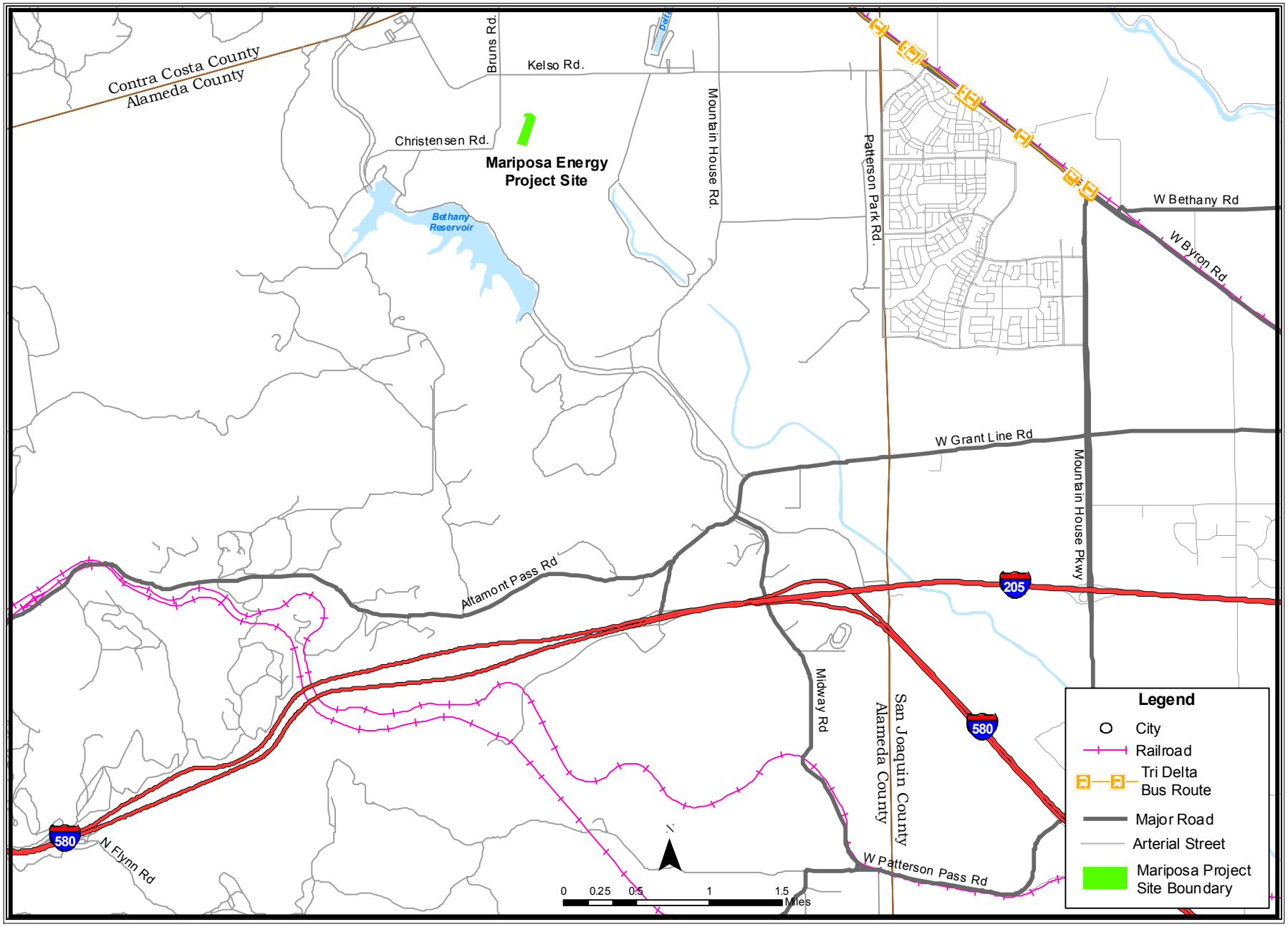


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 2A

Mariposa Energy Project - Local Transportation Setting South of the Project Site

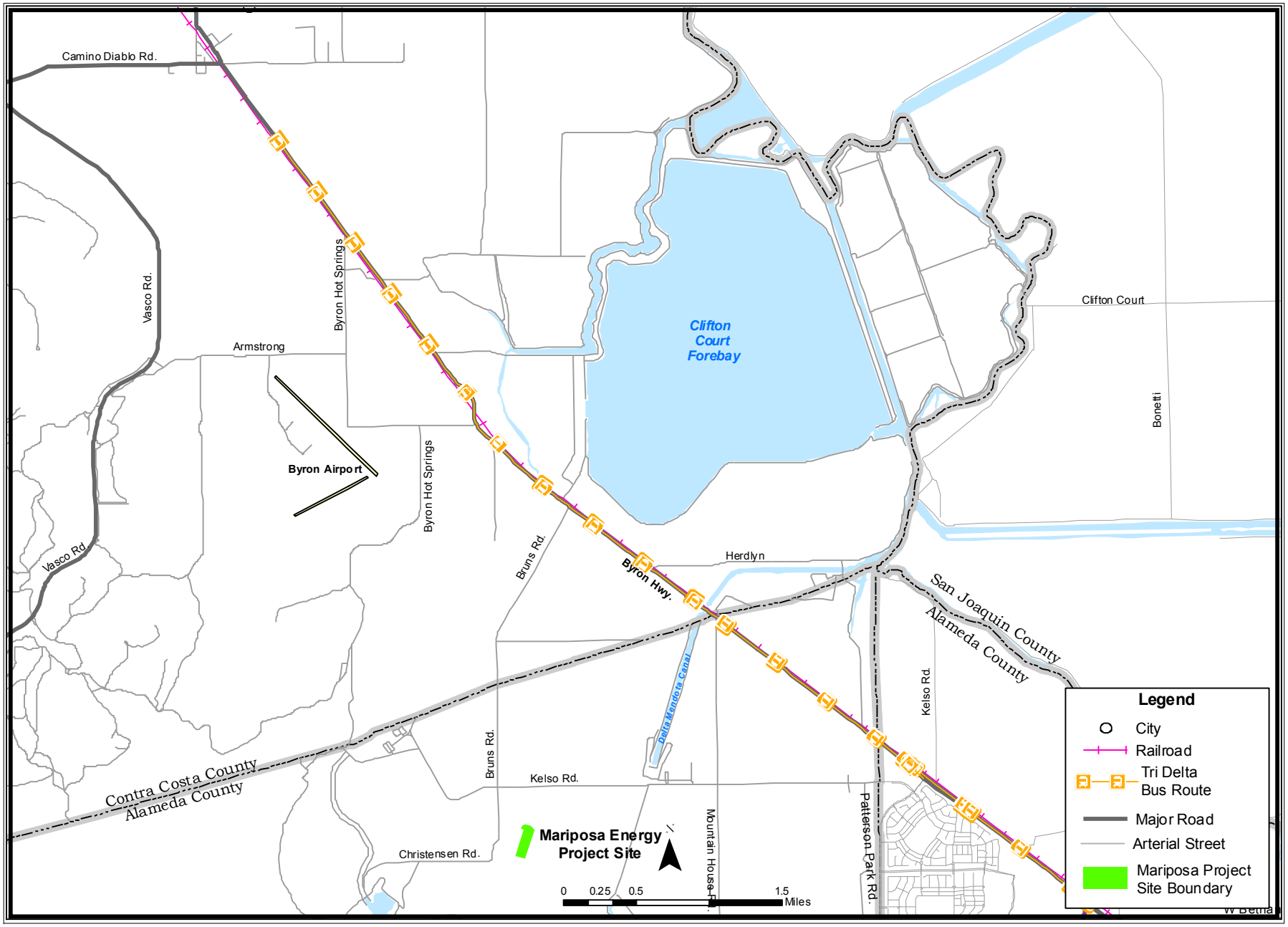


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

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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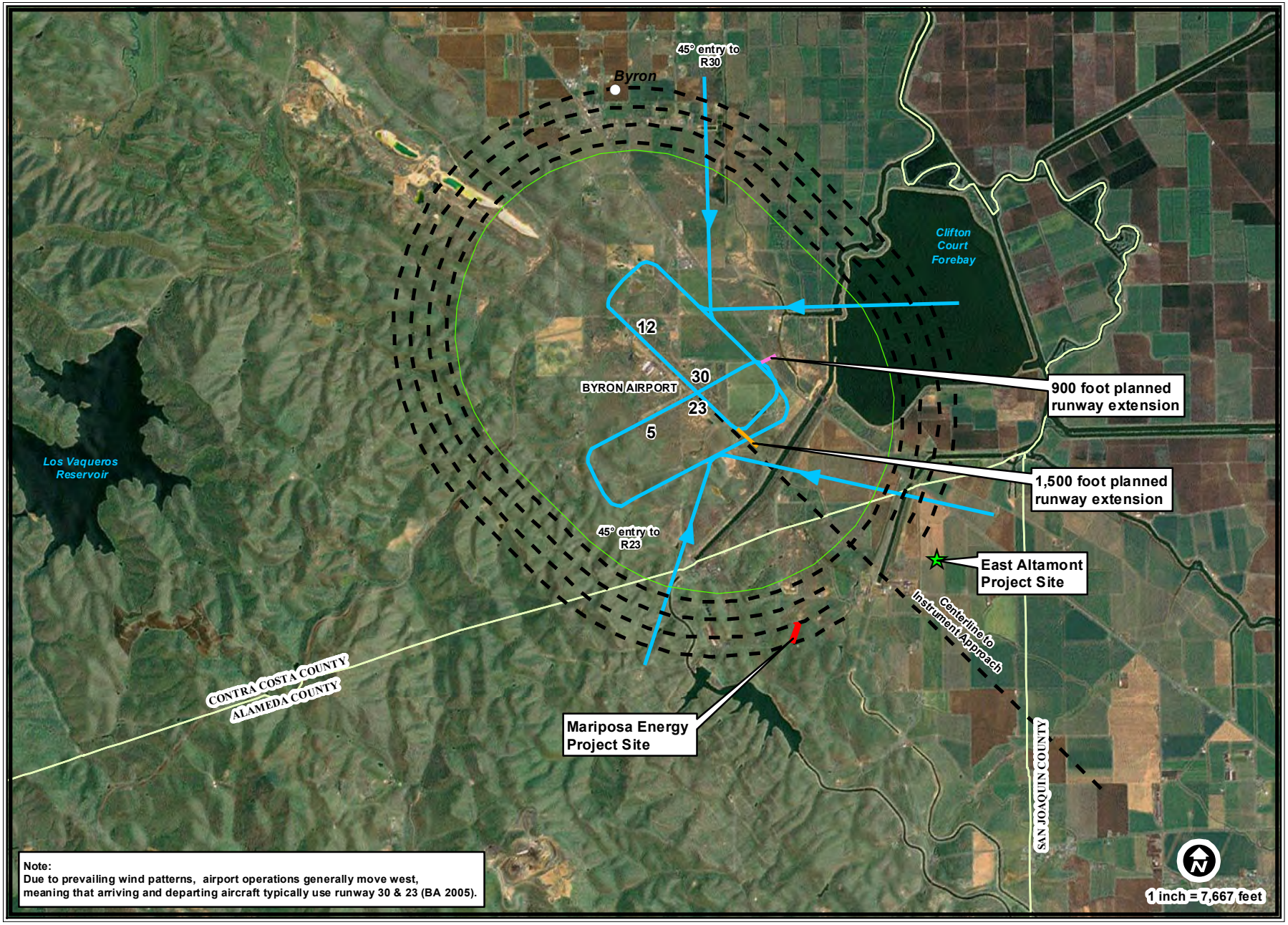
SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 3

Mariposa Energy Project - Byron Airport



TRAFFIC AND TRANSPORTATION

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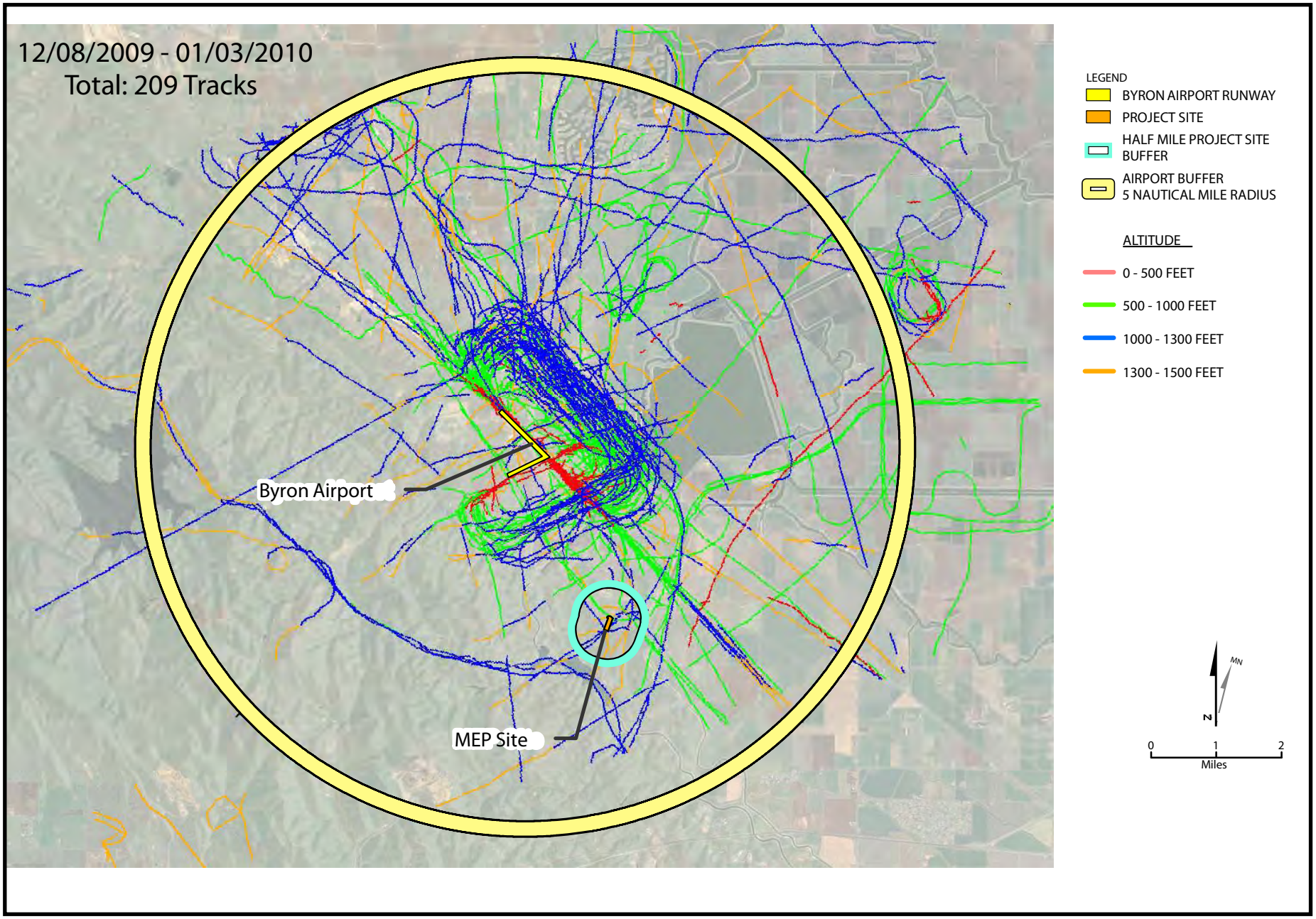
SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 4A

Mariposa Energy Project - Flight Tracks near the MEP from 12/8/2009 to 1/3/2010



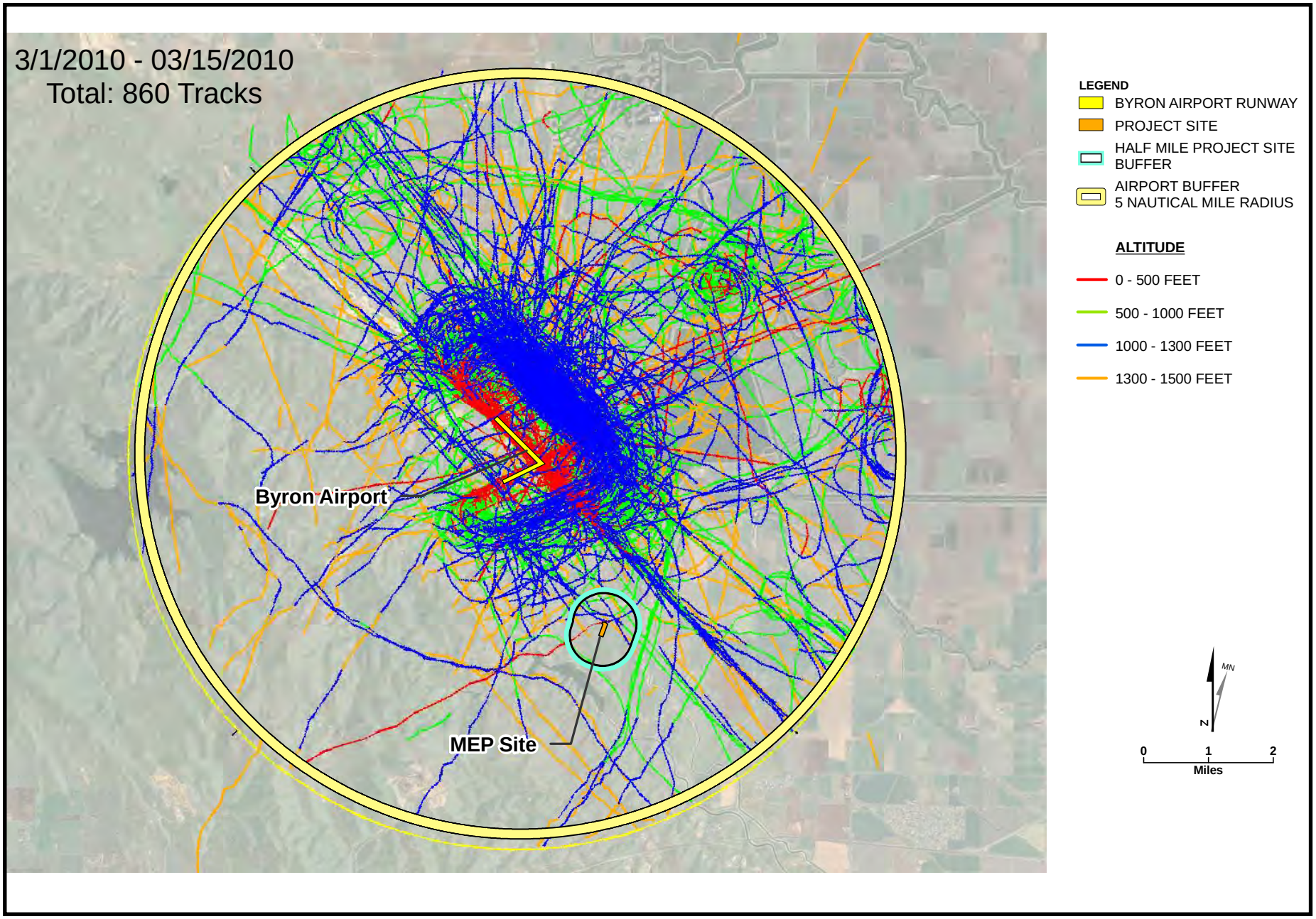
TRAFFIC AND TRANSPORTATION

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



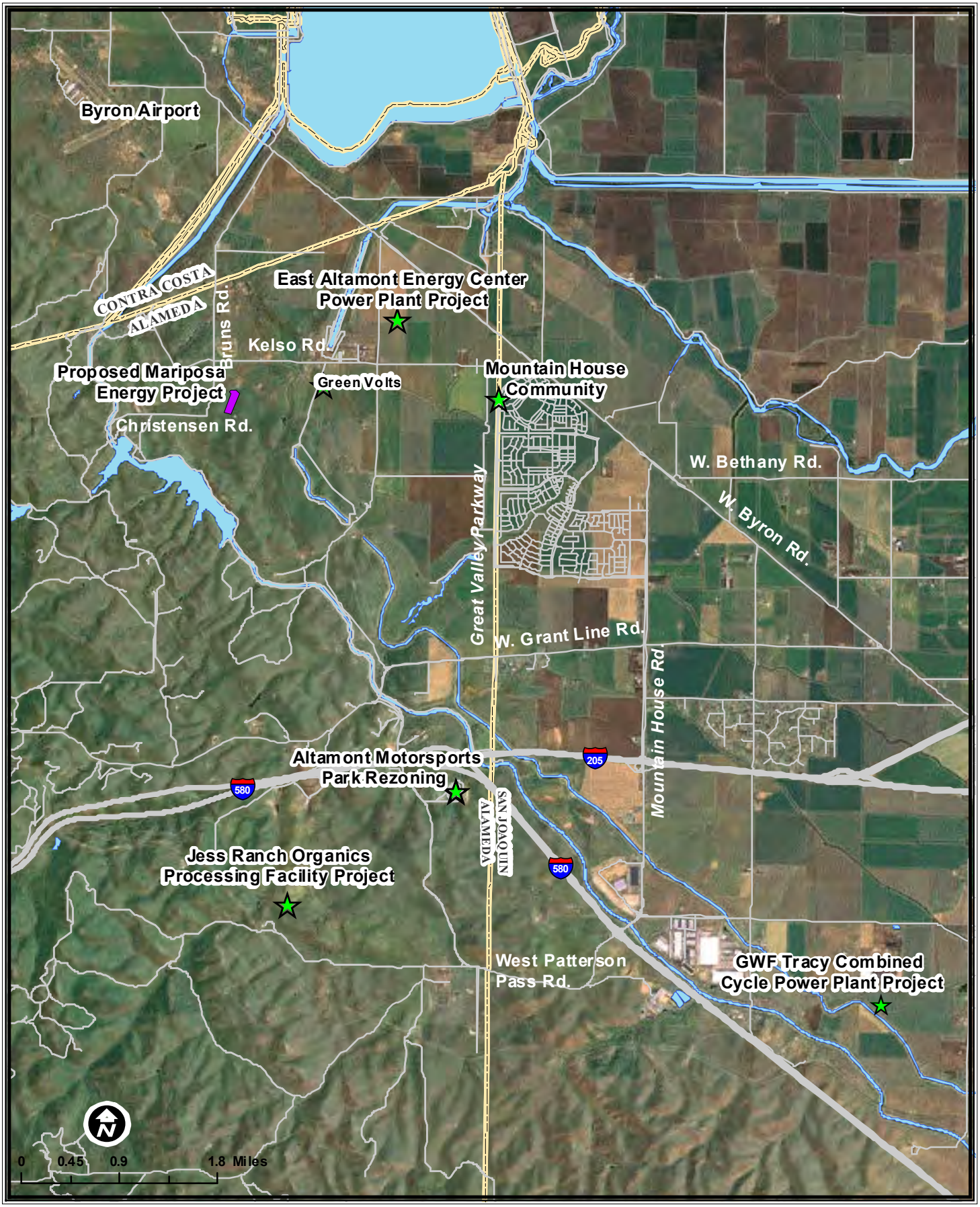
TRAFFIC AND TRANSPORTATION

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

Testimony of Obed Odoemelam, Ph.D.

