

Staff Assessment

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**CALIFORNIA
ENERGY
COMMISSION**

MARSH LANDING GENERATING STATION

Application For Certification (08-AFC-3)
Contra Costa County



STAFF REPORT

APRIL 2010
(08-AFC-3)
CEC-700-2010-010



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CALIFORNIA ENERGY COMMISSION

SITING OFFICE

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**Marsh Landing Generating Station
Power Plant (08-AFC-3)
STAFF ASSESSMENT**

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EXECUTIVE SUMMARY

Mike Monasmith

INTRODUCTION

This Staff Assessment (SA) contains the California Energy Commission staff's evaluation of the Application for Certification (AFC) for the Marsh Landing Generating Station (MLGS). The proposed 760-megawatt (MW) MLGS electric generating plant and related facilities are under the Energy Commission's licensing jurisdiction and cannot be constructed or operated without the Energy Commission's certification. The SA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

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

This SA is not the decision document for these proceedings, nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The SA serves as staff's official, sworn testimony in evidentiary hearings to be held by the Committee assigned to this proceeding, comprised of two Commissioners and a Hearing Officer. After evidentiary hearings, the Committee will consider testimony and comments presented by staff, the applicant, other parties to the proceeding, governmental agencies and the public – all aspects that comprise the official record of this proceeding -- and issue a Presiding Member's Proposed Decision (PMPD). Following a public hearing, the full five-member Energy Commission will make its final decision on this power plant application based upon the PMPD, comments by parties to the proceeding and input from members of the public.

PROJECT LOCATION AND DESCRIPTION

The proposed MLGS project is a simple-cycle "peaker" power plant, meaning that it will be used to meet demand for electrical power during short-term "peaks" in demand. As a peaker plant, the facility will help to ensure a reliable supply of power as California transitions to a greater supply of renewable power sources such as solar and wind power. As a peaker plant, the project will help provide on-demand standby power capacity for grid stability with a very short startup time that can come on-line quickly to provide efficient, dispatchable generation when solar energy sources or wind power are not available.

The proposed project consists of four Siemens SGT6-5000F simple-cycle gas turbines, two natural gas fired preheaters, and associated equipment. The proposed power plant would operate up to 20% of the year depending on the demand for electricity in the region. The California Independent System Operator (Cal ISO) would be responsible for dispatching the plant to meet electrical demand.

The MLGS would be constructed adjacent to the existing Contra Costa Power Plant (CCPP), an older facility which is scheduled to be retired when the Marsh Landing Generating Station is complete. While the CCPP is comprised of seven units, as of 2008, five of the Units have been retired. The remaining two units, Units 6 and 7, were constructed in 1964. The existing CCPP has a once-through cooling system, which draws cooling water from the nearby San Joaquin River and then discharges it back into the river after use. The new MLGS would be a simple-cycle facility that would not use river water for cooling or process water requirements. The two sites will be operated as separate and independent facilities, although they have the same ultimate corporate parent, Mirant Corporation. Mirant has agreed to permanently retire the Contra Costa Power Plant on April 30, 2013.

MLGS construction will take 27 months to complete with a workforce of over 270 workers and a budget of \$550 million. A complete facility description, including figures depicting the local and regional setting and plot plan can be reviewed in the **Project Description** section of this Staff Assessment.

PUBLIC AND AGENCY COORDINATION

On June 10, 2008, the Energy Commission staff provided the MLGS description and AFC to a comprehensive list of libraries (in Antioch and Oakley), agencies, organizations, and property owners within 1,000 feet of the proposed project and 500 feet of the linear facilities. The Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

On December 18, 2008, staff conducted a publicly noticed Data Response and Issues Resolution workshop at the Delta Diablo Sanitation District offices in Antioch. Topics discussed included air quality, biological resources, land use, transmission systems engineering, soil and water resources and waste management. Participating agencies in the workshop included several City of Antioch and Contra Costa County agencies, Delta Diablo Sanitation District, the Bay Area Air Quality Management District. Representatives from intervenor California Unions for Reliable Energy (CURE) also participated in the workshops, as did dozens of local residents.