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 PG&E 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 upgrade 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 each line and provide such summaries in the Annual Compliance Report.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the right-of-way of each of the two project-related lines are grounded according to industry standards.

Verification: At least 30 days before the lines are 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

Testimony of Mark R. Hamblin

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).

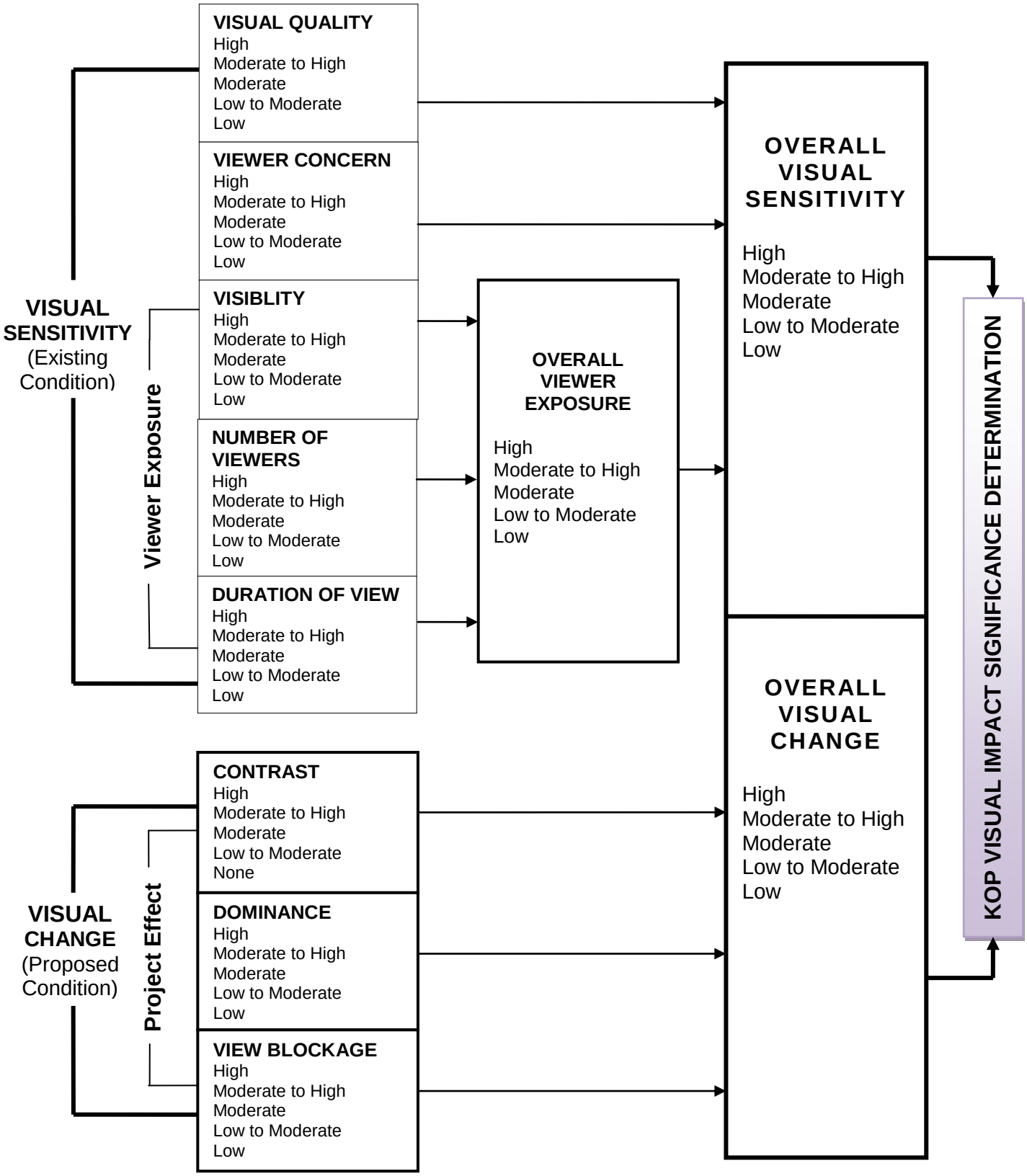
For each KOP, an applicant provides a photograph showing the existing physical environment (*existing condition*). The applicant also provides a photographic simulation of the proposed project or project feature in the existing physical environment (*proposed condition*). Photographic simulations are 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 “industrialize.”

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 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 consistent with worker safety and security;

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. Wherever feasible and safe and not needed for security, 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 consistent with operational safety and security;

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 section 5.13.5.1. Landscaping shall be installed or bonded prior to 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 by the start of commercial operation, and the planting must occur during the optimal planting season.

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.

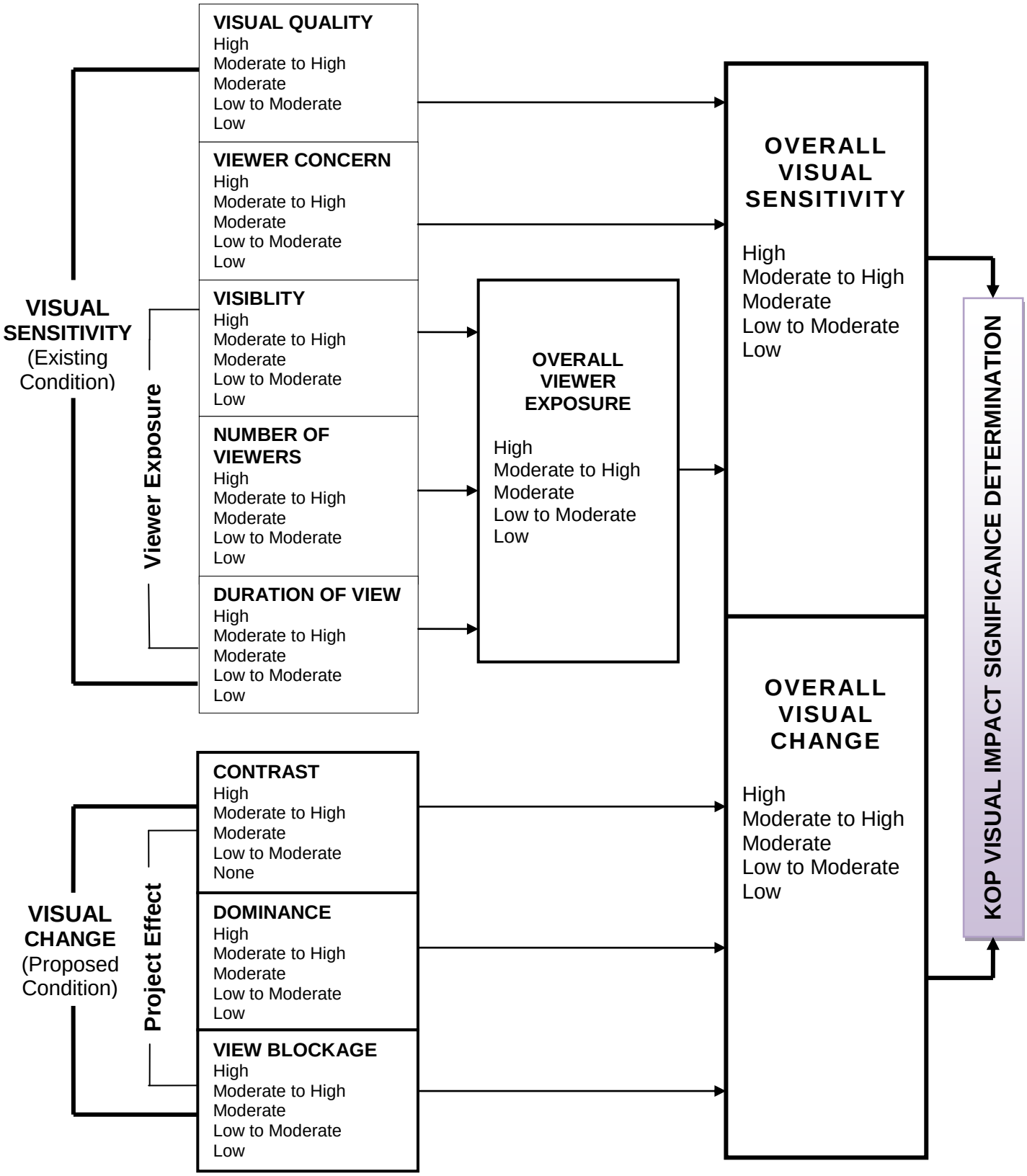
An applicant provides a photograph showing the existing physical environment (*existing condition*) at the KOP. The applicant prepares a photographic simulation of the proposed project or project feature in the existing physical environment (*proposed condition*). Photographic simulations are prepared 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;

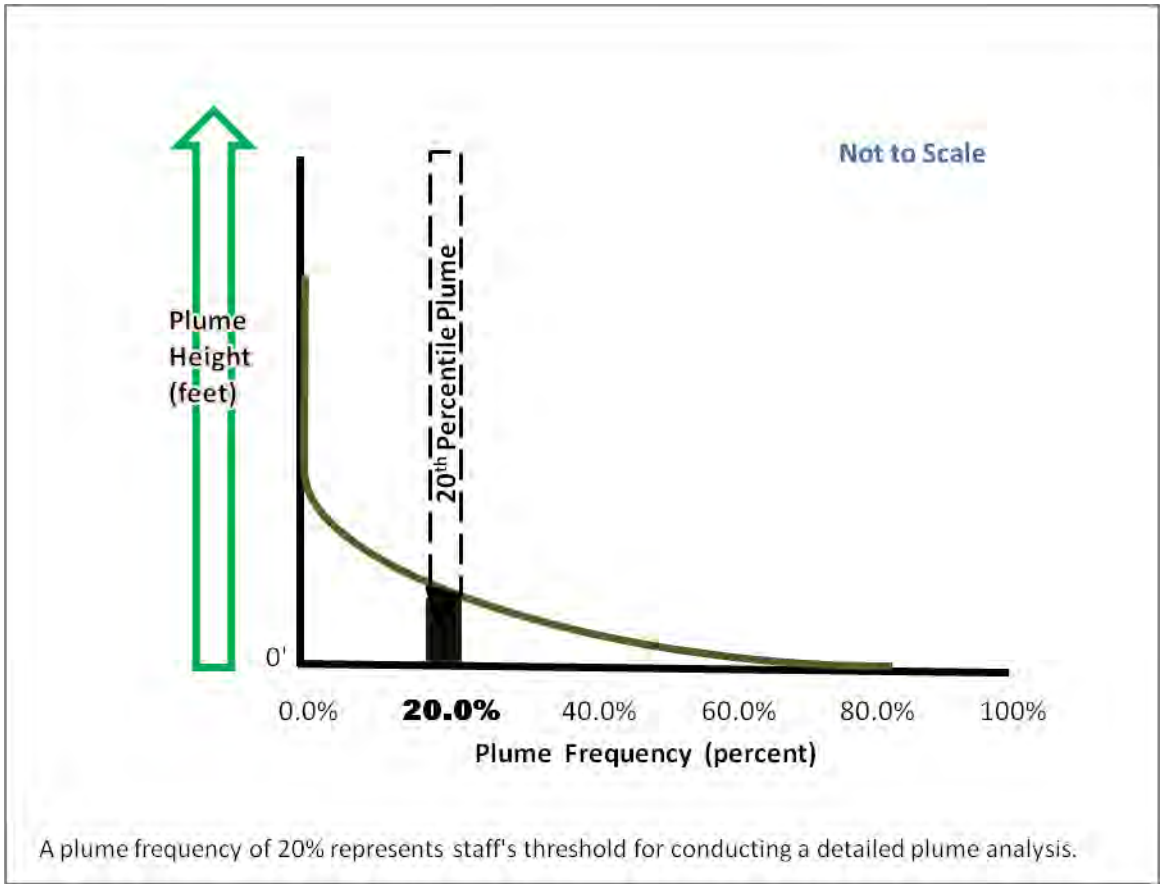
a) visible plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and,
b) for a substantial portion of the time when 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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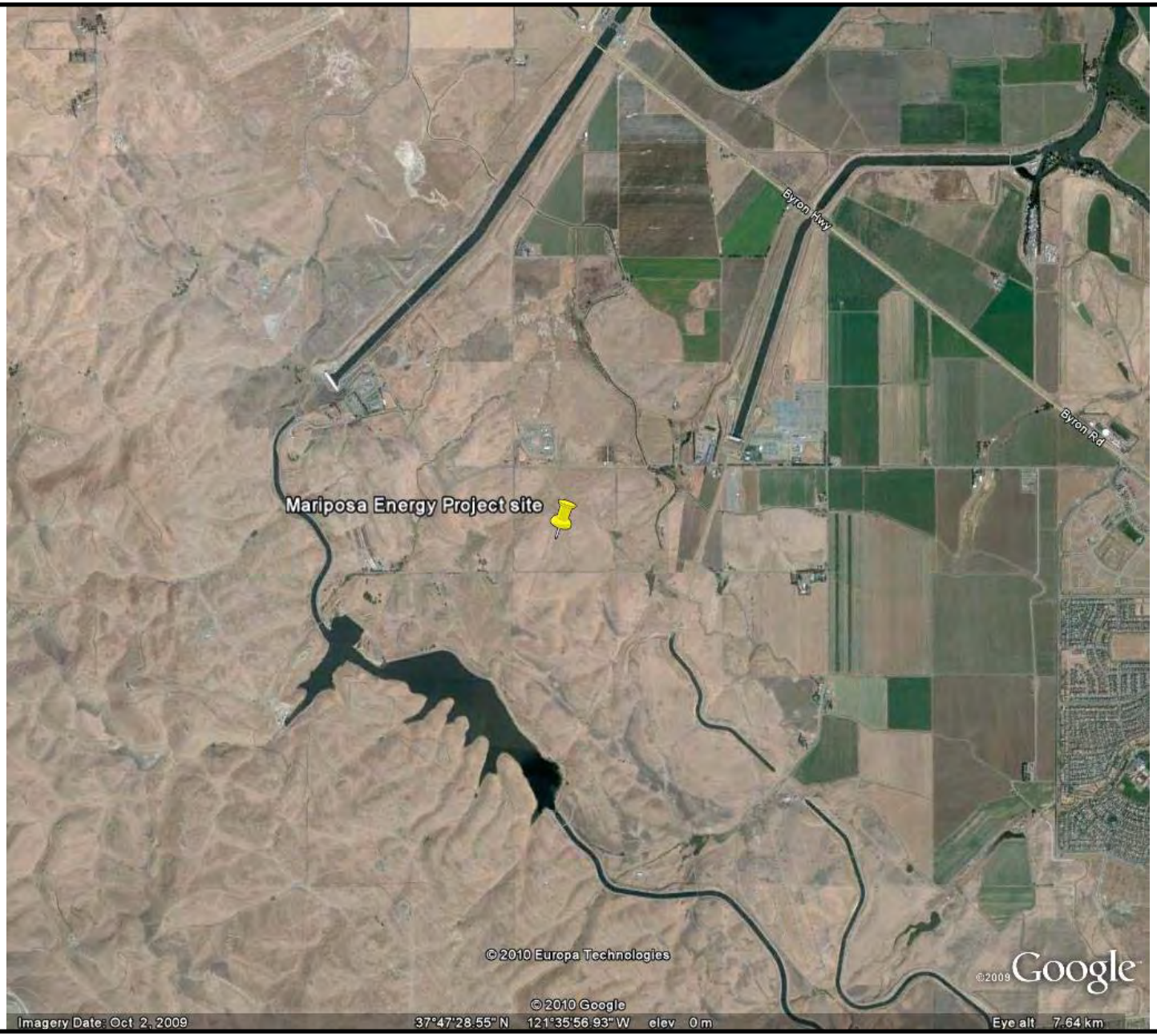
VISUAL RESOURCES - FIGURE 1

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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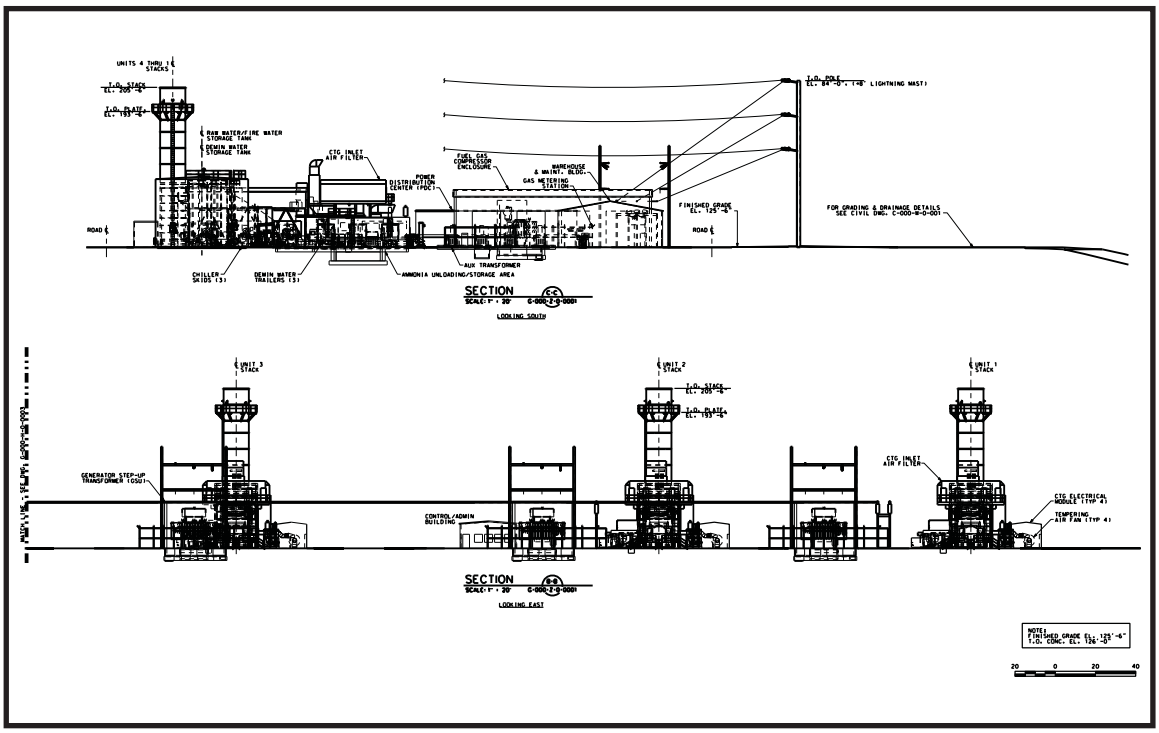
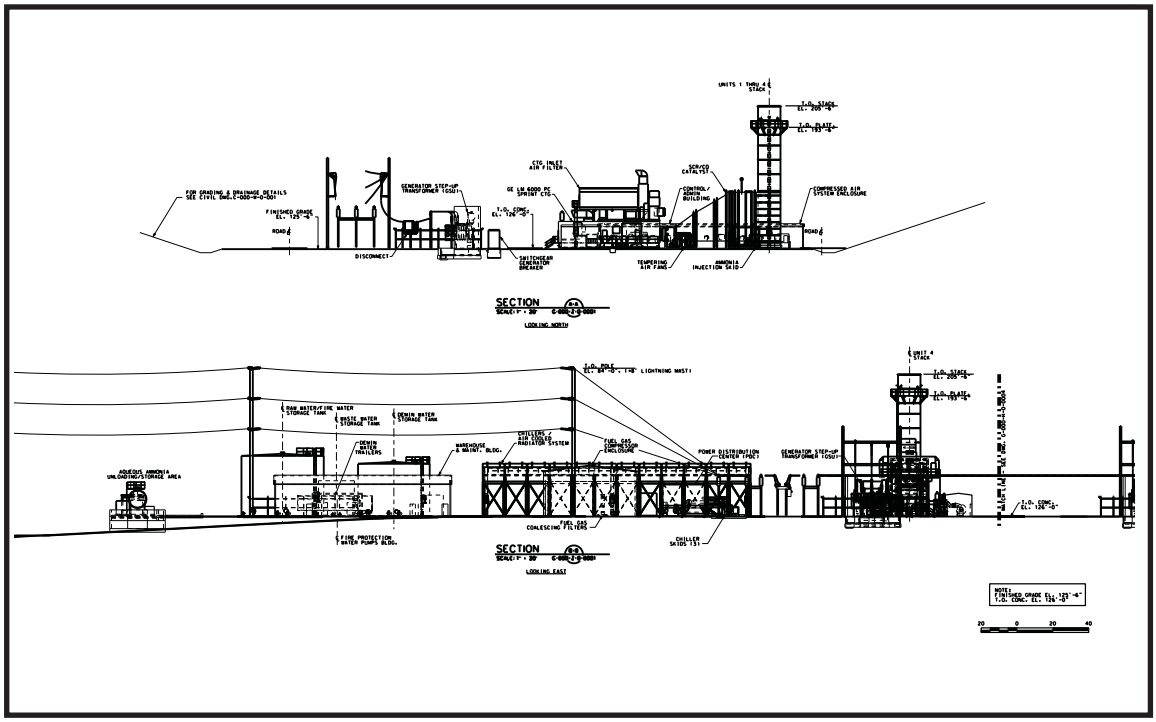
SOURCE: AFC Figure 1.1-1

VISUAL RESOURCES - FIGURE 5

Mariposa Energy Project - MEP Elevations





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SOURCE: AFC Figure 2.3-2A & 2.3-2B

VISUAL RESOURCES - FIGURE 6

Mariposa Energy Project - Aerial Proposed Project Site

VISUAL RESOURCES

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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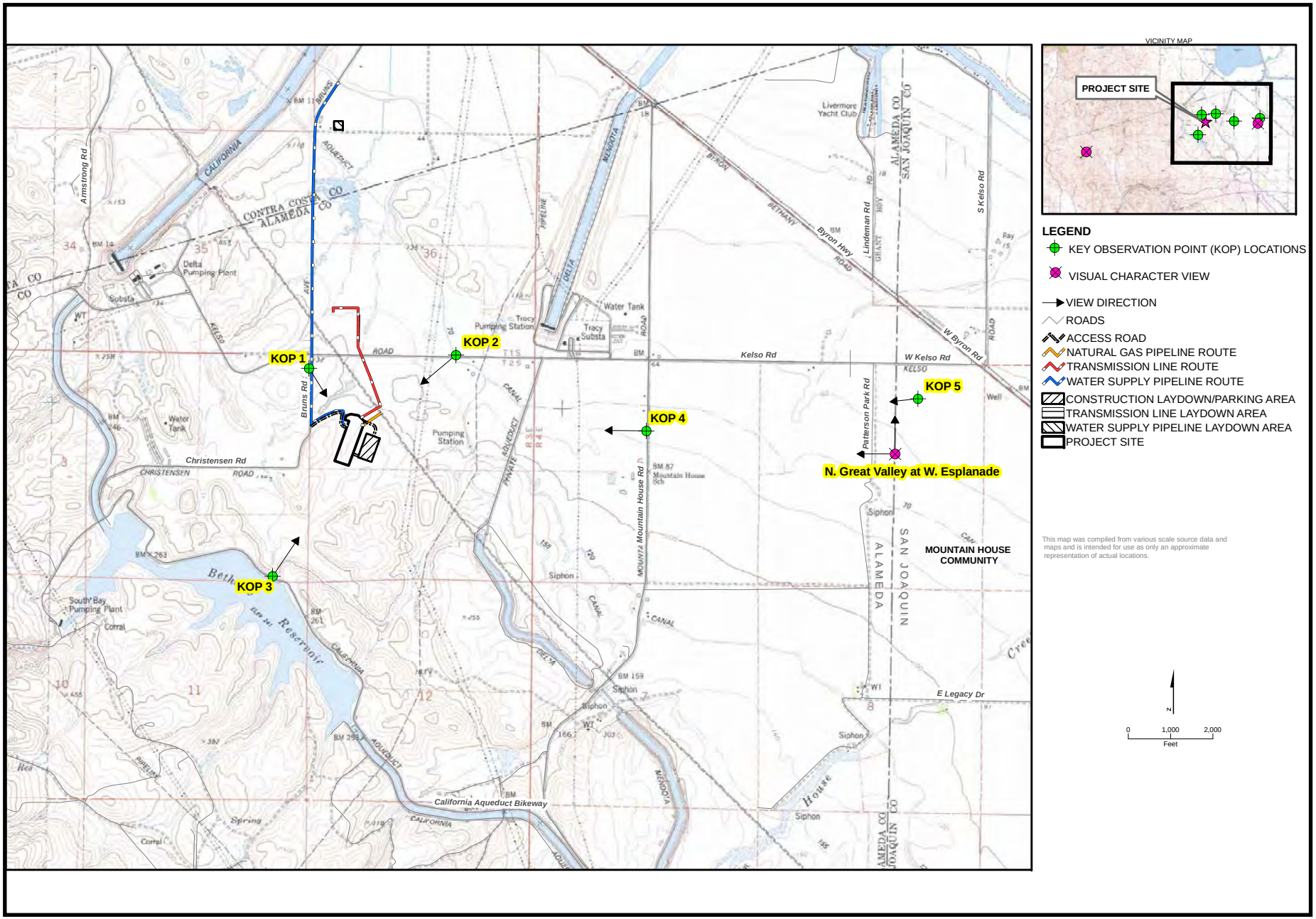
SOURCE: AFC Figure 5.13-8

VISUAL RESOURCES - FIGURE 8

Mariposa Energy Project - Key Observation Point Locations



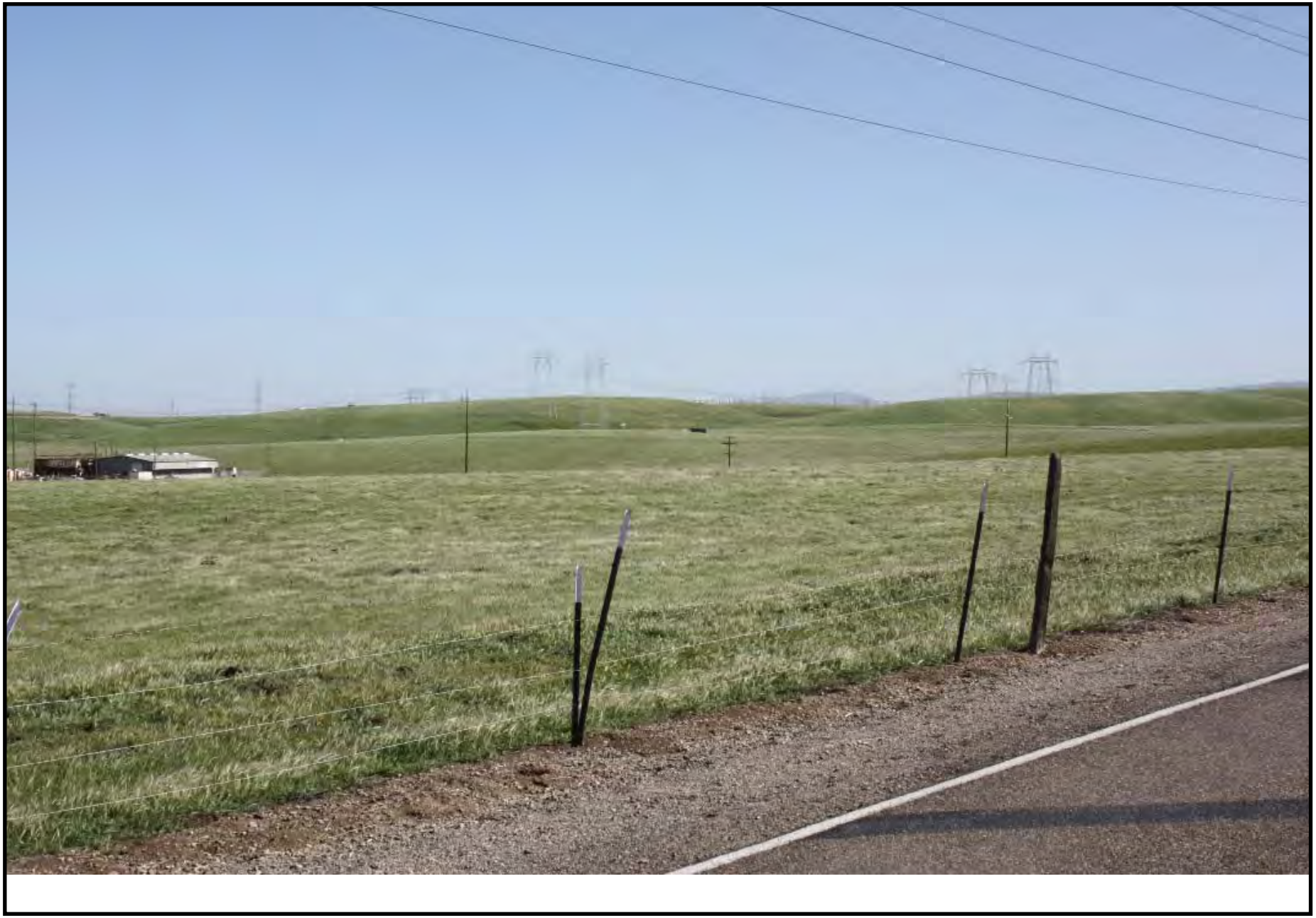
VISUAL RESOURCES

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

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-2a

VISUAL RESOURCES - FIGURE 10

Mariposa Energy Project - KOP 1 - Photographic Simulation of Project's Publicly Visible Structures

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

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

VISUAL RESOURCES

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SOURCE: AFC Figure 5.13-3b

VISUAL RESOURCES - FIGURE 13

Mariposa Energy Project - Landscape Character Photos Showing Area Around KOP 2

West

East

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SOURCE: Staff Photo 2/2010

VISUAL RESOURCES - FIGURE 14

Mariposa Energy Project - KOP 3 - Existing View Towards Project Site

VISUAL RESOURCES

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SOURCE: AFC Figure 5.13-4a

VISUAL RESOURCES - FIGURE 15

Mariposa Energy Project - KOP 3 - Photographic Simulation of Project's Publicly Visible Structures

VISUAL RESOURCES

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

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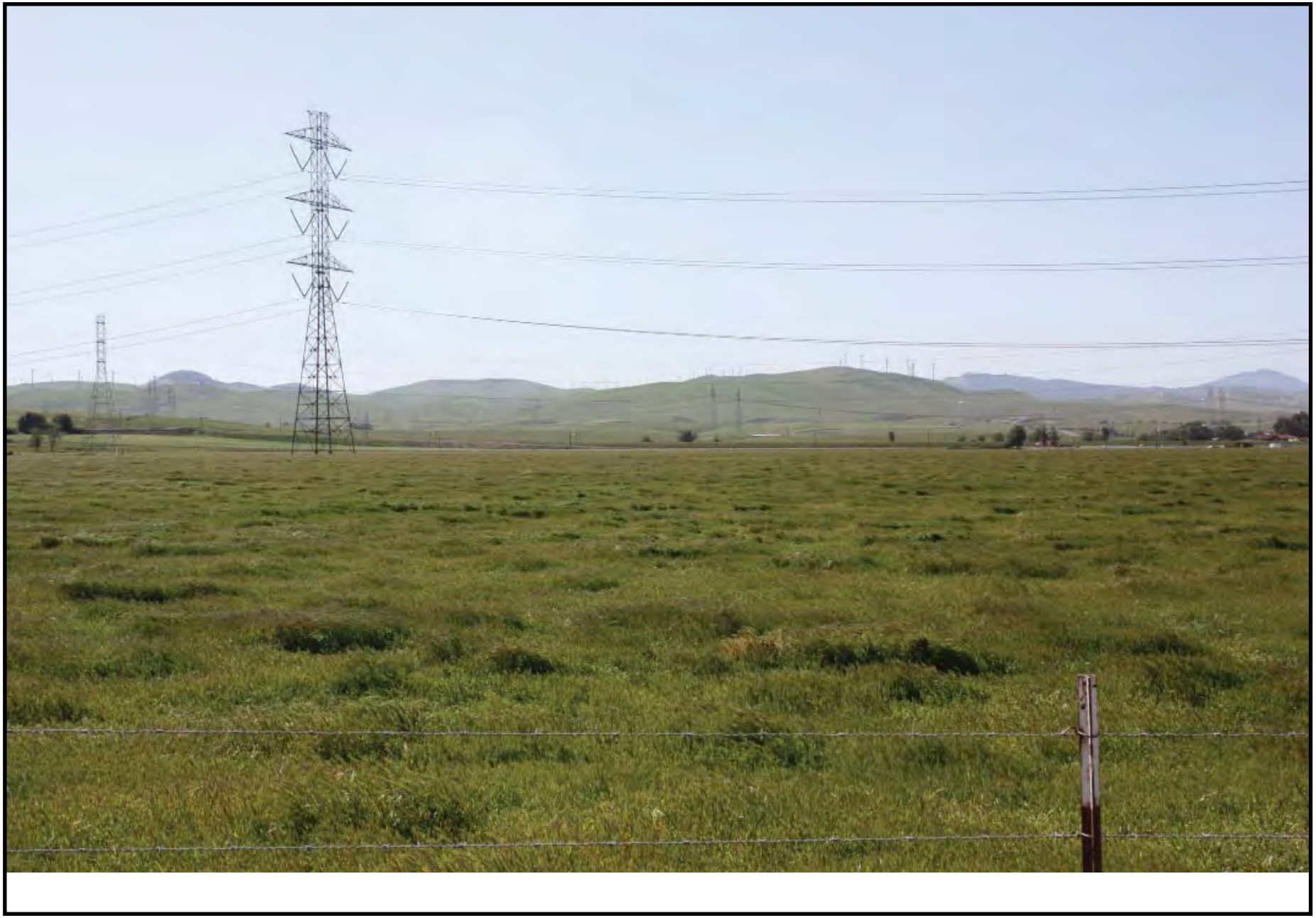
SOURCE: Staff Photo 2/2010

VISUAL RESOURCES - FIGURE 17

Mariposa Energy Project - KOP 4 - Existing View Towards Project Site



VISUAL RESOURCES

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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

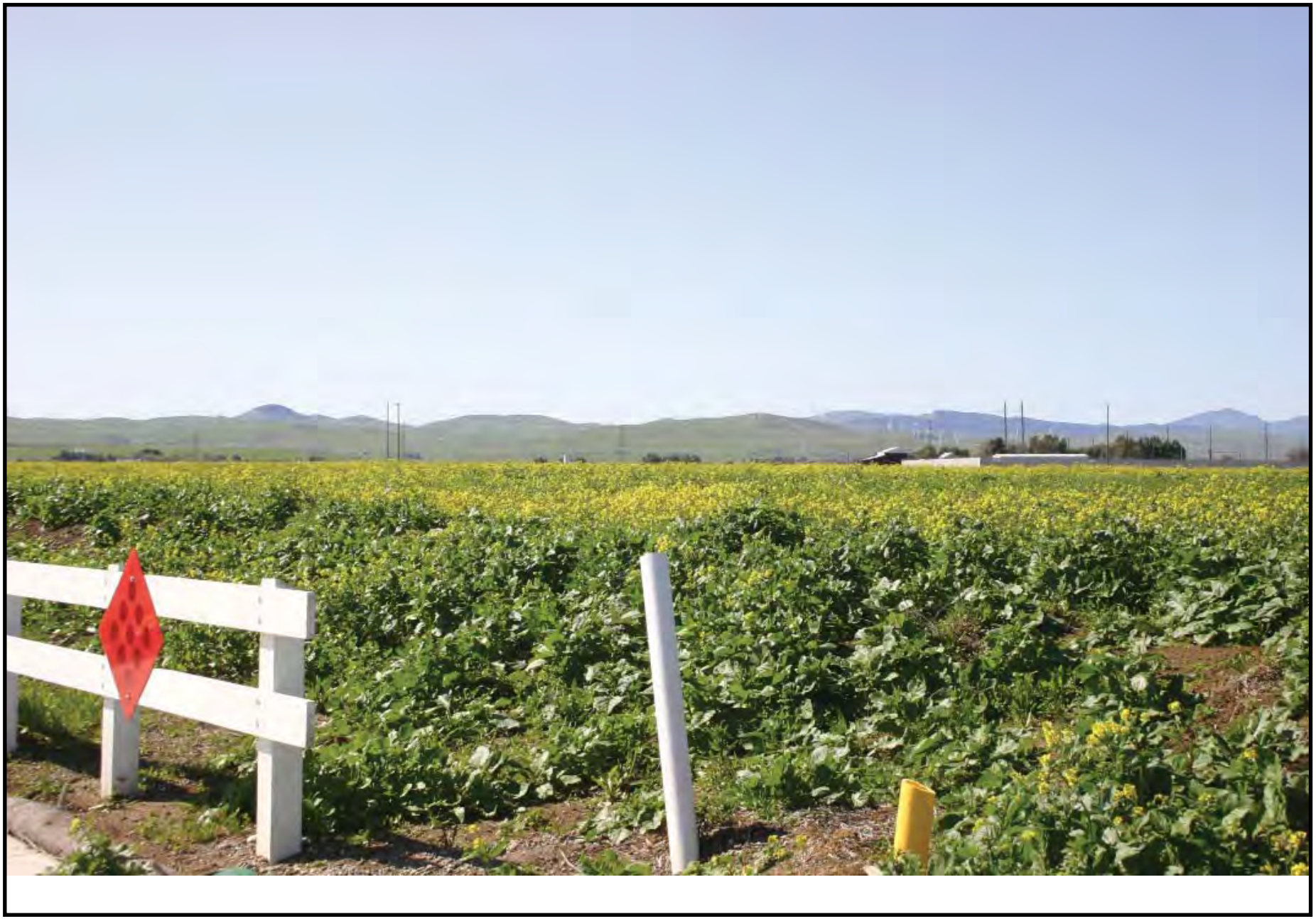
South

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



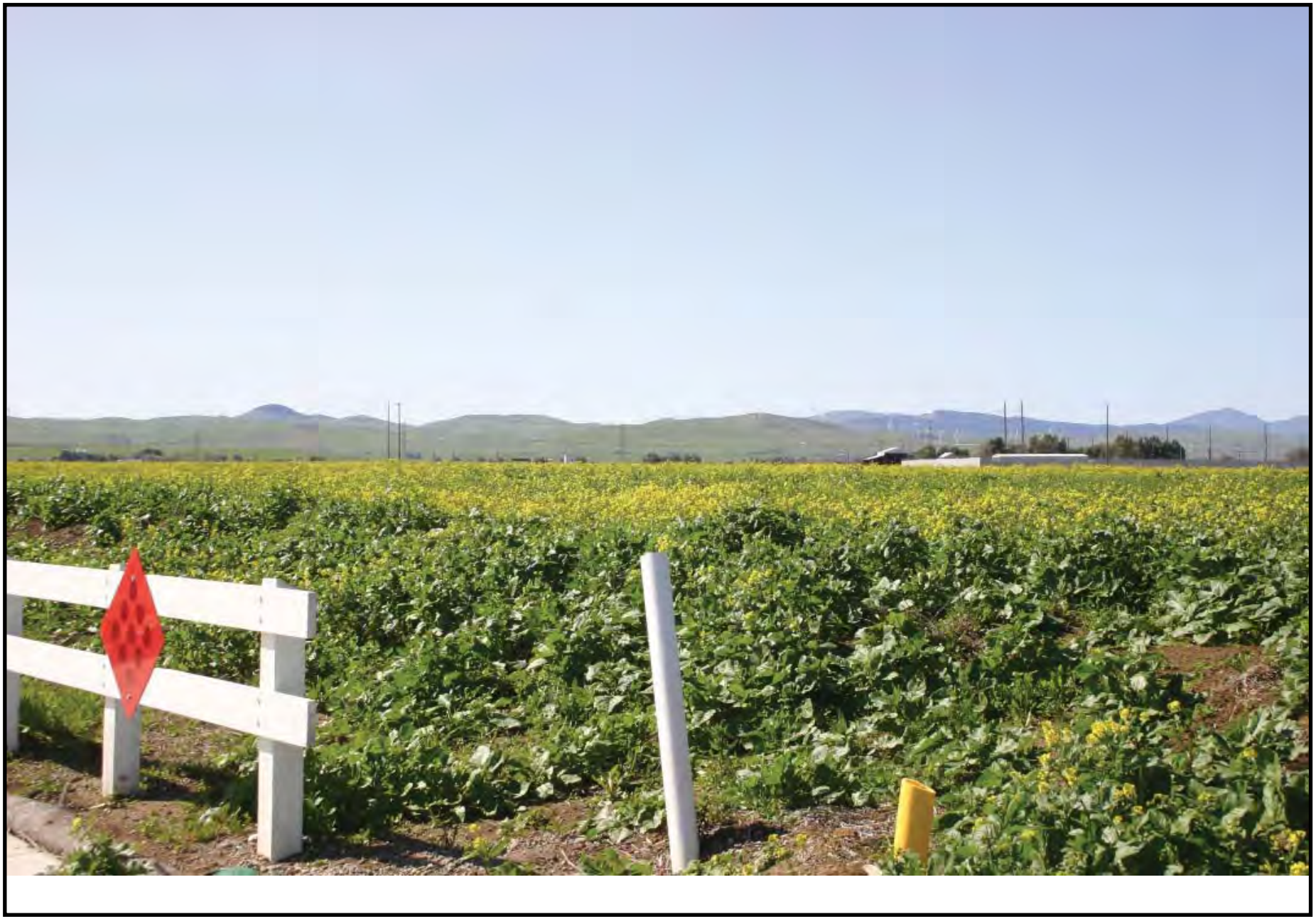
VISUAL RESOURCES

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

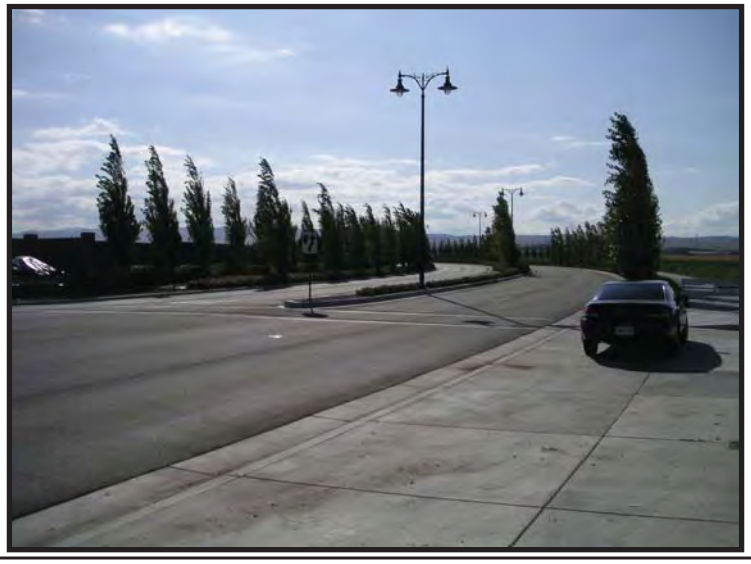
SOURCE: AFC Figure 5.13-6b

VISUAL RESOURCES - FIGURE 22

Mariposa Energy Project - Landscape Character Photos Showing Area Around KOP 5

North

South

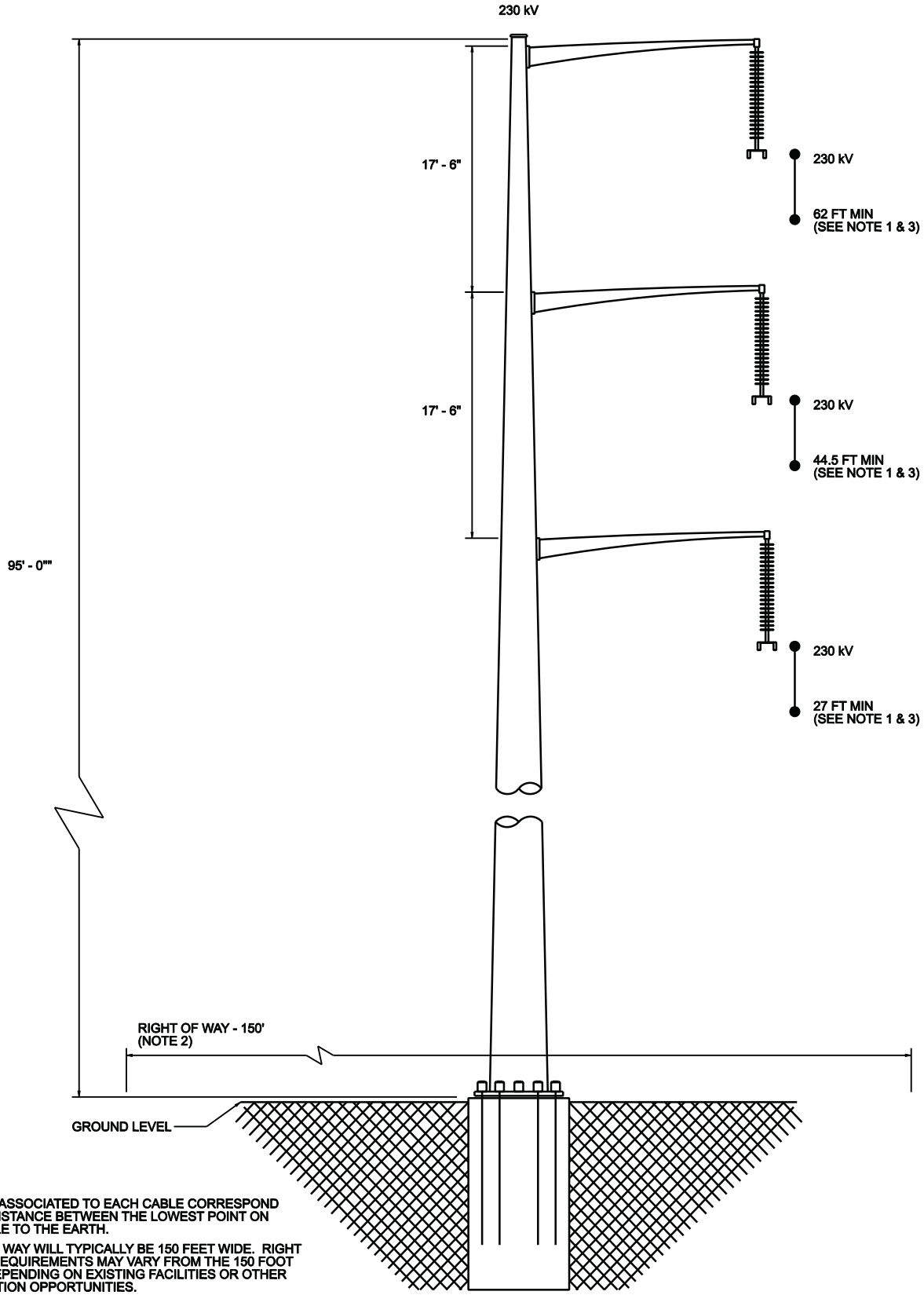


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

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

WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough, REA

SUMMARY OF CONCLUSIONS

Management of the nonhazardous and hazardous waste generated during construction and operation of the Mariposa Energy Project would not result in any significant adverse impacts, and would comply with applicable waste management laws, ordinances, regulations, and standards, if the measures proposed in the Application for Certification and staff's proposed conditions of certification are implemented.