On September 17, 2009, Mirant Marsh Landing, LLC (applicant) filed a supplement to the MLGS AFC. The Supplement described several changes to the proposed project, including switching the facility's water source from Title 22 reclaimed water from Delta Diablo Sanitation District to on-site degraded groundwater. The revised MLGS AFC also modified the initial combustion turbine configuration (two combined-cycle and two simple-cycle units) to four simple-cycle units producing 760 megawatts of electricity (down from initial nominal proposed output of 930 megawatts).

The MLGS supplement was distributed to a comprehensive list of libraries (in Antioch and Oakley), agencies, and organizations, and a notice of this supplement was mailed to agencies, libraries and property owners within 1,000 feet of the proposed project and 500 feet of the linear facilities. The supplement was also made available to hundreds of individuals through the Energy Commission's Listserve e-mail alert system.

Modifications to the proposed MLGS AFC also consisted of an increase in stack height from 150 feet to 165 feet, and a 27 month construction schedule. On October 14, 2009, staff conducted a Data Response and Issues Resolution Workshop specifically organized to address water and waste management issues associated with the MLGS.

LIBRARIES

Energy Commission staff sent copies of both the initial May 31, 2008 AFC, and the September 22, 2009 AFC Supplement, to the following libraries:

Antioch Library 501 W. 18 th Street Antioch, CA	Oakley Library 1050 Neroly Road Oakley, CA	Pittsburg Library 80 Power Avenue Pittsburg, CA

In addition to these local libraries, copies of the AFC and AFC Supplement were also made available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, state libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

Energy Commission's Public Adviser's Office

In addition, the Public Adviser's Office (PAO) of the Energy Commission provided notification by letter and enclosed notice of the December 18, 2008 Informational Hearing and Site Visit held at Delta Diablo Sanitation District offices in Antioch. Outreach by the PAO was conducted for city residents, representatives of environmental, Native American, and local public interest and regulatory organizations, and others with an expressed or anticipated interest in this project. Also, elected and certain appointed officials from the City of Antioch and Contra Costa County were similarly notified of the hearing and site visit. The PAO also contacted the *Contra Costa Times* newspaper and paid to have a one-page flyer distributed to Antioch, Oakley and Pittsburg subscribers regarding the December 18, 2008 Information Hearing and Site Visit.

ENVIRONMENTAL JUSTICE

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." In light of the progress made by federal environmental agencies on environmental justice, the Energy Commission has examined federal guidelines pursuant to its desire to follow environmental justice principles for the environmental review of this project.

The steps recommended by the U.S. Environmental Protection Agency's (EPA's) guidance documents to assure compliance with Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis.

The purpose of staff's environmental justice screening analysis is to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the screening analysis in accordance with the Final Guidance for Incorporating Environmental Justice Concerns in US EPA's National Environmental Protection Act Compliance Analysis (Guidance Document) dated April 1998. People of color populations, as defined by this Guidance Document, are identified where either:

- the minority population of the affected area is greater than 50% of the affected area's general population; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Socioeconomics Figure 1 (located in the **Socioeconomics** section of this analysis) shows a total minority population of 43.01% within a six-mile radius of the MLGS site. Several census blocks with a minority population of greater than 50% exist within the six-mile boundary. Despite a total minority population less than the 50% threshold, staff's environmental justice outreach was nonetheless incorporated into its overall analysis and outreach activity facilitated by the Energy Commission's Siting Office and Public Adviser's Office.

STAFF'S ASSESSMENT

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

- the environmental setting of the proposal;
- impacts on public health and safety and measures proposed to mitigate these impacts;
- environmental impacts and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;

- compliance of the project with all applicable laws, ordinances, regulations, and standards (LORS) during construction and operation;
- environmental justice for minority and low income populations;
- proposed conditions of certification; and
- identification of the remaining issues that must be addressed before staff can recommend project approval or denial.