INTRODUCTION

This Staff Assessment (SA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the Mariposa Energy Project (MEP). The technical scope of this analysis encompasses solid wastes existing onsite and those to be generated during facility construction and operation. Management and discharge of wastewater is addressed in the **Soil and Water Resources** section of this document. Additional information related to waste management may also be covered in the **Worker Safety** and **Hazardous Materials Management** sections of this document.

The Energy Commission staff's objectives in conducting this waste management analysis are to ensure that:

- The management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- Upon project completion, the site is managed in such a way that project wastes and waste constituents would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental laws, ordinances, regulations and standards have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the MEP with respect to management of waste.

WASTE MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code (U.S.C.), §§6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al).	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al, establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • Waste labeling practices and use of appropriate containers; • Use of a manifest when transporting wastes; • Submission of periodic reports to the United States Environmental Protection Agency (USEPA) or other authorized agency; and • Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by USEPA and its ten regional offices. The Pacific Southwest regional office (Region 9) implements USEPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, U.S.C., §§ 9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and • Requirements for property owners/potential buyers to conduct “all appropriate inquiries” into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA “all appropriate inquiries” requirements.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes.	These regulations were established by USEPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 246 addresses source separation for materials recovery guidelines. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and

	lamps). USEPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of USEPA.
Title 49, CFR, Parts 172 and 173. Hazardous Materials Regulations	U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20.
State	
California Health and Safety Code (HSC), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended.	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5. Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CFR include: • Identification and Listing of Hazardous Waste (Chapter 11, §§66261.1, et seq.) • Standards Applicable to Generators of Hazardous Waste (Chapter 12, §§66262.10, et seq.) • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §§66263.10, et seq.) • Standards for Universal Waste Management (Chapter 23, §§66273.1, et seq.) • Standards for the Management of Used Oil (Chapter 29, §§66279.1, et seq.) • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §§67450.1, et seq.) The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.
HSC, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Material Management Plan / Hazardous Material Inventory Statement Program

	• Hazardous Waste Generator / Tiered Permitting Program • Underground Storage Tank Program The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). San Diego County Department of Environmental Health is the area CUPA. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program. Other elements of the Unified Program may be addressed in the Hazardous Materials and/or Worker Health and Safety analysis sections.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400-15410). • Article 10 – Business Reporting to CUPAs (§§15600 – 15620).
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989.	The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans and local implementation of solid waste requirements.
Title 14, CCR, Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 -- Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling
HSC, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).	This law was enacted to expand the State's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4 year cycle, with a summary progress report due to DTSC every 4th year.
Title 22, CCR, §67100.1 et seq. Hazardous Waste Source Reduction and Management Review.	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the Act.
Local	
East County Area Plan, Policies 247, 248, 249, and 250	Provides guidance to ensure the safe and efficient disposal or recycling of wastes. MEP will comply with the county's requirements as detailed in Special Services Facilities, pages 62-63, of the Area Plan.

Alameda County Integrated Waste Management Plan	Provides guidance for local management of solid waste and household hazardous waste (incorporates the county's source Reduction and Recycling Elements, which detail means of reducing commercial and industrial sources of solid waste0. Waste will be recycled in a manner consistent with applicable LORS.
Alameda County Department of Environmental Health, Hazardous Material Division (HMD) various programs	HMD is the Certified Unified Program Agency (CUPA) for Alameda county that regulates and conducts inspections of businesses that handle hazardous materials, hazardous wastes, and/or have underground storage tanks. HMD programs assistance with oversight on property redevelopment (i.e., brownfields); and voluntary or private oversight cleanup assistance.

PROJECT DESCRIPTION AND SETTING

The proposed MEP would consist of the construction and operation of a 200 megawatt (MW) natural gas-fired, simple cycle peaking generation facility. The facility would be located on 10 acres of a 160-acre parcel (a.k.a. the Lee Property) at 4901 Bruns Avenue near Byron, Alameda County California. The Alameda County Assessor's Parcel Number is 099B-7050-001-10 (MEP 2009a, page 1-1).

The 10-acre MEP project site is in an unincorporated area of eastern Alameda County, California. It is situated on barren rolling hill grasslands and is zoned for large parcel agriculture. The project would be located directly south of the existing 6.5 MW Byron Cogen Plant, which occupies 2 acres in the middle portion of the Lee Property.

The main features of the MEP project are four General Electric LM6000 PC Sprint combustion turbine generators, selective catalytic reduction systems, an air cooled condenser, and a Zero Liquid Discharge (ZLD) facility. The project's linear facilities include a 0.7-mile-long transmission line, a 580 foot 4-inch diameter natural gas pipeline and a 1.8-mile 6-inch diameter water supply line (MEP 2009a, page 1-1).

The proposed MEP would operate as a peaking power plant during times of very high electrical load or during emergency conditions. Operation and maintenance of the plant and associated facilities will generate a variety of wastes, including hazardous wastes. Construction of the MEP will produce a variety of mixed nonhazardous wastes, such as scrap wood, metal, plastics, etc. Waste will be recycled where practical and nonrecyclable waste will be deposited in a Class III landfill. The hazardous waste generated will consist of electrical equipment, used oils, universal wastes, solvents, and empty containers of hazardous waste materials (MEP 2009a, Section 5.14). Universal wastes are hazardous materials that contain mercury, lead, cadmium, copper or other substances that are hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This Waste Management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction and operation.

a) For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the releases or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed uses of the areas where the contaminants/contamination are found; and any potential exposure pathways for workers, the public, or sensitive species or environmental areas that may be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by Energy Commission staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases or threatened releases of hazardous substances at or near the site and to identify any areas known to be contaminated (or a source of contamination) at or near the site.

In general, the Phase I ESA uses a qualified Environmental Professional (EP) to conduct inquiries into past uses and ownership of the property, research the history of hazardous substance releases or hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the EP then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the EP may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

In conducting its assessment of a proposed project, Energy Commission staff will review the project's Phase I ESA and work with the appropriate oversight agencies, as necessary, to determine if additional site characterization work is needed and if any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

[1] Title 20, California Code of Regulations, Section 1704(c) and Appendix B, section (g) (12) (A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

b) Staff reviews the applicant's proposed methods for management of project-related solid and hazardous wastes generated during construction and operation of the proposed project, and determines if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

   Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's wastes would have a significant impact on the volume of wastes a facility is permitted to accept. Staff uses a waste volume threshold equal to 10 percent of a disposal facility's remaining permitted capacity to determine if the impact from disposal of project wastes at a particular facility would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions

The 10-acre project site is located within 160 acres of rolling hill grasslands. However, other uses, including cattle grazing, power generation, power transmission, natural gas compression, water management facilities and a State Recreation area occur within a 1-mile radius of the project site (MEP 2009a, page 5.6-1). The Byron Cogen Plant, PG&E Kelso Substation and Bethany Compressor Station are located north of the MEP project site. Northeast of the project is the Western Area Power Administration Tracy Substation and the Tracy Pumping Station. The California Department of Water Resources Delta Pumping Plant is located northwest of the project site. West of the project site is the California Aqueduct. The Delta-Mendota Canal is located to the east of MEP. The Bethany Reservoir State Recreation Area is located southwest of MEP (MEP 2009a, Appendix 5.14A).

A Phase I ESA of the proposed project site, dated June 20, 2008, was prepared by CH2MHILL in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 (MEP 2009a, Appendix 5.14). The Phase I ESA conducted for the proposed MEP site did not identify recognized environmental conditions (REC) associated with the proposed project site. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicates an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

The proposed project site was once developed as a windfarm. The windfarm consisted of approximately 38 wind turbines. The wind turbines were taken out of service around 1989. There are remnants of wind turbines throughout the site. Most of the wind turbine equipment has been removed. The Byron Cogen Plant is located at the center of the 160-acre Lee property, directly north of the MEP project site, and has operated since 1990. The majority of the 160 acres, including the project site, is currently used for cattle

grazing. The Phase I ESA did not identify any RECs, but potential areas of concern are located within the parcel. There may be potential soil and groundwater contamination on the parcel due to historical uses at the project, spills or release of chemical compounds used at the Byron facility, and nitrate from concentrated manure from stockyards that are adjacent to the property (MEP 2009a, Appendix 5.14A).

In the event that contamination is identified during any phase of construction, staff proposes Condition of Certification **WASTE-1**, which would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-2** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the Energy Commission Compliance Project Manager (CPM) and DTSC with findings and recommended actions.

Construction Impacts and Mitigation

Site preparation and construction of the proposed power plant and associated facilities would last approximately nine months and would generate both nonhazardous and hazardous wastes in solid and liquid forms (MEP 2009a, Section 5.14.1.2.1). Before construction could begin, the project owner would be required to develop and implement a Construction Waste Management Plan, per proposed Condition of Certification **WASTE-3**.

Non-hazardous Wastes

Non-hazardous solid wastes generated during construction would include approximately 130 tons of scrap wood, concrete, steel/metal, paper, glass, and plastic waste, 120 tons of concrete waste and 10 tons of scrap metal (MEP 2009a, Section 5.14.2.1.1). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, §17200 et seq.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Sanitary wastes would be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash water will be contained at designated wash areas and transported to a sanitary wastewater treatment facility. Please see the **Soil and Water Resources** section of this document for more information on the management of project wastewater.

Hazardous Wastes

Hazardous wastes anticipated to be generated during construction include empty hazardous material containers, solvents, waste paint, oil absorbents, used oil, oily rags, batteries, and cleaning wastes. The amount of wastes generated would be minor if handled in the manner identified in the AFC (MEP 2009a, Section 5.14.1.2.1).

The project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction pursuant to proposed Condition of Certification **WASTE-4**. Although the hazardous waste generator number is

determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site. Wastes would be accumulated onsite for less than 90 days and then properly manifested, transported and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC Section 5.14.1.2.1 and in the responses to data requests, and concluded that all wastes would be disposed in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-5** to notify the Energy Commission's Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

In the event that construction excavation, grading or trenching activities for the proposed project encounter potentially contaminated soils, specific handling, disposal, and other precautions may be necessary pursuant to hazardous waste management LORS, staff finds that proposed Conditions of Certification **WASTE-1** and **WASTE-2** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with LORS. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Operation Impacts and Mitigation

The proposed MEP would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. (Table 5.14-2 of the project AFC gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed.) Before operations could begin, the project owner would be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-6**.

Non-hazardous Solid Wastes

Non-hazardous solid wastes expected to be generated during project operation include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media) as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All non-hazardous wastes will be recycled to the extent possible, and non-recyclable wastes would be regularly transported offsite to a local solid waste disposal facility (MEP 2009a, section 5.14.1.2.2). The applicant estimates the project will generate 39 tons of non-hazardous waste per year (MEP 2009a, page 5.14-5).

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation, and are discussed in the **Soil and Water Resources** section of this document.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed Condition of Certification **WASTE-4**, would be retained and used for one ton per year of hazardous waste generated during facility operation (MEP 2009a, page 5.14-11).

Hazardous wastes expected to be generated during routine project operation include used hydraulic fluids, oils, greases, oily filters and rags, spent SCR catalyst, cleaning solutions and solvents, and batteries. In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices will help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-7** requiring the project owner/operator to report, clean-up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **Hazardous Material Management** section of the SA.

The amounts of hazardous wastes generated during the operation of the MEP would be minor, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on-site, transported offsite by licensed hazardous waste haulers, and recycled or disposed at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-5** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

Construction and operation of the proposed project would respectively generate approximately 795 cubic yards[2] (159 tons) per year and 195 cubic yards (39 tons) of nonhazardous solid waste (MEP 2009a, Section 5.14.2.4). The waste would be accumulated onsite for less than 30 days, and then recycled or disposed of in a Class III landfill.

Table 5.14-3 of the project AFC identifies four non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes generated by the MEP. These Class III landfills are all located in northern

[2] Cubic yards calculated using CalRecycle (California Integrated Waste Management Board construction/demolition and inert debris tools and resources – 400 pounds per cubic yard http://www.ciwmb.ca.gov/leatraing/Resources/CDI/Tools/Calculations.htm

California in Alameda County. The remaining capacity for the four landfills combined is over 153 million cubic yards. Over 1.8 million tons of solid waste was disposed of in Alameda County Class III landfills in 2008. The total amount of nonhazardous waste generated from project construction and operation will contribute less than one percent of the available landfill capacity. Staff concludes that disposal of the solid wastes generated by the MEP can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Section 5.14.2.3.2 of the project AFC discusses the two Class I landfills in California: The Clean Harbor Landfill (Buttonwillow) in Kern County, and the Chemical Waste Management Landfill (Kettleman Hills) in Kings County. The Kettleman Hills facility also accepts Class I, II and Class III wastes. In total, there is in excess of 10 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with approximately 30 years of remaining operating lifetimes.

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Approximately four cubic yards of construction waste and three cubic yards per year of operation waste that cannot be recycled will be transported offsite to a permitted treatment, storage, or Class I disposal facility. The volume of hazardous waste from the MEP requiring offsite disposal would be far less than staff's threshold of significance and would therefore not significantly impact the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

Applications for six proposed projects have been filed in the area surrounding the project, including both Alameda and San Joaquin Counties. These projects include power generation facilities, a residential development, a motorway rezoning, and a composting facility. The closest project is a 2 MW utility-scale solar farm, which is approximately 1 mile away from the project site.

The construction schedules for the above referenced projects are not published as of the writing of this assessment, and it is unlikely this would occur considering the current economic setting. Since the MEP anticipates a construction period of only 9 months, cumulative impacts are not anticipated; therefore, Staff considers that any cumulative impact(s) would be less than significant to waste management during construction. The proposed project site is consistent with city and county long range planning policies for industrial development in this area; therefore, cumulative impacts during project operations is not considered significant.

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the MEP would add to the total quantity of waste generated in the State of California. However, project wastes would be generated in modest quantities, waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes generated by the project. Therefore, staff concludes that the waste generated by MEP would not make a cumulatively considerable contribution to any cumulative waste management impacts in Alameda County or the region.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed MEP would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the MEP would be required to obtain a hazardous waste generator identification number from USEPA. The MEP would also be required to properly store, package and label all hazardous waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments provided.

CONCLUSIONS

Consistent with the main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1. After review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits (90, 180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

   However, to help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **7**. These conditions would require the project owner to do all of the following:

   - Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE- 1, 2**, and **3**).
   - Obtain a hazardous waste generator identification number (**WASTE-4**).
   - Prepare Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-3** and **6**).

- Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-5**).
- Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-7)**.

2. Regarding impacts of project wastes on existing waste disposal facilities, the existing available capacity of the four Class III landfills that may be used to manage nonhazardous project wastes exceeds 10 million cubic yards (MEP 2009a, page 5.14-9).The total amount of nonhazardous wastes generated from construction and operation of MEP would be minimal compared to the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

   In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of MEP have a combined remaining capacity in excess of 10 million cubic yards. The total amount of hazardous wastes generated by the MEP project would contribute less than one percent of the remaining permitted capacity. Impacts from disposal of MEP generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

Staff concludes that management of the waste generated during construction and operation of the MEP would not result in any significant adverse environmental impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the project AFC and staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of an experienced and qualified Professional Engineer or Professional Geologist, who shall be available for consultation during site characterization (if needed), excavation and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Professional Engineer or Professional Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-2 If potentially contaminated soil is identified during site characterization, demolition, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Professional Engineer or Professional Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the

project owner, representatives of Department of Toxic Substances Control, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Professional Engineer or Professional Geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Professional Engineer or Professional Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide the number to the CPM in the next Monthly Compliance Report.

WASTE-4 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-5 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A description of all construction waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-6 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;
- A detailed description of how facility wastes will be managed, and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE-7 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are reported, cleaned-up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that occur on the project property or

related pipeline and transmission corridors. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; amount of contaminated soil/material generated; how release was managed and material cleaned-up; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have be generated by the release. Copies of the unauthorized spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

REFERENCES

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.

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.

WORKER SAFETY AND FIRE PROTECTION

Testimony of Rick Tyler

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.

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

FACILITY DESIGN

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The California Energy Commission staff (staff) concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Mariposa Energy Project. The purpose of this analysis is to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (MEP 2009a, Appendix 2A). Key LORS are listed in **Facility Design Table 1,** below:

FACILITY DESIGN Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 (or the latest edition in effect) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Alameda County regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

Mariposa Energy Project (MEP) would be built on an approximately 10-acre portion of a 158-acre parcel (known as the Lee Property) located in an unincorporated area in eastern Alameda County. The project site lies in a seismically active area. For more information about the site's seismic setting, please see the **Geology and Paleontology** section of this document. Also, for more information on the site and its related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC, Appendix 2A (MEP 2009a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see MEP 2009a, Appendix 2A, for a representative list of applicable industry standards),

design practices, and construction methods in preparing and developing the site. Staff concludes that this project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and the **Geology and Paleontology** section of this document) to ensure that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. See condition of certification (**GEN-2)**, below.

MEP shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included condition of certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

Major structures as defined above, also include enclosures, tanks, pipes, gas lines, waterlines, septic systems, grading, and are required to comply with the engineering codes adopted by the State of California. Exempt work is listed under Section 105.2 in Appendix Chapter 1 of the CBC.

PROJECT QUALITY PROCEDURES

The project's AFC (MEP 2009a, Appendix 2A) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that MEP is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In

addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite Alameda County or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. Items exempt from this requirement are listed in Section 105.2 of Appendix Chapter 1 of the CBC. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

The Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities on a case by case basis. The Energy Commission and the CBO also have the authority to interpret and accept alternate methods of construction and alternate materials.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing," to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant

shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- Proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- All applicable LORS, local/regional plans, and proof of adherence to those applicable LORS and local/regional plans;
- The activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- Decommissioning alternatives other than complete site restoration.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project will likely comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that MEP is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if, the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review) and other applicable codes adopted by the State of California; and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 (or the latest edition in effect when initial project engineering designs are submitted for review) California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Then project owner shall submit plans, calculations and other related documents that have been specifically developed for the MEP

Verification: Five days prior to requesting the issuance of the certificate of occupancy, the project owner shall submit to the CPM and the CBO a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawings and master specifications list. The master drawings and master specifications list shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures, systems, and equipment. Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. The schedule shall contain the planned date of each submittal to the CBO. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request. In addition to the design submittals referenced above, plans and calculations for all construction work shall be submitted to the CBO for approval.

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, and the master drawings and master specifications list of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures, systems, and equipment defined above in Condition of Certification **GEN-2**. Major structures and equipment shall be added to or deleted from the list only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO, in accordance with the 2007 CBC. These fees may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: A copy of the contract between the project owner and the CBO shall be submitted to the CPM. The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of

certification in the **Transmission System Engineering** section of this document.

The RE shall be aware of construction activities at the project site at all times. However, he/she is not required to be physically present at the job site as long as the construction work is being performed as delegated below. The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical, plumbing, and electrical portions of the project, respectively. A registered civil engineer may be delegated responsibility for civil engineering aspects of the project such as grading, storm water pollution prevention practices (SWPPP), storm water management practices (SWMP), drainage, erosion, sedimentation control programs (DESCP) and similar aspects of civil engineering. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE or his/her delegate shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to CBO-approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are 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.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume 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.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: 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; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the conditions of certification in the **Transmission System Engineering** section of this document.

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 (for example, 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 project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

4. Review, implement and monitor storm water pollution prevention practices (SWPPP).

5. Review, implement and monitor storm water management practices (SWMP).

6. Review, implement and monitor drainage, erosion, sedimentation control programs (DESCP).

7. Review, implement and monitor all other civil engineering (earthwork) aspects of the project.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible 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 resume 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.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the applicable edition of the CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A certified welding inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special

inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 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 required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. An storm water pollution prevention plan (SWPPP);

4. Related calculations and specifications, signed and stamped by the responsible civil engineer; and

5. Soils, geotechnical, or foundation investigations reports required by the CBC.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

Verification: Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction, the project owner shall submit plans, calculations and other supporting documentation to the CBO for design review and acceptance for all project structures and equipment identified in the CBO-approved master drawing and master specifications list. The design plans and calculations shall include the lateral force procedures and details as well as vertical calculations.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component

listed in the CBO-approved master drawing and master specifications list, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the CBC.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in the CBO-approved master drawing and master specifications list. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);

- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Alameda County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in the CBO-approved master drawing and master specifications list, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans shall include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and

2. system grounding drawings.

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;

2. ampacity of feeder cables;

3. voltage drop in feeder cables;

4. system grounding requirements;

5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;

6. system grounding requirements; and

7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

REFERENCES

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.

GEOLOGY AND PALEONTOLOGY

Testimony of Patrick A. Pilling, Ph.D., P.E, G.E., D.GE.

SUMMARY OF CONCLUSIONS

The proposed Mariposa Energy Project (MEP) site is located in an active geologic area at the boundary between the Great Valley and Coast Ranges physiographic provinces. Most of the project site is located in an unincorporated area of northeastern Alameda County, California, along the western foothills of the Diablo Range. A portion of the project linears extend north into Contra Costa County. Because of its geologic setting, potential geologic hazards include strong earthquake-related ground shaking, excessive consolidation settlement of native clay soils, corrosion of metal pipe in contact with the ground, and expansive clay soils. The possible impact of these geologic hazards on the proposed facility must be mitigated, to the extent practical, through structural designs required by the 2007 California Building Code (CBC). In addition, the design-level geotechnical investigation required for the project by proposed **Facility Design** Condition of Certification **GEN-1**, **GEN-5** and **CIVIL-1** must present geotechnical engineering design recommendations that will also mitigate these potential geologic hazards to a less than significant level.

There are no known viable geologic or mineralogical resources at the proposed MEP project site. Paleontological resources have been documented in Quaternary, Tertiary and Cretaceous sediments within 4 miles of the site, and paleontological resources were encountered during construction of the nearby Delta Pumping Plant and segments of regional aqueduct systems (Hilton 2003; Holroyd 2009). Potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Based on its independent research and review, the California Energy Commission (Energy Commission) believes that the potential is low for significant adverse cumulative impacts to the project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the MEP can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, Energy Commission staff discusses the potential impacts of geologic hazards on the proposed MEP as well as the MEP's impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there will be no consequential adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and that operation of the plant will not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and

palentologic resources, with the proposed conditions of certification. Conditions of certification are conditions with respect to design and/or construction, required of the applicant by the Energy Commission as a part of its approval, which outline required procedures to mitigate impacts to potential resources and potential impacts to the facility from geologic hazards.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS are listed in the application for certification (AFC) (MEP 2009a). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

GEOLOGY and PALEONTOLOGY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The proposed MEP is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The project site is not located within a designated Alquist-Priolo Earthquake Fault Zone.
The Seismic Hazards Mapping Act, PRC section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…" With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.

Local	
County of Alameda, East County Area Plan, (2000) Policy 309	States "The County shall not approve new development in areas with potential for seismic and geologic hazards unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis". Require compliance with state codes including CBC, CEQA, and Alquist-Priolo Earthquake Fault Zoning Act.
Contra Costa County General Plan (2005), Safety Element.	Furthers "the protection of the community from any unreasonable risk associated with the effects of seismically induced surface rupture, ground shaking , ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides, subsidence and other geologic hazards;…"

SETTING

The proposed MEP would involve construction of a 200-megawatt (MW) natural gas fired simple cycle electric generating facility. The MEP project would occupy approximately 10 acres of a 158-acre parcel at the southeast corner of the intersection of Bruns Road and Kelso Road in an unincorporated area designated for agriculture in the northeastern Alameda County, California. A portion of the linear facilities extend northward into Contra Costa County. The proposed project site is located 7 miles east of the city of Livermore and 7 miles northwest of Tracy. Construction would require installation of four General Electric LM6000 PC Sprint combustion turbine generators (CTG), an emission control system including selective catalytic reduction systems, and associated ancillary equipment and facilities. A new 580-foot-long, 4-inch-diameter gas pipeline would provide fuel for the MEP from the existing Pacific Gas and Electric Company (PG&E) high pressure natural gas pipeline which runs northeast of the site. The generated electricity will be delivered to the existing Kelso Substation north of the MEP site via a new 0.7-mile-long, 230-kilovolt (kV) transmission line. Service water would be provided by the Byron-Bethany Irrigation District Canal 45 located north of the project site in Contra Costa County via a new 1.8-mile-long, buried 6-inch-diameter pipeline. The water supply system would include construction of a turnout structure and a pump station. A temporary laydown area immediately adjacent to the southeast side of the proposed plant site would be utilized during construction.

REGIONAL 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 graywackes 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).

PROJECT SITE DESCRIPTION

The proposed MEP site and associated linears are located in Section 36, Township 1 South, Range 3 East, and Section 1, Township 2 South, Range 3 East of Mount Diablo Meridian at approximately 37.79 degrees north latitude by 121.60 degrees west longitude. The site would be located on private land, known as the Lee Property, which is zoned for agricultural usage within the jurisdiction of the East County Area Plan of Alameda County. The north end of the project linears crosses into Contra Costa County. The proposed site is located in the lower foothills of the Diablo Range, which consist of a relatively shallow northeast-facing slope dissected by northeast-flowing drainages. The plant site is situated within a north-northeast-flowing drainage between to moderately steep-sided ridges. The existing elevation on the proposed power plant pad ranges from 110 feet above mean sea level (msl) at the north end to 155 feet above msl at the south end. Proposed finished pad elevation is 125 feet above msl, which would necessitate cuts up to 30 feet and fills to 10 feet (MEP 2009a). The hilltop elevations to the east and west are approximately 145 and 175 feet above msl, respectively. The western and eastern ridges slope at a gradient of about 11 to 13% towards the center valley, respectively. The center valley itself slopes from south to north at about a 1.5% gradient (CH2M 2009a).

The proposed MEP plant site and project linears are immediately underlain by Quaternary alluvial and fluvial deposits and Cretaceous marine deposits (CDMG 1966; USGS 1994; USGS 1996a; USGS 1997; Dibblee 2006). Quaternary sediments shown by most recent mapping (Dibblee 2006) are Holocene in age at the surface; however, Pleistocene-age deposits are mapped within 100 feet of the proposed facilities in several locations such that older alluvium could be encountered within several feet of the surface. Miocene to Pliocene-age, non-marine sedimentary rocks are exposed at

the surface less than 1,500 feet southeast of the proposed plant site and construction laydown area. The local stratigraphy as interpreted by numerous authors is presented in **Geology and Paleontology Table 2**.

Geology and Paleontology Table 2
Correlation and Ages of Stratigraphic Units

Age	Unit/Description	Rodgers (CDMG 1966)	Graymer and others (USGS 1994, 1996a)	Helley and Graymer (USGS 1997)	Dibblee, Jr. (2006)
Holocene	Younger alluvial and fluvial sediments	Qb	Qu	Qpaf	Qa
Pleistocene	Older alluvium	Qc	Qt		Qoa
Pliocene	Oro Loma Formation	QP	Tol, Ttu*	br	Tol
Miocene	Neroly Sandstone	Pmlc	Tn		Tn
Cretaceous	Moreno Shale	Ku	Kel		Km
	Panoche Formation	Ku	Kd		Kps

* - Oro Loma Formation of USGS (1996) mapped as Tulare Formation by USGS (1994)

Quaternary alluvium and fluvial sediments generally consist of interbedded gravel, sand, silt and clay, and are shown by most mapping to be present along the northeast-trending drainage that crosses the plant site and over most of the project linear routes (CDMG 1966; USGS 1994; USGS 1996a; USGS 1997; Dibblee 2006). Holocene-age deposits are generally unconsolidated and undissected, whereas Pleistocene-age deposits are more weathered, cemented and incised by erosion. Tertiary units in the local area include the Pliocene Oro Loma Formation, which consists of reddish alluvial conglomerate, sandstone, siltstone and claystone, and Miocene Neroly Sandstone, which is composed of blue marine and non-marine sandstone with minor siltstone, shale, tuff and andesite-pebble conglomerate (USGS 1996a; Dibblee 2006). Cretaceous units, which are mapped over most of the MEP plant site and portions of the project linears, are part of the Great Valley Sequence (USGS 1994 and 1996a). The marine sedimentary rocks include the Moreno Shale and the underlying sandstones of the Panoche Formation. These Mesozoic age rocks dip at 15 to 37 degrees to the northeast, so that Moreno Shale is mapped at the northeast end of the site and Panoche Formation over most of the southwest portion (MEP 2009a).

Soils in the upper 3 to 10 feet of test pits and borings on the proposed plant site are reportedly stiff to very stiff, moderately to highly expansive clays (MEP 2009a). These fine grained soils, which probably represent Quaternary-age sediments and/or intensely weathered Cretaceous bedrock (possibly Moreno Shale), are deepest within the existing drainage along the west side of the proposed plant site. The surficial clay soils have been classified as slightly moist to moist lean to fat clay, and as containing medium to high plasticity fines (MEP 2009a). The surface clay layer is underlain by pedogenic soils

formed by weathering of sandstone and interbedded mudstone bedrock, which likely represents Cretaceous-age Panoche Formation (MEP 2009a). The weathered bedrock, persists to depths of 23 feet or more. Weathering of sandstone and mudstone yields highly to very highly expansive clay soils with plasticity indices up to 63. Hardness, primary cementation, and fractures increase as degree of weathering decreases with depth. Moderately to strongly cemented, slightly altered to unaltered sandstone with interbedded mudstone is present below the weathered bedrock to the maximum depth of exploration, approximately 100 feet below the existing ground surface.

No ground water was encountered to the maximum depth of exploration of 100 feet at the plant site, and no historic ground water level data was found in the immediate vicinity of the project site (MEP 2009a). The ground water table is expected to be deeper than 100 feet below the existing ground surface (MEP 2009a). The closest available ground water data was measured in wells east and southeast of the proposed site (WDL 2009); however, these wells were developed in Quaternary alluvium on agricultural lands of the San Joaquin Valley, and are not likely to be representative of site ground water conditions, which is underlain by shallow bedrock.

Several active and potentially active faults related to regional strike-slip faulting and compressional tectonics are present within 50 miles of the proposed MEP site. EQFAULT™ Version 3.00 was used to model these potential seismic sources (Blake 2000). The various faults are listed in **GEOLOGY and PALEONTOLOGY Table 3**, along with the maximum earthquake magnitude, orientation (strike), and distance from the project site. The fault type and fault class, as well as the estimated peak acceleration the proposed MEP site would experience during an earthquake of maximum magnitude for each fault, are also given. Fault locations are shown on various maps, reports and websites published by the California Division of Mines and Geology (CDMG) and the United States Geological Survey (USGS), including the Fault Activity Map of California (CDMG 1994) and the USGS Quaternary fault database available as a Google Earth overlay (USGS 2009b). The sense of movement and fault class were derived from a California Department of Conservation (CDC) seismic hazard assessment report (CDC 2002).

GEOLOGY and PALEONTOLOGY Table 3
Active Faults Relative to the Proposed MEP Site

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike[1]	Fault Class
GREAT VALLEY, Segment 7	5.7	6.7	0.294	Blind Thrust	B
GREENVILLE (GN)	7.1	6.7	0.207	Right lateral – Strike slip	B
MOUNT DIABLO (MTD)	8.0	6.7	0.232	Reverse (Northeast)	B
GREENVILLE (GS+GN)	8.0	6.9	0.223	Right lateral – Strike slip	B
GREENVILLE (GS)	8.0	6.6	0.186	Right lateral – Strike slip	B
GREENVILLE (FLOATING)	8.0	6.2	0.151	Right lateral – Strike slip	B
CALAVERAS (CS+CC+CN)	19.1	6.9	0.118	Right lateral – Strike slip	B
CALAVERAS (FLOATING)	19.1	6.2	0.081	Right lateral – Strike slip	B
CALAVERAS (CC+CN)	19.1	6.2	0.082	Right lateral – Strike slip	B
CALAVERAS (CN)	19.1	6.8	0.109	Right lateral – Strike slip	B
GREAT VALLEY 5	21.6	6.5	0.105	Reverse (West)	B
CONCORD/GV (CON+GVS)	22.6	6.6	0.087	Right lateral – Strike slip	B
CONCORD/GV (CON+GVS+GVN)	22.6	6.7	0.093	Right lateral – Strike slip	B
CONCORD/GV (FLOATING)	22.6	6.2	0.071	Right lateral – Strike slip	B
CONCORD/GV (CON)	22.6	6.3	0.073	Right lateral – Strike slip	B
HAYWARD (FLOATING)	25.2	6.9	0.094	Right lateral – Strike slip	A
HAYWARD (HS+HN+RC)	25.2	7.3	0.114	Right lateral – Strike slip	A
HAYWARD (HS+HN)	25.2	6.9	0.095	Right lateral – Strike slip	A
HAYWARD (HS)	25.2	6.7	0.084	Right lateral – Strike slip	A
CALAVERAS (CS+CC FLOATING)	26.3	6.2	0.063	Right lateral – Strike slip	B
CALAVERAS (CS+CC)	26.3	6.4	0.069	Right lateral – Strike slip	B
CALAVERAS (CC)	26.3	6.2	0.064	Right lateral – Strike slip	B
CONCORD/GV (GVS+GVN)	31.1	6.5	0.064	Right lateral – Strike slip	B
CONCORD/GV (GVS)	31.1	6.2	0.057	Right lateral – Strike slip	B
GREAT VALLEY 8	32.6	6.6	0.081	Reverse (West)	B
HAYWARD (HN+RC)	33.5	7.1	0.085	Right lateral – Strike slip	A
HAYWARD (HN)	33.5	6.5	0.061	Right lateral – Strike slip	A
GREAT VALLEY 4	38.5	6.6	0.071	Reverse (West)	B
ORTIGALITA	39.9	7.1	0.074	Right lateral – Strike slip	B
MONTE VISTA - SHANNON	41.8	6.7	0.070	Right lateral – Strike slip	B
WEST NAPA	43.6	6.5	0.050	Right lateral – Strike slip	B
CONCORD/GV (GVN)	44.0	6.0	0.039	Right lateral – Strike slip	B
SAN ANDREAS (SAP)	44.2	7.2	0.070	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP+SAN+SAO)	44.2	7.9	0.104	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP+SAN)	44.2	7.8	0.096	Right lateral – Strike slip	A
SAN ANDREAS (FLOATING)	44.2	6.9	0.061	Right lateral – Strike slip	A
SAN ANDREAS (SAP+SAN+SAO)	44.2	7.8	0.100	Right lateral – Strike slip	A
SAN ANDREAS (SAP+SAN)	44.2	7.7	0.091	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP)	44.2	7.4	0.081	Right lateral – Strike slip	A
SAN ANDREAS (SAS)	47.7	7.0	0.062	Right lateral – Strike slip	A
HAYWARD (RC)	49.9	7.0	0.059	Right lateral – Strike slip	A

[1]All faults strike northwest unless otherwise noted.

MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS concerning geologic hazards and geologic and mineralogic resources apply to this project. The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard includes evaluating each hazard's potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions.

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site, or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area and to determine if proposed plant operations could adversely affect any such resources.

Staff reviewed existing paleontologic information and requested a records search from the University of California Museum of Paleontology at Berkeley (UCMP) for the area surrounding the proposed site (Holroyd 2009; UCMP 2009). Site-specific information generated by the applicant for the proposed MEP site was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate impacts to potential resources, and proposed as part of the projects approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, corrosive soils, foundation settlement due to compressible soils and expansive clay soils represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a project-specific, design-level geotechnical report as required by the CBC (2007). The requirements of the proposed **Facility Design** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also aid in mitigating these impacts to a less than significant level.

Geologic units in the upper 3 to 10 feet at the proposed project site typically consist of fine grained clay soils with relatively thin interbeds (i.e. generally less than 5 feet thick) of granular materials (MEP 2009a). These soils are presumably Quaternary-age alluvial

and fluvial deposits, or intensely weathered bedrock. Cretaceous sandstone bedrock with interbedded mudstone underlies surficial soils to the depths explored (approximately 100 feet). The sandstone bedrock is intensely weathered to fine grained clay and clayey sand soils to depths of roughly 23 feet. Sedimentary units of Tertiary age are mapped in the area, but are not mapped or likely to underlie the proposed plant site or project linears. The geologic units at the site are widespread throughout the eastern Coast Ranges and western Great Valley of California and, as such, are not unique in terms of recreational, commercial, or scientific value (MEP 2009a).

The proposed site is located within the South San Francisco Bay Production-Consumption Region, but is more than 11 miles from the nearest area classified as a Mineral Resource Zone (MRZ) (CDMG 1996). No precious metal, base metal, or other non-industrial mineral mines or deposits are known to exist in Alameda, Contra Costa or San Joaquin Counties (CDMG 1998 and 1999). Finally, staff reviewed existing documentation that outlines oil, geothermal, and natural gas production in the area (CDC 1982a and b; CDC 2002; CDOGGR 2009). Numerous producing gas fields, including the Union Island, Tracy, Vernalis, and East Brentwood fields are located in the San Joaquin Valley between 8 and 25 miles north, east and southeast of the proposed site (CDC 1982b and 2002). There are fewer oil fields with historic production in the area, and include the Livermore and Brentwood fields, located 8 miles southwest and 12 miles northwest of the site, respectively. The information provided and the documentation reviewed indicates that the project should not impact, directly or indirectly, available geologic resources.

Energy Commission staff has reviewed the paleontological resources section contained in the AFC (MEP 2009a). Staff has also reviewed the paleontological literature and records search conducted by the UCMP (Holroyd 2009), as well as the on-line locality and specimen database maintained by the UCMP (2009). Numerous vertebrate fossil localities have been recorded within 4 miles of the proposed MEP site. Although no paleontological resources were discovered within the proposed project boundaries during field reconnaissance conducted for the AFC, the documented specimens were recovered from geological units of Cretaceous and Quaternary-age that are present at the surface and at shallow depths on the plant site, laydown area and along project linears. Most of the recorded fossil finds were discovered during excavation for the nearby California Aqueduct, Delta Mendoza Canal, and other facilities associated with the regional aqueduct system (Holroyd 2009). Of particular interest are a tooth specimen of an undetermined Cretaceous age marine reptile (*Reptilia*) uncovered during construction of the Delta Pumping Plant (Hilton 2003), and two localities that contained remains of *Mammuthus* from areas mapped as Quaternary alluvium (Holroyd 2009).

The upper 1 to 2 feet of the proposed plant site and laydown area has been disturbed by agricultural activities, and is unlikely to produce fossil specimens within their natural context. However, cuts up to 30 feet deep are anticipated during proposed site grading and trenching. Therefore, the potential to encounter significant paleontological resources during construction of the MEP project is high in excavations below 1 to 2 feet of the surface. Potential impacts to such resources can be effectively mitigated through the Conditions of Certification **PAL-1** through **PAL-7**. These conditions

essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (a paleontologic resource specialist [PRS]).

The proposed conditions of certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse direct or indirect impacts to the project from geologic hazards and to potential geologic, mineralogic, and paleontologic resources from the proposed project is low, assuming the proposed conditions of certification are adopted and enforced.

GEOLOGICAL HAZARDS

The AFC (MEP 2009a) provides documentation of potential geologic hazards at the proposed plant site. Review of the AFC, coupled with staff's independent research, indicates that the possibility of geologic hazards impacting the plant site during its practical design life is low. Geologic hazards, such as strong ground shaking, corrosive soils, settlement due to compressible soils, and expansive soils must be addressed in a design-level, project-specific geotechnical report per CBC (2007) requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the MEP plant site. Geological information was available from the California Geological Survey (CGS), the CDMG, the CDC, the USGS, and other government organizations. Since 2002, the CDMG has been known as the CGS.

Faulting and Seismicity

Type A faults have slip-rates of ≥ 5 mm per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. Fifteen Type A Faults and 26 Type B faults have been identified within 50 miles of the proposed MEP Site (Blake 2000). The fault type, potential magnitude, and distance from the site have been summarized previously in **GEOLOGY and PALEONTOLOGY Table 3**.

The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations 2007) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. Since no active faults have been documented within the MEP proposed site, setbacks from occupied structures will not be required.

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (CDMG 1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG 2003; CGS 2002; Hart and Bryant 1999). No active faults are shown on published maps as crossing the boundary of new construction at the proposed MEP site or its proposed transmission routes. The nearest major active fault is the Segment 7 of the Great Valley Fault located approximately 5.7 miles south of the project site (**GEOLOGY and PALEONTOLOGY Table 3**).

The Great Valley fault is a blind thrust that dips 15 degrees to the west, strikes roughly northwest, does not intersect the surface, and is roughly 4.5 miles deep at its shallowest level (USGS 1996b). Segment 7 has been identified as a Type B Fault with a slip rate of approximately 1.5 millimeters per year (mm/year). The Great Valley fault is responsible for the Magnitude 6.4 Coalinga earthquake of 1983, which occurred along a segment approximately 135 miles to the southeast (CGS 2008). The Greenville Fault, a Type B, right-lateral strike-slip fault with a slip rate of approximately 5.0 mm/year, is mapped 7.1 miles west of the proposed MEP site. The closest Type A fault relative to the proposed site is the Hayward Fault, which is approximately 25 miles to the west and has a slip rate as high as 9.0 mm/year (CDC 2002; USGS 1996b). Nearly all active faults listed on **GEOLOGY and PALEONTOLOGY Table 3**, including the Greenville Fault and Hayward faults within 50 miles of the proposed MEP plant site are northwest-striking, right-lateral strike-slip faults related to regional transform faulting, of which the San Andreas Fault Zone is the central structure.

Based on standard penetration test (SPT) resistance data and the presence of shallow bedrock in test pits and borings, the proposed MEP site soil class is Class C (MEP 2009a). The estimated peak horizontal ground acceleration for the proposed MEP site is 0.62 times the acceleration of gravity (0.62g) for a bedrock acceleration based on 2% probability of exceedence in 50 years based on 2007 CBC criteria (USGS 2009a).

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. The surface soils at the proposed MEP site are comprised of stiff to very stiff clay soils which are underlain by intensely weathered shallow bedrock to approximately 23 feet and unweathered sandstone and mudstone bedrock below (MEP 2009a). 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 the presence of clay soils and shallow bedrock, and the absence of ground water within the upper 30 feet of the site, liquefaction potential at the proposed MEP site is negligible.

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Because the proposed MEP site is not subject to liquefaction, the potential for lateral spreading of the site surface during seismic events is negligible.

Dynamic Compaction

Dynamic compaction of soils can occur when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase is soil density). The decrease in volume can result in settlement of overlying structural improvements. Since the proposed MEP site is underlain by clays and shallow bedrock, the potential for dynamic compaction of site soils during and earthquake is low.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flashflood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. Quaternary-age alluvial and fluvial sediments at the proposed MEP site were not deposited by flashfloods. All other soils are residual in nature and were formed by the intense weathering of sedimentary bedrock (MEP 2009a). Based on the depositional environment of Quaternary sediments and the presence of weathered bedrock at the proposed site, the potential for hydrocompaction is minimal.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to surcharge loads. Regional subsidence could occur due to future changes in ground water pumping or development of hydrocarbon resources in the area. Consolidation testing presented in the preliminary geotechnical investigation indicates the clay soils at the proposed MEP site are moderately to highly compressible. Recommendations for mitigating the effects of subsidence due to foundation loads on compressible soils must be provided in a project-specific geotechnical report as required by the CBC (2007) and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. When necessary, mitigation is normally accomplished by over-excavation and replacement of the compressible soils for lightly-loaded foundations. For heavily loaded foundations, deep foundations are commonly used to support the loads. The closest oil or gas deposits are at least 8 miles from the proposed MEP site (CDC 1982b and 2002), and service water for the project would be supplied from a nearby canal rather than a well, so no fluid extraction in the vicinity of the proposed MEP is expected that would cause local subsidence.

Corrosive Soils

Fine-grain soils with high in-situ moisture contents that contain sulfides can be corrosive to buried metal pipe, which can lead to premature pipe failure and leaking. Such soils are present at this site, and the preliminary geotechnical investigation (MEP 2009a) indicates that site soils could be potentially corrosive to metal pipe. The effects of corrosive soils can be effectively mitigated through final design by incorporating the recommendations of the site-specific project geotechnical report required by the CBC (2007) and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation of corrosive soils with respect to metal pipe typically involves cathodic protection or polyethylene encasement of the pipe.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying

structural improvements. Plasticity index, expansion index and swell tests, which are indicators of the expansive potential and clay content in soils, have been performed on representative samples of the surficial clay soils at the proposed MEP site (MEP 2009a). The test results indicate the surficial clay soils exhibit medium to high plasticity and are moderately to highly expansive. The surficial clays are underlain by intensely weathered sandstone or mudstone with high to very high plasticity fines, which indicates a high to very high expansion potential. Recommendations for mitigating the effects of expansive clays soils must be provided in a project-specific, design-level geotechnical report as required by CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. When necessary, mitigation is normally accomplished by over-excavation and replacement of the expansive soils beneath structural improvements, although lime treatment of the expansive soils is commonly used beneath pavements.

Landslides

The Coast Ranges and Diablo Range are well known for their landslide deposits (USGS 1999). However, no landslides are mapped in the vicinity of the proposed MEP site. The maximum gradient of existing slopes at the proposed site is approximately 13% (MEP 2009a). Significant cuts and fills are planned for construction of the MEP pad. Stable cut and fill slopes can be designed to prevent potential landslides according to recommendations presented in a design-level, site-specific geotechnical report as required by CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the proposed MEP site and project linears as lying in areas with no special flood hazard or in areas outside the 0.2% annual chance flood plain (FEMA 2009a and b). Therefore, the potential impact of flooding on the proposed MEP is negligible.