SUMMARY OF PROJECT-RELATED IMPACTS

Staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the MLGS project would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any direct, indirect or cumulatively significant impacts. For a more detailed review of potential impacts, see staff's technical analyses in this SA. The status of each technical area is summarized in the table below and the subsequent text.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Undetermined*	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Not Applicable	Not Applicable
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Not Applicable	Not Applicable
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety / Fire Protection	Yes	Yes

*pending FDOC

AIR QUALITY

While staff concludes that the operation of the proposed project would comply with all Bay Area Air Quality Management District (District) LORS, the District will not publish the Final Determination of Compliance (FDOC) until after the SA is published.

Therefore, while staff estimates no complications, it cannot find compliance with LORS until the FDOC is released and entered into the record. Staff anticipates handling this through a Supplemental Staff Assessment.

TRANSMISSION SYSTEM ENGINEERING

Transmission system impacts and appropriate mitigation have been identified at this point and are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. However, The California Independent System Operator (California ISO) Phase II Interconnection Study will be performed based on the 1,409 MW in the Group 1 cluster, which includes the MLGS. The Phase II Interconnection Study will not be available until Fall 2010 and thus not incorporated into staff's analysis of the MLGS. While staff doesn't anticipate unmitigated impacts, Condition of Certification (COC) TSE-5 requires that the Phase II Interconnection Study be provided to the Energy Commission before the start of transmission facility construction.

WASTE MANAGEMENT

In regards to the existing soil and groundwater contamination on the site, staff issued a number of data requests that were satisfactorily completed by the applicant. The data was included in two reports issued by the applicant in January and February 2010. However, the Department of Toxic Substance Control (DTSC) subsequently asked for further site characterization and this data is not yet available. If DTSC determines the presence of contamination requiring additional Conditions of Certification in order to protect workers and the off-site public, staff will file a Staff Assessment Addendum.

ALTERNATIVES SUMMARY

In this analysis of the MLGS, several alternative project sites were examined, as well as alternative generation technologies. The alternative sites would not reduce or avoid all potentially significant impacts of the proposed project. The alternative technologies could not achieve most of the project objectives and would likewise not substantially lessen or avoid environmental impacts. Staff also believes that the "no project" alternative is not superior to the proposed project. Please refer to the **Alternatives** section of this SA for further details.

NOTEWORTHY PUBLIC BENEFITS

MLGS offers the following public benefits:

- Meeting the need for new quick-start, highly efficient, highly flexible, reliable electrical generating resources located in the load center of the Bay Area/Central California region;

- Modernizing the existing aging electrical generation and utilizing existing infrastructure to reduce environmental impacts and costs;
- utilizes simple-cycle turbines that are designed as a firm supply of power for when renewable energy sources such as wind power are not available;
- provide standby power capacity for grid stability using simple-cycle turbines for this purpose;
- facilitating the retirement of existing CCPP Units 6 and 7 and eliminating the need for once-through river water cooling and its associated fish impingement and biological impacts;
- accomplishing a *brownfield* (land that has already been developed as an industrial use) redevelopment of an existing power plant for a net increase in electrical capacity.

Staff has identified additional noteworthy socioeconomics public benefits that would include both short term construction-related and long term operational-related increases in local expenditures and payrolls, as well as sales tax revenues.

RECOMMENDATIONS AND SCHEDULE

Staff will conduct a public workshop on the Staff Assessment approximately two weeks following publication of the SA. Subsequent to the workshop, staff expects to docket the Final Determination of Compliance from the BAAQMD and will also file any necessary revisions to the SA. Staff will then await Committee direction on the filing of testimony and a schedule for evidentiary hearings.