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. Seismic activity can also cause a periodic oscillation, known as a seiche, within a large, enclosed body of water. Since the proposed MEP site lies more than 50 miles from the Pacific Ocean, and is not adjacent to any significant lake or inland body of water, potential impacts to the site due to tsunamis or seiches is negligible.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (Alameda County 2000; CDC 1980; CDC 1982a and b; CDC 2000; CDC 2001; CDC 2006; CDMG 1966; CDMG 1990; CDMG 1994; CDMG 1996; CDMG 1998; CDMG 1999; CDMG 2003; CDOGGR 2009; CGS 2008; Contra Costa County 2005; Dibblee 2006; Hilton 2003; Holroyd 2009; UCMP 2009; USGS 1985; USGS 1993; USGS 1994; USGS 1996a and b; USGS 1997; USGS 1999; USGS 2009b; WDL 2009).

The proposed site is located within the South San Francisco Bay Production-Consumption Range, but is more than 11 miles from the nearest area classified as a Mineral Resource Zone (MRZ) (CDMG 1996). No precious metal, base metal, or other non-industrial mineral mines or deposits are known to exist in Alameda, Contra Costa or San Joaquin Counties (CDMG 1998 and 1999). Numerous producing gas fields, including the Union Island, Tracy, Vernalis, and East Brentwood fields, are located in the San Joaquin Valley between 8 and 25 miles north, east and southeast of the proposed MEP site (CDC 1982a and b; CDC 2002; CDOGGR 2009). There are fewer oil fields with historic production in the area, and include the Livermore and Brentwood fields, located 8 miles southwest and 12 miles northwest of the proposed site, respectively. The information provided and the documentation reviewed indicates that there is a very low potential for the proposed MEP project to impact, directly or indirectly, economically valuable geologic resources.

No paleontological resources were discovered within the proposed project boundaries during the field reconnaissance conducted for the AFC (MEP 2009a). The records and literature search conducted by the UCMP indicates that 15 vertebrate fossil localities have been documented within 4 miles of the proposed MEP plant site, laydown area and project linears (Holroyd 2009). Many of the sites were uncovered during excavation for the California Aqueduct, Delta Mendoza Canal and other facilities associated with the regional aqueduct system (Holroyd 2009). The fossil sites are located in areas mapped as Quaternary alluvium, Tertiary Oro Loma Formation and Neroly Sandstone, and Cretaceous Panoche Formation. The closest locality relative to proposed construction produced a *Reptilia* fossil from the Cretaceous Panoche Formation during excavation for the Delta Pumping Plant approximately 1.4 miles northeast of the plant site and just under a mile west of the water line route (Holroyd 2009). This tooth specimen from an undetermined marine reptile was discovered in 1964 and is noted in a recently published book, *Dinosaurs and Other Mesozoic Reptiles of California* (Hilton 2003). Remains of *Mammuthus* were recovered from areas mapped as Quaternary alluvium approximately 1 mile northeast and 1.6 miles southeast of the proposed plant site. Other fossil finds reported by the UCMP include bison, vole, horse, extinct ground sloth (*glossotherium*), tapir and a number of bony fish, including *orthodon* (Holroyd 2009). No fossil specimens are recorded from areas mapped as Cretaceous age Moreno Shale, a deep marine sedimentary rock that would typically produce significant microfossils, but few vertebrate specimens (MEP 2009a). The upper 1 to 2 feet of the proposed site has been disturbed by agricultural activities, and would be unlikely to contain fossil specimens in their original natural context.

The UCMP has documented locations of scientifically significant vertebrate fossils in areas representing all mapped geologic units, with the exception of the Cretaceous Moreno Shale, that are present within and adjacent to the proposed MEP plant site, laydown area, and project linears (Holroyd 2009; UCMP 2009). Therefore, staff considers Quaternary alluvium, Tertiary Oro Loma Formation and Neroly Sandstone, and Cretaceous Panoche Formation to have a high sensitivity rating. The upper 1 to 2 feet of the proposed plant site and laydown area is disturbed, is assigned a negligible paleontological sensitivity, and shallow excavations are unlikely to impact significant paleontological resources. However, excavations that penetrate into undisturbed sediments below 1 to 2 feet in areas mapped as Quaternary alluvium or Panoche Formation have a high potential to impact significant paleontological resources. Since

significant cuts up to 30 feet would be required during proposed pad construction, excavations could encounter Panoche Formation below the Moreno Shale at depths exceeding 3 to 10 feet. Holocene alluvial and fluvial deposits typically do not contain scientifically significant fossils, however, exposures of Pleistocene-age alluvium are mapped within several hundred feet of portions of the proposed project linears (Dibblee 2006; USGS 1996a). Recovery depths for fossil localities documented in areas mapped as Holocene alluvium were not reported by the UCMP (Holroyd 2009; UCMP 2009). Although depth to Pleistocene alluvium is presently unknown, proximity of exposures of older alluvium and documented fossil finds suggest that highly sensitive Pleistocene sediments could be encountered in shallow excavations within several feet of the surface during proposed construction, particularly along project linears. The potential to impact significant paleontological resources in Tertiary units is considered to be low, because the sedimentary deposits are not mapped on the MEP plant site or along project linears.

Since the proposed MEP site construction would include significant amounts of grading, excavation, and utility trenching, staff considers the probability that highly sensitive paleontological resources would be encountered during such activities to be high anytime excavation activities fully penetrate disturbed ground, Holocene alluvium and the Moreno Shale, and encounter undisturbed Pleistocene alluvium and Panoche Formation. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate direct impacts to paleontological resources, as discussed above, to less than significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist PRS.

Construction Impacts and Mitigation

The site-specific, design-level geotechnical investigation required for the proposed project by the CBC (2007) and proposed **Facility Design** Condition of Certification **GEN-1** would provide standard engineering design recommendations for mitigation of the effects of intense earthquake-related ground shaking, expansive clay soils, excessive settlement due to compressible soils, as appropriate (See proposed **Conditions of Certification**, **Facility Design**).

Based on site-specific exploration (MEP 2009a), no viable geologic or mineralogic resources are known to be present at the proposed MEP plant site and laydown area, and are not expected to be present along the proposed project linear routes. Surface soils at the proposed plant site and laydown area have been disturbed by agricultural activities, and the upper 1 to 2 feet of the site is therefore considered to have a negligible paleontological sensitivity. Where Holocene-age deposits are mapped at the surface along the project linear routes, highly sensitive Pleistocene-age sediments are likely to be present at very shallow depths beneath the surface. Since construction of the proposed MEP project would include significant grading, excavation, and utility trenching, the potential to impact significant paleontological resources during all excavations that penetrate into undisturbed Cretaceous and Quaternary sediments, either at the surface in areas unaffected by prior grading activities or below disturbed soils, is considered to be high. In general, staff considers the potential for encountering significant paleontological resources would increase with the depth of excavation.

Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions would require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (PRS). Earthwork would be halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the conditions of certification would yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist would be retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the on site monitoring. During the monitoring, the PRS can and often does petition the CEC for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the MEP, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geologic hazards at the proposed site during project design life and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

Operation Impacts and Mitigation

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking, expansive soils, and foundation settlement due to compressible soils can be effectively mitigated through facility design (See proposed **Conditions of Certification GEN-1, GEN-5** and **CIVIL-1** in the **Facility Design** section) such that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts correspond to a proposed project's potential incremental effect, together with other closely related past, present, and reasonably foreseeable future projects whose impacts on geologic, mineralogic, and paleontologic resources may compound or increase the incremental effect of the proposed project on such resources.

Potential cumulative effects, as they pertain to geologic hazards, are essentially limited to regional subsidence due to ground water or hydrocarbon (oil and gas) extraction. As this proposed project would not involve pumping of ground water, and the nearest known producing oil or gas field is located at least 8 miles from the site, the proposed MEP would not contribute to any increase of this potential hazard. In addition, a significant number of large-scale ground water, oil or gas pumping operations would have to be constructed to have any significant impact on the proposed facility. Since

heavily loaded foundations would most likely include deep foundations to mitigate potential settlement due to foundation loads, potential effects due to regional subsidence under such conditions would also be effectively mitigated.

Although not encountered during site-specific exploration (MEP 2009a), viable industrial mineral or other geologic resources may be present in the local region; however, the regional geologic units that have the most potential to be viable resources are widespread alluvial deposits that occur throughout the northern San Joaquin Valley and are therefore not unique in terms of recreational, commercial, or scientific value. As a result, the proposed MEP should have negligible cumulative effect on these resources.

Paleontological resources have been documented within 4 miles of the proposed project, and have been discovered during construction of the nearby California Aqueduct, Delta Mendoza Canal, Delta Pumping Plant, and other facilities associated with the regional aqueduct system (Hilton 2003; Holroyd 2009). As the value of paleontological resources is associated with their discovery within a specific geologic host unit, the potential impacts to paleontological resources due to construction activities would be mitigated as required by proposed Conditions of Certification **PAL-1** to **PAL-7**. Implementation of these conditions should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found, to be recovered, identified, studied and preserved.

Based on the above discussion, staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards, during the project's design life, would be low, and that the potential for impacts to geologic, mineralogic, and paleontologic resources would also be low.

Based upon the literature and archives search, field surveys and compliance documentation for the proposed MEP, the applicant proposes monitoring and mitigation measures for construction of the project. Energy Commission staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site, and that impacts to scientifically significant vertebrate and invertebrate fossils encountered during construction would be mitigated to levels of less than significant.

The proposed conditions of certification allow the Energy Commission CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities would not be expected to impact geologic or mineralogic resources since no such resources are known to exist at either the proposed project location or along its linear routes. In addition, the decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during proposed construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments regarding geologic hazards, mineral resources, or paleontology at this time.

CONCLUSIONS

The applicant would be able to comply with applicable LORS, provided that the proposed conditions of certification are adopted and enforced. The design and construction of the project should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to engineering geology are proposed under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. Proposed paleontological conditions of certification follow in **PAL-1** through **PAL-7**. It is staff's opinion that the likelihood of encountering paleontologic resources is high on the plant site, construction laydown area, and along buried pipelines connecting to the plant. Staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative, deep excavations to fully understand site stratigraphy.

PAL-1 The project owner shall provide the CPM with the resume and qualifications of its PRS for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the SVP guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and

5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified PRMs to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification: (1) At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance is completed.

Verification: (1) At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the SVP (1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;
2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;
3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;
5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;
7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;
9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and
10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial PRS training, or may utilize a CPM-approved video or other presentation format, during the project kick off for those mentioned above. Following initial training, a CPM-approved video or other approved training presentation/materials, or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: (1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the training program presentation/materials to the CPM for approval if the project owner is planning to use a presentation format other than an in-person trainer for training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

(4) In the monthly compliance report (MCR, the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or other approved presentation format) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the

CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.
4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report

(see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Mariposa Energy Project (09-AFC-03)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date:___/___/____

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POWER PLANT EFFICIENCY

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

The Mariposa Energy Project, if constructed and operated as proposed, would generate a nominal 200 MW of peak electric power. While the project would consume substantial amounts of energy, with an overall project fuel efficiency of approximately 38% lower heating value (LHV) at maximum full load, it would do so in the most efficient manner practicable. The project would not require additional sources of energy supply, would not consume energy in a wasteful or inefficient manner, and would not create significant adverse impacts on energy supplies or resources.

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the Mariposa Energy Project (MEP) would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the MEP's consumption of energy would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state or local/county laws, ordinances, regulations, and standards apply to the efficiency of this project.

SETTING

Mariposa Energy, LLC (Mariposa Energy) proposes to construct a 200 MW (nominal net output) natural gas fired, simple cycle electrical generating facility in Alameda County near the existing 6.5 MW Byron Power Cogen Plant.

The applicant intends to operate the plant's four GE LM6000PC SPRINT combustion turbine generators (MEP 2009a, AFC §§ 1.1, 2.3.2, 2.4.3) no more than 4,000 hours per year (approximately 46% of the year). Each combustion turbine generator would utilize a selective catalytic reduction system for air emissions control and an inlet air fogger to

maintain maximum output and efficiency at escalated temperatures. Natural gas would be transmitted to the plant via a new 4-inch-diameter natural gas pipeline extending 580 feet to connect with a Pacific Gas & Electric (PG&E) transmission line (MEP 2009a, AFC §§ 1.1, 2.2, 2.4.2.3).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF ENERGY RESOURCES

CEQA Guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4[a][1]). Appendix F of the Guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient, and unnecessary consumption of energy (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient, and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

At full load operation, the MEP is expected to consume natural gas at a maximum rate of 1,926 million British thermal units (MMBtu) per hour higher heating value (HHV) (MEP 2009a, AFC § 2.4.3). This is a substantial rate of energy consumption and could potentially impact energy supplies. Under expected project conditions, electricity would be generated at a thermal efficiency of approximately 38% LHV at full load operation (MEP 2009a, AFC Figure 2.3-3).

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project in the Application for Certification (MEP 2009a, AFC §§ 2.2, 2.3.6, 2.4.3). Natural gas for the MEP would be supplied by a new 4-inch-diameter natural gas pipeline that would interconnect with an existing Pacific Gas & Electric (PG&E) transmission line located 580 feet from the project site. The PG&E natural gas supply represents an adequate source for a project of this size; it is highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel would be supplied to the project by a new 4-inch-diameter pipeline that would interconnect with a larger PG&E pipeline (MEP 2009a, AFC §§ 2.2, 2.3.6, 2.4.3). PG&E is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the MEP would require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the MEP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

The MEP could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient, or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The project objectives are to provide additional operationally flexible power generation to support intermittent renewable resources, such as solar and wind facilities, and to provide peak electricity generation to meet projected summer load. The applicant expects that the MEP would mostly operate to meet peak demand and during periods when intermittent renewable resources experience fluctuation (MEP 2009a, AFC §§ 1.1.1, 1.1.3). A simple cycle configuration is consistent with and supports this expectation due to its operating flexibility.

The MEP would be configured as four simple cycle power plants in parallel, in which electricity is generated by one natural gas-fired turbine generator per plant, four combustion turbine generators (CTG) total. This configuration, with its short start-up time and fast ramping[1] capability, is well suited to providing peaking power. Further, when reduced output is required, one or more of the turbine generators can be shut down, allowing the remaining machines to produce a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at a less efficient part load output.

Though the applicant is requesting permitting the project for 4,000 operating hours, the applicant expects this facility to operate in peaking duty for approximately 600 hours per year on average; a capacity factor of about 7% (MEP 2009a, AFC §§ 1.1.3, 2.3.2).

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The applicant would employ four General Electric LM6000PC SPRINT

[1] "Ramping" is increasing and decreasing electrical output to meet fluctuating load requirements.

gas turbine generators (MEP 2009a, AFC §§ 1.1, 2.3.2, 2.3.4). The LM6000PC SPRINT gas turbine to be employed in the MEP represents one of the most modern and efficient such machines now available. The SPRINT version of this machine is nominally rated at 50 MW and 40.3% efficiency LHV at ISO[2] conditions (GTW 2009). This rating differs from the projected efficiency for the MEP of 38%LHV because of efficiency losses from parasitic loads and increased flow losses due to the selective catalytic reduction units used on the exhaust of each unit.

Efficiency of Alternatives to the Project

Alternative Generating Technologies

Alternative generating technologies for the MEP are considered in the AFC (MEP 2009a, AFC § 6.6). Fossil fuels (oil and coal), biomass, geothermal, hydroelectric, solar, and wind technologies are all considered. Fossil fuels other than natural gas cannot meet air quality limitations; biomass has additional air quality and waste impacts and does not allow for the needed operational flexibility; and renewables require more physical area and are not always available when peaking power is needed (see the "Alternative Electricity Generating Technologies" portion of the **Alternatives** section of this document). Given the project objectives, location, and air pollution control requirements, staff agrees with the applicant that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

The applicant plans to employ four General Electric LM6000PC SPRINT gas turbine generators (MEP 2009a, AFC §§ 1.1, 2.3.2, 2.3.4). The SPRINT version of this machine is nominally rated at 50 MW and 40.3%efficiency LHV at ISO[3] conditions (GTW 2009). (Staff compares alternative machines' ISO ratings as a common baseline, since project-specific ratings are not available for the alternative machines.) Alternative machines that can meet the project's objectives are the SGT-800 and FT8 TwinPac which, like the LM6000, are aeroderivative machines, adapted from Siemens Power Generation and Pratt & Whitney aircraft engines, respectively.

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 47 MW and 37.5% LHV at ISO conditions (GTW 2009).
The Pratt & Whitney FT8 TwinPac gas turbine generator in a simple cycle configuration is nominally rated at 51 MW and 38.4% LHV at ISO conditions (GTW 2009).

[2] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60% relative humidity, and one atmosphere of pressure (equivalent to sea level).

[3] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60% relative humidity, and one atmosphere of pressure (equivalent to sea level).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LM6000PC SPRINT	**50**	**40.3 %**
Siemens SGT-800	47	37.5 %
P & W FT8 TwinPac	51	38.4 %

Source: GTW 2009

The LM6000PC SPRINT is further enhanced by the incorporation of spray intercooling (thus the name, SPRay INTercooling). This takes advantage of the aeroderivative machine's two-stage compressor.[4] By spraying water into the airstream between the two compressor stages, the partially compressed air is cooled, reducing the amount of work that must be performed by the second stage compressor. This reduces the power consumed by the compressor, yielding greater net power output and higher fuel efficiency. The benefits in generating capacity and fuel efficiency increase with rising ambient air temperatures (GTW 2000).

While the LM6000 enjoys a slight advantage in fuel efficiency over the alternative machines, any differences among the three in actual operating efficiency would be relatively insignificant. Other factors such as generating capacity, cost, and ability to meet air pollution limitations are some of the factors considered in selecting the turbine model.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air-cooling methods.[5] The two commonly used techniques are the evaporative cooler, or fogger, and the chiller (mechanical or absorption); both techniques increase power output by cooling the gas turbine inlet air. In general terms, a mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ a mechanical chiller (MEP 2009a, AFC § 2.3.7). Given the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach would yield no significant adverse energy impacts.

In conclusion, the project configuration (simple cycle) and generating equipment chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

[4] The larger industrial type gas turbines typically are single-shaft machines, with single-stage compressor and turbine. Aeroderivatives are two-shaft (or, in some cases, three-shaft) machines, with two-stage (or three-stage) compressors and turbines.

[5] A gas turbine's power output decreases as ambient air temperatures rise. The LM6000 SPRINT produces peak power at 50°F; this peak output can be maintained in much hotter weather by cooling the inlet air.

CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the MEP project to create cumulative impacts on natural gas resources. The PG&E natural gas supply system draws from extensive supplies originating in the Rocky Mountains, in the southwest, and in Canada, and is capable of delivering the required amount of gas to both of these projects. Therefore, staff believes the PG&E system is adequate to supply the MEP without adversely impacting its other customers.

NOTEWORTHY PROJECT BENEFITS

The applicant expects the MEP to help meet local electricity generation resource adequacy requirements for the northern California bay area. By doing so in a fuel-efficient manner with GE LM6000 SPRINT gas turbines, one of the most modern and efficient such machines now available, the MEP would benefit electric consumers in California.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 200 MW of peaking electric power, at an overall project fuel efficiency of approximately 38% LHV at maximum full load. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources. No cumulative impacts on energy resources are likely.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

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POWER PLANT RELIABILITY

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

Mariposa Energy, LLC (Mariposa Energy), the applicant, predicts an equivalent availability factor between 92 and 98%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Mariposa Energy Project would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the proposed Mariposa Energy Project (MEP) to determine if the power plant is likely to be built in accordance with applicable laws, ordinances, regulations, and standards (LORS) and with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see the "Setting" subsection below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with applicable LORS and with typical industry norms for reliability of power generation. While the applicant has predicted an equivalent availability factor between 92 and 98% for the MEP (see below), staff uses typical industry norms as a benchmark, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Although no federal, state, or local/county LORS apply to the reliability of this project, recently adopted laws and regulations influence the project's operational requirements (see "Setting," below).

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the state. Determining how the California ISO and other control area

operators would ensure system reliability has been an ongoing process; protocols have been developed and put in place that allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements, for example, are two mechanisms that have been employed to ensure an adequate supply of reliable power.

In September 2005, California AB 380 (Núñez, Chapter 367, Statutes of 2005) became law. This modification to the Public Utilities Code requires the California Public Utilities Commission to consult with the California ISO to establish resource adequacy requirements for all load-serving entities (basically, public and privately owned utility companies). These requirements include maintaining a minimum reserve margin (extra generating capacity to serve in times of equipment failure or unexpected demand) and maintaining sufficient local generating resources to satisfy the load-serving entity’s peak demand and operating reserve requirements.

In order to fulfill this mandate, the California ISO has begun to establish specific criteria for each load-serving entity under its jurisdiction. These criteria guide each load-serving entity in deciding how much generating capacity and ancillary services to build or purchase, after which the load-serving entity issues power purchase agreements to satisfy these needs. As a load-serving entity, Mariposa Energy is obligated to satisfy these criteria, which include maintaining a 15% reserve margin and increasing local generation to reduce reliance on imported power.

The California ISO’s mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there has been valid cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Accordingly, staff has recommended that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

The applicant proposes to operate the 200-MW (nominal output) MEP, a simple cycle peaking power plant, to serve peak loads at times of high demand and to provide back-up for renewable resources, such as as-available wind and solar facilities (MEP 2009a, AFC §§ 1.1.1, 1.1.3). The MEP is expected to achieve an equivalent availability factor between 92 and 98% (MEP 2009a, AFC §§ 2.3.2, 2.4.2.1). The applicant expects to operate the plant at an average capacity factor of about 7% each year (MEP 2009a, AFC §§ 1.1.3, 2.3.2).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752[c]). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system.

The equivalent availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available and are affected by starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 40-year life (MEP 2009a, AFC § 2.4.2.1), the MEP will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the power plant will be as reliable as other power plants on the electric system and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction, and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (MEP 2009a, AFC §§ 2.4.2.5, 2.4.2.5.2) typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A peaking generating facility commonly offers adequate opportunity for maintenance work during its downtime; the applicant expects to operate the MEP approximately 600 hours per year, or about 7% of the year (MEP 2009a, AFC §§ 1.1.3, 2.3.2). During

periods of extended dispatch, however, as could occur if other major generating or transmission assets were disabled, the facility may be required to operate for extended periods. A typical approach for achieving reliability in such circumstances is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (MEP 2009a, AFC § 2.4.2.2). The fact that the project consists of four combustion turbine-generator sets operating in parallel as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). Further, all plant ancillary systems are also designed with adequate redundancy to ensure continued operation in the face of equipment failure. Staff believes that equipment redundancy would be sufficient for a project such as this.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant is expected to base the project's maintenance program on those recommendations. The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The MEP will burn natural gas supplied by Pacific Gas & Electric (PG&E). Natural gas fuel will be supplied to the project via a new 4-inch-diameter pipeline extending 580 feet to interconnect with an existing PG&E transmission line (MEP 2009a, AFC §§ 2.2, 2.3.6, 2.4.3). The PG&E natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas. Staff agrees that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The MEP will obtain raw water from the Byron Bethany Irrigation District (BBID) via a new 6-inch-diameter, 1.8-mile-long pipeline (MEP 2009a, AFC §§ 2.3.8, 2.4.2.4, 5.15.2.1.1; Appendix 2D). Raw water would be used as service water, chiller make-up and fire protection. A portion would be demineralized and stored for use as gas turbine SPRINT injection water, combustor injection water, and turbine wash water. Potable water would also be obtained from the BBID. Staff believes this source yields sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see the **Soil and Water Resources** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but seismic shaking (earthquake) and flooding may present credible threats to reliable operation.