In summary this SA finds that:

- With one exception (**Air Quality**), the MLGS project will be in conformance with all laws, ordinances, regulations, and standards (LORS), and the project's construction and operation impacts can be mitigated to a level of less than significant. Air Quality is an exception pending the Final Determination of Compliance from the Bay Area Air Quality Management District.
- In terms of **Transmission System Engineering**, the Phase I Interconnection Study does not provide for a full analysis of the reliability impacts of interconnecting new MLGS generation (coupled with permanent decommissioning of the Contra Costa Power Plant). Nonetheless, staff does not anticipate that the forthcoming Phase II Interconnection Study will indicate the potential for any unmitigated impacts.

INTRODUCTION

Mike Monasmith

PURPOSE OF THIS REPORT

This Staff Assessment (SA) is the California Energy Commission staff's independent analysis of the proposed Marsh Landing Generating Station (here after referred to as MLGS). 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.

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 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 will prepare 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.

When necessary, staff provides a 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 normally 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, 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 rebut 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 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 typically 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, California State Lands Commission, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Air Resources Board and the Bay Area Air Quality Management District.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by its Public Adviser's Office (PAO). This is an ongoing process that provides a consistent level of public outreach, regardless of outreach efforts conducted by the applicant or other parties.

LIBRARIES

Energy Commission staff sent copies of both the initial May 31, 2008 AFC, and the September 22, 2009 AFC Supplement, to the following libraries:

Antioch Library 501 W. 18 th Street Antioch, CA	Oakley Library 1050 Neroly Road Oakley, CA	Pittsburg Library 80 Power Avenue Pittsburg, CA

In addition, to these local libraries, copies of the AFC and AFC Supplement were also made available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, state libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

INITIAL OUTREACH EFFORTS

The PAO's public outreach work is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted its own outreach efforts to identify "sensitive receptors" (including schools, community, cultural and health facilities, daycare and senior-care centers, as well as environmental and ethnic organizations) within a six-mile radius of the proposed site for the project. These sensitive receptors, especially elementary schools, are contacted and kept informed of Energy Commission proceedings through PAO outreach. The PAO also works with the siting division and the governmental affairs office to identify and contact local elected and appointed officials from the area.

The PAO provided notification by letter and enclosed notice of the December 18, 2008 Informational Hearing and Site Visit, held at the Delta Diablo Sanitation District in Antioch. Notices were initially distributed to Antioch residents through a notice flyer sent to all subscribers of the *Contra Costa Times*. Notices were also distributed to representatives of environmental, Native American, and certain public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials of the City of Antioch and Pittsburg and Contra Costa County were similarly notified of the hearing and site visit.

Energy Commission regulations require staff to notice, at a minimum, 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). This was done for the MLGS project. 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.

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 (U.S. EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

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 EPA's NEPA (National Environmental Policy Act) 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 AMS project, are discussed in the **EXECUTIVE SUMMARY**.

PROJECT DESCRIPTION

Mike Monasmith

INTRODUCTION

Mirant Marsh Landing, LLC (the applicant) filed an Application for Certification (AFC) on May 30, 2008 to construct and operate the Marsh Landing Generating Station (MLGS), a 930 megawatt (MW) natural gas-fired combined cycle power plant, just north of the City of Antioch in Contra Costa County. On September 19, 2008, the applicant provided a Data Adequacy Supplement to the AFC to satisfy the Energy Commission's informational requirements. On September 24, 2008, the Energy Commission accepted the AFC with the supplemental information as complete. On September 16, 2009, Mirant Marsh Landing submitted an amendment to the AFC modifying the MLGS to constitute a nominal 760 MW facility consisting of four combustion turbines operating in simple-cycle mode. **Project Description Figure 1** provides a visually-simulated depiction of the proposed MLGS.

The MLGS facility is proposed for a 27-acre industrial site north of Wilbur Avenue, one mile northeast of the City of Antioch, and south of the San Joaquin River. Highway 4 and the Antioch Bridge are approximately 0.7 miles east of the site. Immediately adjacent to the site are existing industrial facilities, including the existing Contra Costa Power Plant (CCPP) owned and operated by Mirant Delta, LLC (Mirant Delta), a Pacific Gas and Electric Company (PG&E) Substation, and PG&E's Gateway Generating Station (GGS). **Project Description Figure 2** provides a site vicinity and regional map for the proposed facility.