Seismic Shaking

The site lies within a seismically active area of California and is influenced by the San Joaquin Fault system. However, the site is not located within an Alquist-Priolo Earthquake Fault Zone or within the trace of any known active faults (MEP 2009a, AFC §§ 2.4.1.1, 5.4.1.2.2, 5.4.2.2); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project will be designed and constructed to the latest applicable LORS (MEP 2009a, AFC § 2.4.1; Appendix 2A). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it would be built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **Facility Design**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during earthquakes.

Flooding

The site does not lie within either a 100 or 500-year floodplain (MEP 2009a, AFC § 2.4.1.1.1). With proper plant design (ensured by adherence to the proposed **Facility Design** conditions of certification), staff believes there should be no significant concerns with power plant functional reliability due to flooding. For further discussion, see the **Soil and Water Resources** and **Geology and Paleontology** sections of this Staff Assessment.

COMPARISON WITH EXISTING FACILITIES

The North American Electric Reliability Corporation (NERC) keeps industry statistics for availability factors (as well as many other related reliability data). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System and periodically summarizes and publishes the statistics on the Internet (http://www.nerc.com). NERC reports the following summary generating unit statistics for the years 2002 through 2006 (NERC 2007):

- for Gas Turbine units (50 MW and larger):

  Equivalent Availability Factor = 91.82%

The gas turbines that will be employed in the project have been on the market for several years; General Electric has documented typical annual availability for this machine of 97.8%. The applicant's prediction of an annual availability factor between 92 and 98%(MEP 2009a, AFC §§ 2.3.2, 2.4.2.1) appears reasonable compared to the

NERC figure for similar plants throughout North America (see above) and General Electric's experience. In fact, these new machines can well be expected to outperform the fleet of various (mostly older) gas turbines that make up the NERC statistics. Further, since the plant will consist of four parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement, and construction of a reliable power plant appear to follow industry norms, and staff believes they are likely to yield an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

The applicant proposes to provide peaking power to provide additional local generating capacity and to provide back-up to as-available renewable resources (MEP 2009a, AFC §§ 1.1.1, 1.1.3). The fact that the project consists of four combustion turbine generators configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). In light of this and the additional reliability-enhancing features of the project described above, the applicant's prediction of an equivalent availability factor between 92 and 98% appears achievable. Staff believes this should provide an adequate level of reliability.

PUBLIC AND AGENCY COMMENTS

Staff did not receive any public or agency comments in the area of Power Plant Reliability.

CONCLUSION

Mariposa Energy predicts an equivalent availability factor between 92 and 98%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

GE 2008 - General Electric website www.gepower.com, January 2008.

McGraw-Hill 1994 - McGraw-Hill Energy Information Services Group. Operational Experience in Competitive Electric Generation, an Executive Report, 1994.

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.

NERC 2007 - North American Electric Reliability Corporation. 2002–2006 Generating Availability Report, November 8, 2007.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Ajoy Guha, P. E. and Mark Hesters

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 Group 1 Phase 1 Interconnection Study (Phase 1 Study) does not provide a meaningful forecast of the transmission reliability impacts of the MEP. The Phase I Interconnection Study analyzed the impacts of 4,707 MW of queue generation projects including the MEP in the Group 1 cluster. However, after a December 2009 milestone most of the generation dropped out of the California Independent System Operator (California ISO) generator interconnection queue and only 1,273 MW queue generation remained in the updated cluster for the California ISO Transition Cluster Group 1 Interconnection Phase 2 Study (Phase 2 study). Staff expects that the reliability impacts in the Phase 2 Study for the addition of 1,273 MW generation projects would be significantly smaller than the impacts identified in the Phase 1 Study. However, mitigation of the following two overloads indentified in the Phase 1 study for the addition of the MEP would likely require reconductoring even with the significant reduction of generation in the Group 1 cluster:

- 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 reconductoring is considered an indirect project impact. A general environmental analysis of these reconductorings is included as Attachment A to this Transmission System Engineering (TSE) section, to meet the California Environmental Quality Act (CEQA) requirements.

The Phase 2 Study will not be available until fall 2010 and thus not incorporated into staff's analysis of the MEP. Condition of Certification (COC) TSE-5 requires that the Phase 2 Study be provided to the California Energy Commission before the start of transmission facility construction.

Because the Phase 1 Interconnection Study does not provide a meaningful analysis of the reliability impacts of interconnecting the MEP, at this time staff is unable to determine the project's compliance with reliability LORS. However, with recommended Condition of TSE-5 staff expects the MEP would conform to reliability LORS after completion of the Phase 2 Study and execution of the Large Generator Interconnection Agreement (LGIA).

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 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 1 Interconnection Study performed by PG&E and/or third party,

provide their analysis, conclusions, and recommendations. On satisfactory completion of the PG & E Phase 2 Interconnection Study based on the expected commercial operation date (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, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, "NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table" and on Section I.D, "NERC and WECC Standards for Voltage Support and Reactive Power". These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a

common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).

- North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to 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 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 (California ISO 2007a).

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 194 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) 45/60/75MVA 13.8/230 kV transformer with a specified impedance of 8.5% @45 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 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 Kelso substation 230 kV ring bus by building a new 0.7-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, 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 planning standards, WECC reliability criteria, and California ISO reliability criteria. 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, 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 substation evaluation.

If the Phase 1 and Phase 2 Studies show that the interconnection of the cluster queue projects causes the grid to be out of compliance with reliability standards, then the studies will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. According to the Phase 1 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 1 INTERCONNECTION STUDY

The July 28, 2009, transition cluster Phase 1 Interconnection study was prepared by the California ISO in coordination with PG&E. Twelve queue generation projects including the proposed 194 MW MEP (Queue #334) in the greater bay area with a total of 4,707 MW net generation output are included in this Group 1 cluster study. In order to determine the system impacts caused by the proposed project and eleven other Group 1 projects, the Phase 1 Interconnection study was performed with the following full loop base cases with and without the Group 1 queue projects:

- A 2013 summer peak base case developed from PG&E 2008 base case series and has 1-in -10 year heat wave load forecast for PG&E’s greater bay area.
- A 2013 summer off-peak base case with the load level of 50% of the summer peak load. Level.

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 would be operational by 2013. Also included are the proposed generation projects that would be operational by 2013 along with their associated transmission upgrades required for interconnection. However,

some generation 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 study included analyses for power flow, short circuit, substation evaluation, transient stability, reactive power deficiency, substation evaluation and on-peak deliverability assessment.

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 preliminary work scope & cost estimates for interconnection and network upgrades (CH2M 2010d, Transition Cluster Group1 Phase I Interconnection study report).

TRANSITION CLUSTER PHASE 1 STUDY RESULTS AND PROPOSED MITIGATION

The power flow analysis for the Phase 1 Interconnection study was performed with 2013 summer peak and 2013 summer off-peak base cases to evaluate system impacts caused by the interconnection of twelve Group 1 queue generation projects (total 4,707 MW net output) including the proposed 194 MW MEP (Queue #334) under normal (N-0) and category B (N-1, L-1 &G-1) & category C (N-2 or more) emergency contingency system conditions. Under 2013 summer peak system conditions, the power flow analysis shows that the Group 1 cluster projects would cause new overloads on seventeen new transmission lines/line sections during normal (N-0) conditions, on thirty five new transmission facilities during category B contingency conditions and on thirty nine new transmission facilities during category C contingencies. Under 2013 summer off-peak system conditions, the Group 1 projects would also cause some new overloads which also occur in the summer peak system conditions. The study demonstrates that the addition of 4,707 MW Group 1 cluster projects would cause significant adverse overload impacts on the PG&E transmission system. However, no adverse impacts are identified in the Phase 1 study in the analyses of transient stability, short circuit & substation evaluation and reactive power deficiency.The preferred mitigation options to offset the identified new normal (N-0) and category B emergency overloads include reconductoring of seventeen transmission lines/line sections with higher size conductors and installation of a new 230 kV switching station. For category C contingency overloads the preferred mitigation options include congestion management and installation of Special Protection Systems (SPS) to curtail generation output. The power flow study results are shown in Tables 6-2-1, 6-2-2 and 6-2-3, and the mitigation plan including preliminary cost estimates for all network upgrades and cost allocation to the MEP for network upgrades are shown in sections 11 & 12 respectively of the Phase 1 Interconnection study report (CH2M 2009d, Phase I Interconnection study report, Pages 10-19 & Pages 23-40).

STAFF'S EVALUATION OF THE TRANSITION CLUSTER PHASE 1 STUDY RESULTS

The July 28, 2009 Phase 1 Interconnection Study performed by the California Independent System Operator (ISO) in coordination with PG&E demonstrates significant overload reliability impacts on the PG&E greater bay area system for the addition of twelve Group1 queue projects with a total of 4,707 MW net generation output including the 194 MW MEP. But after December, 2009 milestone date for staying in the queue, only six queue projects including the MEP with a total net output of 1,273 MW remain in the Group 1 cluster.

The Phase 1 study of the 4,707 MW Group 1 cluster projects identified numerous overloads on PG&E transmission facilities. Consequently the Phase 1 study provides a mitigation plan with a large number of network upgrades (reconductoring) to downstream transmission lines. It is obvious that the impacts of a 1,273 MW cluster will be significantly smaller than the impacts identified in the Phase 1 Study. The Phase 1 Study, therefore, does not provide a meaningful forecast of the transmission impacts for the addition of the MEP. However, staff expects that the Phase 2 study results would include some of the impacts and recoductoring mitigation options identified in the Phase 1 study.

The Phase 1 study assigned the MEP partial responsibility along with other cluster projects for the reconductoring of eight overloaded lines/line sections in the PG&E system. For reconductoring six of the lines/line sections the project cost responsibility is minimal and varies from 0.1% to 3.7%. Staff expects with the smaller cluster size for the Phase 2 study, these lines may not overload. The overloads would also not likely meet a "but for" test in that they likely would occur even without the MEP. However, for the reconductoring of the remaining two overloaded line sections, 3.3 miles of the Kelso-USWP RLF 230 kV line and the 4.7 mile USWP RLF-Tesla 230 kV line the MEP has the cost responsibility of 32.5%. In the updated 1,273 MW Group 1 cluster, about 865 MW new net generation (Oakley GS, queue #258; and Marsh Landing GS, queue #320) would be connected to the Contra Costa 230 kV substation and/or Contra Costa Power Plant, the 194 MW MEP at the Kelso substation and the rest, 214 MW new generation, would be elsewhere in the Greater Bay Area. The Phase 2 study, with 1059 MW of Group 1 cluster generation at the Contra Costa and Kelso substations being in immediate proximity of the MEP, will likely show that the 3.3 miles of the Kelso-USWP RLF 230 kV line and 4.7 mile of the USWP RLF-Tesla 230 kV line sections will overload for the addition of the MEP. Thus it is likely that the Kelso-USWP RLF 230 kV line and the USWP RLF-Tesla 230 kV line will require reconductoring and this reconductoring is a reasonably foreseeable consequence of the MEP.

The Phase 2 study is scheduled to be completed by September 2010 and will not be available in time to be incorporated in final staff's analysis of the MEP. Condition of Certification TSE-5 requires that the Phase 2 study report be provided to the Energy Commission before starting construction of the transmission facilities.

CEQA requires the analysis of reasonably foreseeable consequences of proposed projects based on the best available information. Since it is foreseeable that the MEP would be responsible for overload mitigation of the Kelso-USWP RLF 230 kV line and

the USWP RLF-Tesla 230 kV line, staff concurred with the applicant's November 30, 2009 data response that in order to comply with CEQA review requirements during the AFC process, the applicant will provide to the Energy Commission an environmental analysis of the reconductoring of 3.3 miles of the Kelso-USWP RLF and 4.7 mile of the USWP RLF-Tesla line sections of the PG&E Kelso-Tesla 230 kV line. If the Phase 2 study mitigation plan finds that the MEP and the remaining queue generation projects in its cluster would require construction of downstream transmission facilities upgrades in order to maintain grid reliability, those transmission facilities would require Certificate of Public Convenience and Necessity (CPCN) permit from the California Public Utilities Commission (CPUC), which would include necessary CEQA analysis.

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, it is expected that accommodating the interconnection of the project would require downstream reliability upgrades for reconductoring the PG&E Kelso-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. The Phase 2 study will provide an accurate identification of system impacts and a right mitigation plan with downstream transmission upgrades that would be acceptable to staff.

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, enhance reliability

ALTERNATIVE TRANSMISSION ROUTES

The applicant considered three alternate routes for the 230 kV interconnection overhead tie line of the project as follows:

- Preferred option: About 0.7-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.
- About 1-mile line through Western Area Power (WAPA) Balancing Authority area to WAPA Tracy 230 kV substation.
- About 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 party. The applicant, therefore, preferred the direct 0.7-mile shortest line to nearest PG&E Kelso 230 kV substation (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 Phase 1 study results with significant overload impacts were numerous, found speculative and inaccurate due to the addition of 4,707 MW Group 1 cluster generation projects. The Phase 2 Interconnection study would be performed with only 1,273 MW active smaller cluster projects including the MEP. As such staff expects that the system impacts in the Phase 2 Study will be less significant than the identified impacts found in the Phase 1 Study. Consequently after execution of the LGIA with the applicant, the California ISO/PG&E would proceed through the California Public Utility Commission's Certificate of Public Convenience and Necessity (CPCN) permit process for construction of facilities, which would include necessary CEQA analysis.

Because the Phase I Interconnection Study does not provide a meaningful analysis of the reliability impacts of interconnecting the MEP, at this time staff is unable to determine whether or not the project will comply with reliability LORS. However, recommended Condition of Certification TSE-5 requires that the Phase 2 Study be provided to the California Energy Commission before the start of transmission facility construction. Staff, therefore, does expect that the project will comply with all applicable LORS after the Phase 2 study is complete and the Large Generator Interconnection Agreement is executed.

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 California ISO Phase 1 Study does not provide a meaningful forecast of the transmission reliability impacts of the MEP. The Study demonstrates numerous overload impacts on the PG&E Greater Bay Area transmission system for the addition of 4,707 MW queue generation in the Group1 cluster including the MEP. However, after a December 2009 milestone most of the generation dropped out of the interconnection process and only 1,273 MW queue generation remained in the updated cluster for performing the Phase 2 Study. Staff expects that the reliability impacts for the addition of 1,273 MW generation projects including the MEP in the Phase 2 Study would be significantly smaller than the impacts identified in the Phase 1 Study.

3. It is likely that, based on the location of generation in the updated cluster, mitigation for two of the overloads indentified in the Phase 1 Study for the addition of the MEP would likely require reconductoring even with the significant reduction of generation in the Group 1 cluster:

    a. Kelso-USWP RLF 230 kV line (3.3 miles).

    b. USWP RLF -Tesla 230 kV line (4.7 miles).

    These two lines are immediately downstream of the proposed interconnection of the MEP and their reconductoring is considered an indirect project impact. A general environmental analysis of these reconductorings is included as Attachment A to this Transmission System Engineering (TSE) section, in compliance with the CEQA requirements.

4. The Phase 2 study will be completed in September 2010, but will not be available in time to be incorporated in the final staff's analysis of the MEP. Condition of Certification TSE-5 requires that the Phase 2 study report be provided to the Energy Commission before starting construction of the transmission facilities.

5. Because the Phase I Interconnection Study does not provide a meaningful analysis of the reliability impacts of interconnecting the MEP, at this time staff is unable to determine the project's compliance with reliability LORS. However, with recommended Condition of Certification TSE-5 staff expects that the MEP would conform to reliability LORS upon completion of the Phase 2 Study and execution of the LGIA.

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 and at least one of each 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.

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 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) The final Phase II Interconnection Study including a description of facility upgrades and an Operational study from the California ISO and/or PG&E, and

   iv) 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

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

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,

f) The final Phase II Interconnection Study including a description of facility upgrades and an Operational study from the California ISO and/or PG&E, and

g) 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

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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CEC 2009q: CEC/C. Hoffman. MEP Data Request set 1 (no.1-57). Submitted 2-12-09.

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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 Overload	See Single Contingency. This is also called an L-1.
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

Testimony of Sarah Allred, Sara Keeler, Mark Hesters and Craig Hoffman

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. CAISO and PG&E subsequently completed a Phase 1 Interconnection Study (CAISO, 2009) to determine the impact of the MEP on the CAISO Controlled Grid. Under the Federal Energy Regulatory Commission (FERC) -approved Large Generator Interconnection Procedures, interconnection requests are processed together in clusters. A total of 12 proposed projects were grouped together in Transition Cluster Group 1, including MEP.

The Group 1 Phase 1 Interconnection Study identified a large number of new potential overloads on the downstream transmission facilities due to the addition of the 12 projects. In order to eliminate the identified overloads, preferred mitigation options

identified in the study include reconductoring of the overloaded lines with higher-size conductors that will essentially double transmission capacity and constructing a new 230 kV switching station with three switch bays.

The Transition Cluster Phase 2 Interconnection Study Report for PG&E's Greater Bay Area was published July 30, 2010. Energy Commission staff have made comments and expects a modified study in late 2010. The SA Transmission System Engineering section and Transmission System Engineering Appendix A will be modified in a Supplemental Staff Assessment, if necessary, to be consistent with the approved Phase 2 study.

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. Mariposa Energy proposed (and Staff concurred) that this general environmental analysis should be performed for those upgrades for which MEP has significant cost responsibility, which include the following:

- 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 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 Lahontan 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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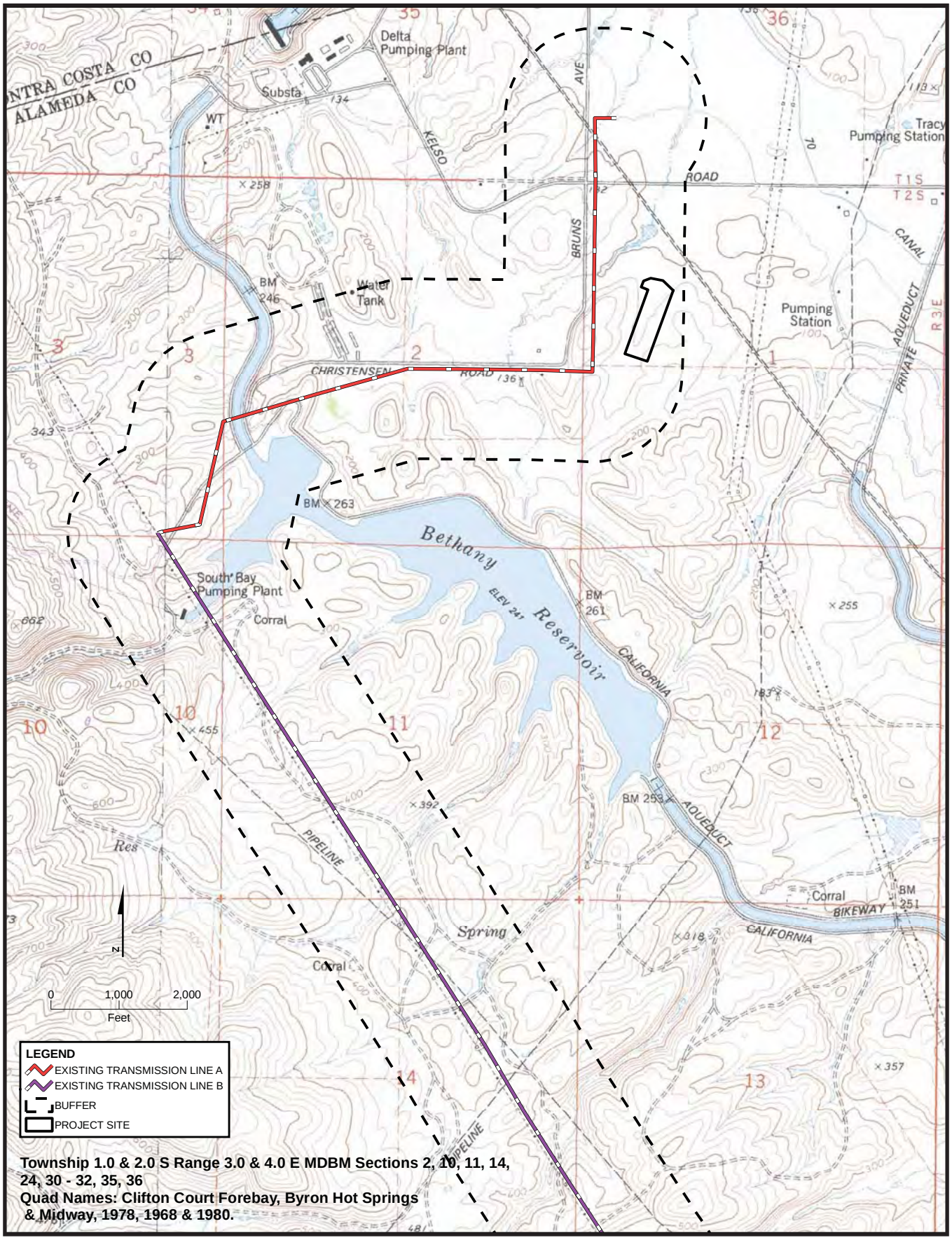
TRANSMISSION SYSTEM ENGINEERING - APPENDIX A - FIGURE 1

Mariposa Energy Project - Project Area Map, 1 of 2



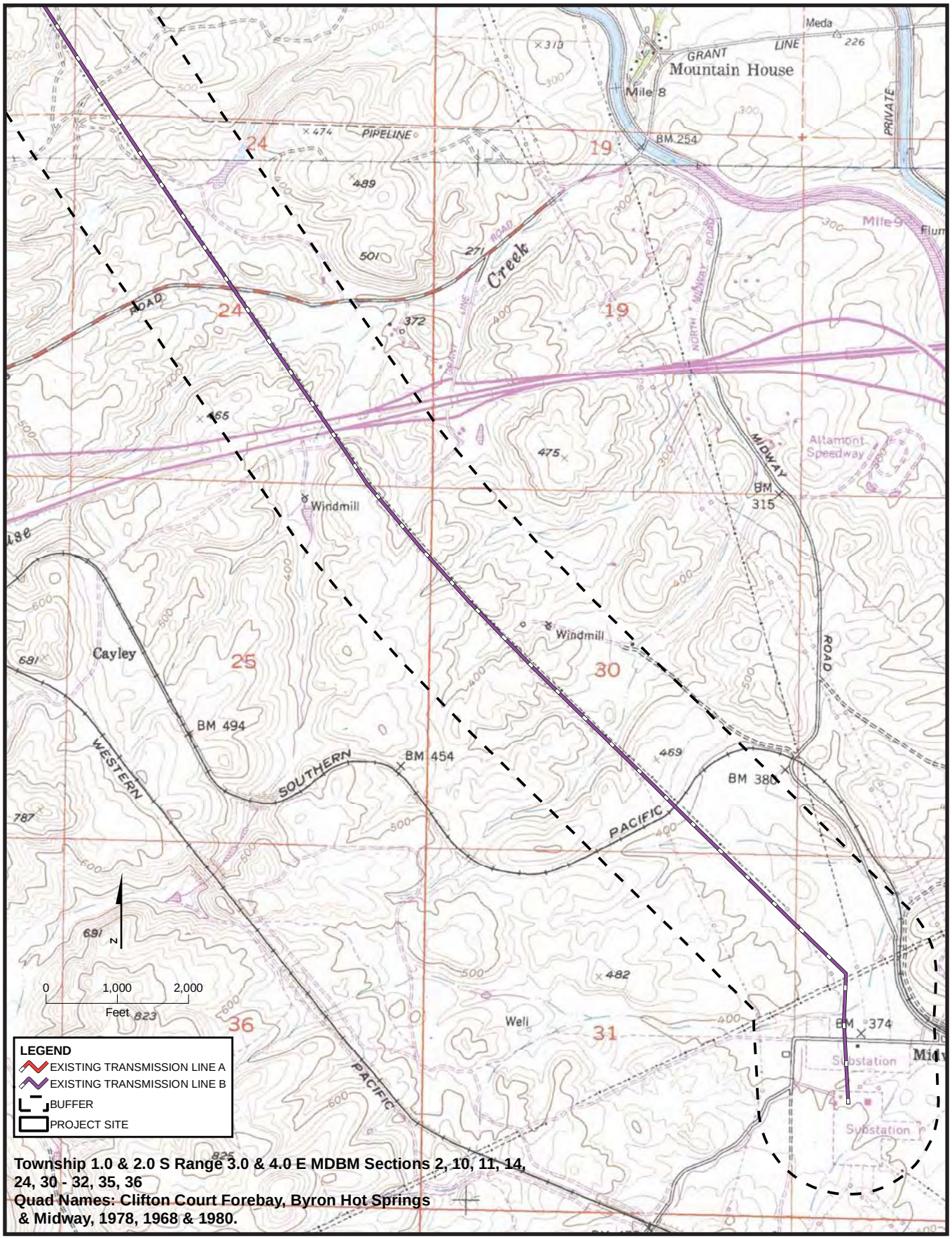
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

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

TRANSMISSION SYSTEM ENGINEERING

TRANSMISSION SYSTEM ENGINEERING - APPENDIX A - FIGURE 2

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

TRANSMISSION SYSTEM ENGINEERING

ALTERNATIVES

Testimony of Craig Hoffman

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 impacts, staff does not recommend 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 4-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 6-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 powerplant.

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

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.

CONCLUSIONS AND RECOMMENDATION

As determined by Energy Commission staff in the SA, 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.

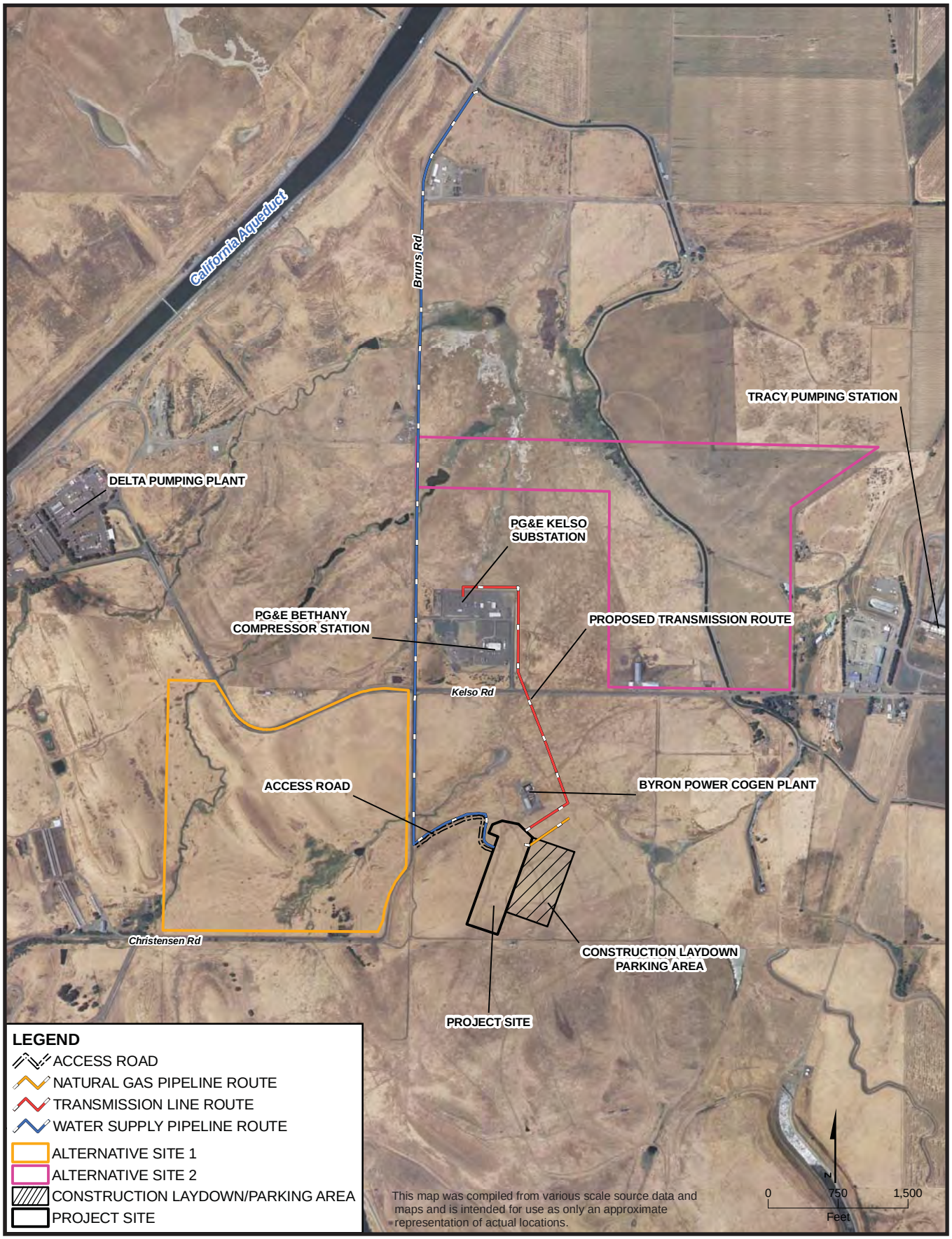
CH2M 2010d - CH2M Hill / D. Urry (TN 55797). Applicant's Supplement B Additional Laydown Area Analysis, dated 3/5/2010 Submitted to CEC on 3/8/2010.

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

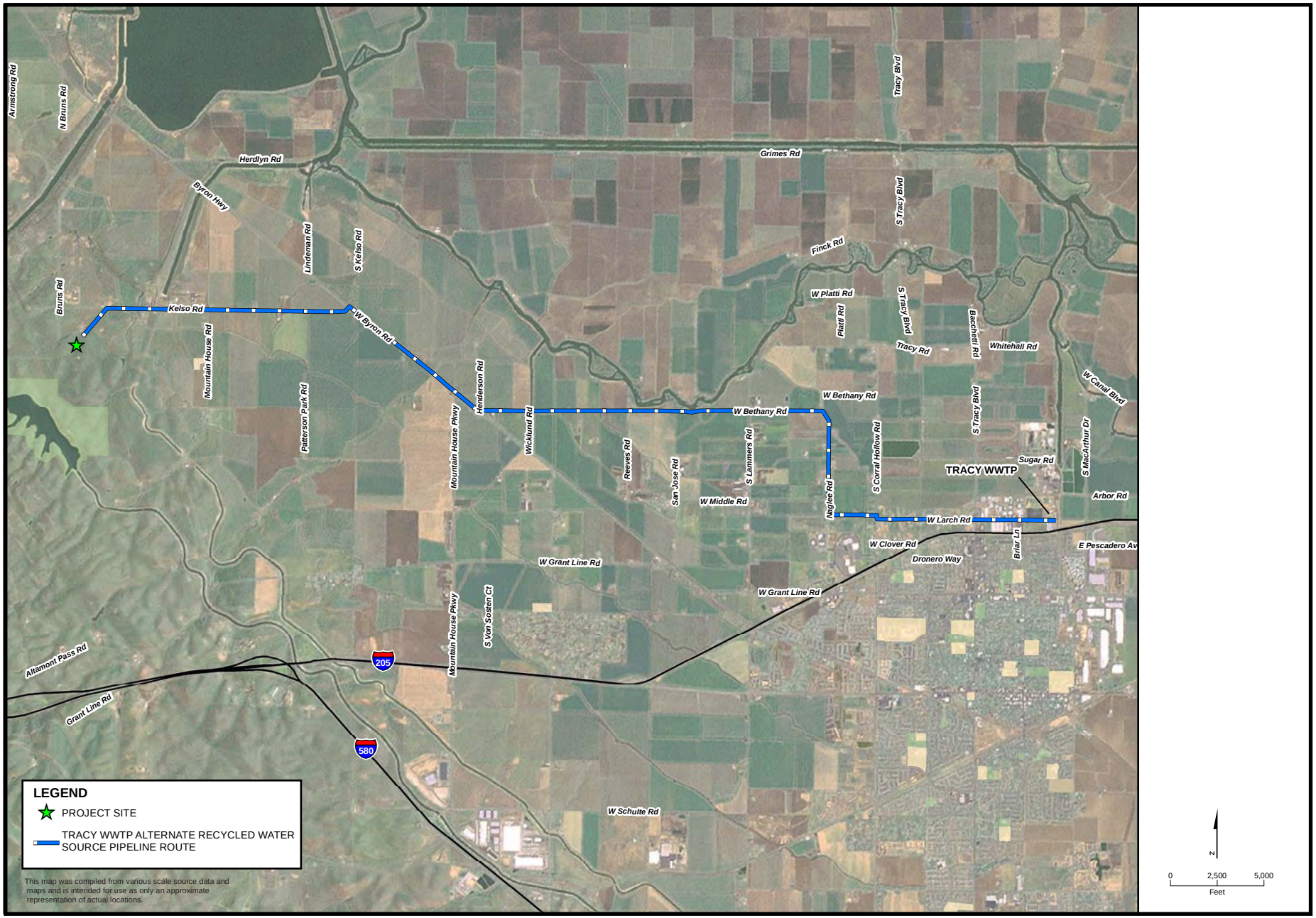
ALTERNATIVES

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

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Dale Rundquist

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental, and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and/or light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

Grading, Boring, and Trenching

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring, and trenching above, construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, when the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions);
4. documenting and tracking compliance filings; and

5. ensuring that compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, Energy Commission, and staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or MS Word files).

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble both the Energy Commission's and project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain the following documents and information as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
2. all monthly and annual compliance reports filed by the project owner;
3. all complaints of noncompliance filed with the Energy Commission; and
4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in the Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the case and revocation of Energy Commission certification; an administrative fine; or other action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE CONDITIONS OF CERTIFICATION

UNRESTRICTED ACCESS (COMPLIANCE-1)

The CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

COMPLIANCE RECORD (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, documents submitted as verification for conditions, and other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

COMPLIANCE VERIFICATION SUBMITTALS (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. monthly and/or annual compliance reports, filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;
2. appropriate letters from delegate agencies verifying compliance;
3. energy Commission staff audits of project records; and/or
4. energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a

condition of certification with a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and CEC submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All hardcopy submittals shall be addressed as follows:

Compliance Project Manager
(09-AFC-3C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by the CPM.

If the project owner desires Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

PRE-CONSTRUCTION MATRIX AND TASKS PRIOR TO START OF CONSTRUCTION (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner’s first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the

submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

COMPLIANCE MATRIX (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable;
7. the compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date); and
8. if the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

MONTHLY COMPLIANCE REPORT (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include the AFC number and an initial list of dates for each of the events identified on the **Key Events List. The Key Events List form is found at the end of these General Conditions.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and an electronic searchable version of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification;
4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;
5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;
9. a listing of the month's additions to the on-site compliance file; and
10. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.

ANNUAL COMPLIANCE REPORT (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project, unless otherwise specified by the CPM. Each Annual Compliance Report shall include the AFC number, identify the reporting period, and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter with the condition it satisfies, and submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file;
9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date (see Compliance Conditions for Facility Closure addressed later in this section); and
10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

CONFIDENTIAL INFORMATION (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501, et. seq.

ANNUAL ENERGY FACILITY COMPLIANCE FEE (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual compliance fee, which is adjusted annually. Current Compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date of the Business Meeting at which the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact

project representatives with questions, complaints, or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with a date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at http://www.energy.ca.gov/sitingcases/power_plants_contacts.html.

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations, and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure, and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to the commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or if the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of **Hazardous Materials Management** and **Waste Management**)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Staff Approved Project Modifications and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **staff approved project modifications** as specified below. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed

modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations, or standards the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide a sample petition to use as a template.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide a sample petition to use as a template.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts may be authorized by the CPM as a staff approved project modification pursuant to section 1769(a) (2). Once staff files an intention to approve the proposed project modifications, any person may file an objection to staff's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If a person objects to staff's determination, the petition must be processed as a formal amendment to the decision and must be approved by the full commission at a noticed business meeting or hearing.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional, and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

Informal Dispute Resolution Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for an informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant

information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;
4. After the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230, et. seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: • property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, • a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, • all pre-construction conditions have been complied with, • the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A
COMPLAINT REPORT/RESOLUTION FORM

COMPLAINT LOG NUMBER:_____ DOCKET NUMBER:_____

PROJECT NAME:_____

COMPLAINANT INFORMATION

NAME:_____ PHONE NUMBER:_____

ADDRESS:_____

COMPLAINT

DATE COMPLAINT RECEIVED:_____ TIME COMPLAINT RECEIVED:_____

COMPLAINT RECEIVED BY: ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_____

_____

_____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____

_____

_____

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS:_____

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:_____

_____

_____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:_____

_____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:_____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

OTHER RELEVANT INFORMATION:_____

_____

_____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE:_____ DATE:_____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

PREPARATION TEAM

MARIPOSA ENERGY PROJECT
09-AFC-3
PREPARATION TEAM

Executive Summary ..... Craig Hoffman

Introduction ..... Craig Hoffman

Project Description ..... Craig Hoffman

Air Quality ..... Brewster Birdsall and Jacquelyn Leyva

Biological Resources ..... Sara Keeler

Cultural Resources ..... Sarah Allred

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

Waste Management ..... Ellie Townsend-Hough

Worker Safety and Fire Protection ..... Rick Tyler

Facility Design ..... Shahab Khoshmashrab

Geology and Paleontology ..... Patrick Pilling

Power Plant Efficiency ..... Erin Bright

Power Plant Reliability ..... Erin Bright

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

General Conditions ..... Dale Rundquist

Project Assistant ..... Hilarie Anderson

Staff Counsel ..... Kerry Willis

DECLARATION OF
Sarah M. Allred

I, Sarah M. Allred, 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 Cultural Resources section of the Staff Assessment, as well as for the Transmission System Engineering analysis (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: September 27, 2010 Signed: Original Signed by Sarah 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: October 6, 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
Erin Bright

I**, Erin Bright,** 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 prepared the staff testimony on **Power Plant Efficiency** and **Power Plant Reliability,** 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: September 28, 2010 Signed: Original Signed by Erin Bright

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

Two years of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

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: October 6, 2010 Signed: Original Signed by R.Cancienne

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, Planner I

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 (Title or position).

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: _____ Signed: Original Signed by Kristin 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: September 28, 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 SA, and are incorporated by reference herein.

I prepared the staff testimony for the Visual Resources section for the proposed Mariposa Energy Center (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: September 27, 2010 Signed: Mark R. Hamblin

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
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: September 28, 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, Introduction, 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: 10/1/10 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: _____ 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 **Facility Design and 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: September 28, 2010 Signed: Original signed by S. Khoshmashrab

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: _____ Signed: Original Signed by A. Koch

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: _____ 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: October 25, 2010 Signed: Original Signed by Mark 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: October 26, 2010 Signed: Original Signed by Paul 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 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: _____ Signed: Original Signed

At: Sacramento, California

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 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: _____ 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
Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.

I, **Patrick A. Pilling**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a Geotechnical 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 **Geology and Paleontology**, for the **Mariposa Energy Project** based on my independent analysis of the Application for Certification, 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 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: October 12, 2010 Signed: _____

At: Reno, Nevada

Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.
President

Education

- B.S. – Civil Engineering –1986 – Santa Clara University
- M.S. – Civil Engineering – 1991 – San Jose State University
- Ph.D. – Civil Engineering – 1997 – University of Nevada, Reno

Registrations

- P.E. – Civil – Nevada, California, Oregon, Arizona, Utah, Idaho
- P.E. – Geotechnical – California, Oregon
- D.GE. – Diplomate, Geotechnical Engineering – Academy of Geo-Professionals

Experience

1997 to Present: Black Eagle Consulting, Inc. Dr. Pilling acted as the Executive Vice President from 1997 until the end of 2007, and assumed the role of President of Black Eagle Consulting, Inc. in January 2008. Dr. Pilling maintains more than 20 years of construction, geotechnical, transportation, and mining engineering experience, and has supervised the engineering and construction of such projects throughout the western United States and South America. Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinating company marketing efforts, and performing project management, engineering and laboratory analyses, and report preparation on most projects. Over the past 8 years, Dr. Pilling has assisted the California Energy Commission (CEC) in reviewing geology and paleontology portions of Applications for Certification (AFC) for various power plants throughout the State of California. The power plants included:

Valero Cogeneration Project
Colusa Energy Project
Central Valley Energy Center
Blythe Energy Project Phase II
Tesla FPL Project
Eastshore Energy Center
Panoche Energy Center
Niland Gas Turbine Power Plant
Los Esteros Critical Energy Facility
Pico Power Project
Roseville Energy Center
Contra Costa Energy Project
Gilroy II Project
San Francisco Electric Reliability Project
Russell City Energy Center
Starwood Energy Center
Ivanpah Solar Plant
Marsh Landing Generating Station
Willow Pass Generating Station
Tracy Expansion
Lodi Energy Center
San Joaquin Solar 1 & 2
Vacaville CPV
Mariposa Energy Project

1996 to 1997: SEA, Incorporated; Senior Geotechnical Engineer. Dr. Pilling provided project coordination, management, supervision, and development, and performed field exploration, engineering analyses, and report preparation.

1990 to 1996: WESTEC; Project Manager. Mr. Pilling was responsible for general geotechnical analyses on most projects, as well as design, management, and permitting of heap leach and tailings storage facilities projects. His

experience varied from foundation design recommendations for small pump house structures to detailed liquefaction and seepage/slope stability analyses for large earthen embankments.

1986 to 1990: Case Pacific Company; Project Manager. Mr. Pilling provided cost estimating, project management, and contract negotiation on a wide variety of projects.

Affiliations

- American Concrete Institute: Concrete Field Testing Technician Grade I
- National Society of Professional Engineers
- Secretary/Treasurer - National Society of Professional Engineers, Northern Nevada Chapter
- American Society of Civil Engineers
- International Association of Foundation Drilling
- National Council of Examiners for Engineering and Surveying

Publications

Ashour, M., P. A. Pilling, and G. M. Norris, "Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Isolated Piles and Pile Groups," Proceedings, 32nd Symposium on Engineering Geology and Geotechnical Engineering, Boise, Idaho, March 1997.

Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, "Development of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects," Report No. CCEER-96-4, University of Nevada, Reno, 1996.

Ashour, M., Norris, G., and Pilling, P., "Lateral Loading of a Pile in Layered Soil Using the Strain Wedge Model," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998, pp. 303-315.

Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, "The Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis," Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, March 1995, pp. 40-53.

Pilling, P. A., "The Response of a Group of Flexible Piles and the Associated Pile Cap to Lateral Loading as Characterized by the Strain Wedge Model," Doctoral Dissertation, University of Nevada, Reno, 1997.

Pilling, P.A., Ashour, M., and Norris, G., "Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group," Transportation Research Board Paper No. 01-0174, 2001.

Pilling, P. A. and P. V. Woodward, "Dependent Facility Closure in California," Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, March 1995, pp. 315-326.

Pilling, P.A. and Beeston, H. E., "Expansion Testing of Clay Soils in Forensic Investigations," Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, March 1998, pp. 119-127.

Pilling, P.A., M. Ashour, and G.M. Norris, "Strain Wedge Model Hybrid Analysis of Laterally Loaded Pile Group," Journal of the Transportation Research Board, Transportation Research Record No. 1772, 2001, Paper No. 01-0174, pp. 115-121.

DECLARATION OF
Dale Rundquist

I, Dale Rundquist, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Compliance Project Manager.

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 **General Conditions** 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: _____ Signed: original signed by D. Rundquist

At: Sacramento, California

DALE RUNDQUIST

Compliance Project Manager

EXPERIENCE SUMMARY

Over 30 years in project and staff management experience with the California Energy Commission (CEC), Bel Air Markets, and the US Army. Extensive experience in managing people and projects, and resolving difficult situations.

PROFESSIONAL EXPERIENCE AND EDUCATION

ENERGY COMMISSION COMPLIANCE PROJECT MANAGER 09/07 to Present
Worked as a Compliance Project Manager (CPM) for the California Energy Commission, in the Compliance Unit of the Siting, Transmission and Environmental Protection Division. Monitored the construction of two power plant projects (Inland Empire (01-AFC-17C) and Panoche Energy Center (06-AFC-5C)), and the operation of several other power plants(ACE (86-AFC-1C), Bottle Rock Geothermal(79-AFC-4C), Crockett Cogeneration(92-AFC-1C), Midway Sunset Cogeneration (85-AFC-3C), and Palomar Energy Project (01-AFC-24C)).

MANAGER/SUPERVISOR FOR BEL AIR MARKETS 11/74 to 09/07
Worked for Bel Air Markets for over thirty-two years starting on Night Stock Crew. Worked in a management capacity for twenty-eight years. Worked at several stores throughout the greater Sacramento area, managing 4 stores. Involved in scheduling employees, projecting sales on a weekly, monthly and yearly basis, resolving employee/customer disputes, controlling labor, developing business plans, ordering merchandise, and overall operation of the entire store.

US ARMY 02/69 to 02/71
Infantry Sergeant; Fort Lewis, Washington, Viet Nam.

EDUCATION 09/63 to 06/74
Bachelor of Arts Degree in Biological Sciences and a Minor Degree in Business Administration from California State University, Sacramento (1974).

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: November 3, 2010 Signed: /s/ Shaelyn 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
Ellen Townsend-Hough, REA

I, Ellen Townsend-Hough, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Associate 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 **Waste Management** 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: _____ Signed: Original signed by E. Townsend-Hough

At: Sacramento, California

Ellen Townsend-Hough, REA

(Registered Environmental Assessor, REA 1 – 05465)

SUMMARY

I am a chemical engineer with 30 years of experience. My professional career has afforded me many unique growth and development opportunities. I have a working knowledge of the California Environmental Quality Act. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

PROFESSIONAL EXPERIENCE

Writing

- Write environmental impact reports , negative declarations that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner's position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

- Wrote speeches for the Commissioner's presentations.

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education
Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer

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: September 28, 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: October 6, 2010 Signed: Original Signed by Will 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: _____ 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)

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*indicates change

DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on November 8, 2010, I served and filed copies of the attached 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 by H. Anderson
Hilarie Anderson