When the AFC and amendment were filed, the western portion of the proposed site was occupied by five above ground fuel storage tanks owned by Mirant Delta. The AFC stated that Mirant Delta may remove these tanks as part of its own site management activities prior to selling the site to Mirant Marsh Landing. As part of EPA's revised Spill Prevention, Control and Countermeasures Rule, Mirant Delta has begun cleaning and removal of the five 120,000 barrel aboveground storage tanks at the CCPP Site and is expected to complete these activities in 2010.

The MLGS project would have a nominal electrical output of 760 MWs generated from four Siemens 5000F combustion turbine units operating in simple-cycle mode. The new 230-kV circuit lines would be interconnected to the existing PG&E switchyard located adjacent to the MLGS site. The MLGS would use natural gas that would be delivered via a new pipeline that would connect to PG&E's interstate gas transmission Line 400, which runs approximately 0.25 miles east of the MLGS site (adjacent to the Gateway Generating Station). The MLGS would require an average of 50 acre-feet of water per year (AFY) to be supplied by two groundwater wells located within the existing CCPP. A new 2,200-foot pipeline would be constructed from the wells to the MLGS raw water storage tank. The groundwater is considered brackish and would undergo treatment (filtration, ion exchange) using a trailer-type system. Project wastewater would be stored prior to discharge to the City of Antioch sewer line along Wilbur Avenue via a new 3,000 foot long pipeline. Potable water would be supplied by the City of Antioch. **Project**

Description Figure 3 provides a location site plan of the MLGS facility and all its associated linear facilities, including pipelines, construction laydown and parking areas and property boundaries.

Project Description Figure 4

The MLGS proposes to use brackish groundwater to be supplied from new groundwater wells located on the adjacent CCPP site. A new buried water supply pipeline will be installed within the existing CCPP access road right-of-way between the well pad site and the MLGS raw water storage tank. Process water requirements are expected to be a maximum of 50 acre-feet per year. Process and sanitary wastewater will be discharged to the City of Antioch sewer line along Wilbur Avenue, which ultimately discharges to Delta Diablo Sanitation District's (DDSD's) wastewater system. One acre-foot of water equates to approximately 325,850 gallons of water. Potable water will be supplied by the City of Antioch, and the City of Antioch will also serve the project as an alternative primary supply of water for process uses. Back-up water supply (and water for fire suppression) will be provided by onsite storage tanks. A more detailed water discussion can be found in the **SOIL & WATER** section of this document, including a stormwater runoff discussion. Stormwater runoff from open areas will be discharged to the San Joaquin River via the existing CCPP stormwater Outfall-001 in accordance with the National Pollutant Discharge Elimination System (NPDES) General Industrial Permit requirements. Stormwater runoff from areas that collect miscible chemicals or volatile liquids and from areas that could collect nonmiscible oil will be directed to a new oily water separator system, with effluent discharged to the wastewater storage tank, and ultimately to the DDSD's wastewater system.

The Energy Commission is responsible for reviewing and ultimately approving or denying all applications to construct and operate thermal electric power plants, 50 MW and greater, in California. The Energy Commission's facility certification process carefully examines public health and safety, environmental impacts, and engineering aspects of proposed power plants and all related facilities, such as electric transmission lines and natural gas and water pipelines. The issuance of a certificate by the Energy Commission is in lieu of any local, state or federal permit (to the extent permitted by federal law). The Energy Commission is the Lead Agency under the California Environmental Quality Act (CEQA), although it produces several environmental and decision documents rather than an Environmental Impact Report.

MLGS construction is proposed to begin during the fourth quarter of 2010 and take 27 months to complete, and is expected to cost approximately \$550 million. The applicant expects commercial operation by May 1, 2013.

Several of the components of the proposed project will be located outside of the proposed MLGS boundary but within the adjacent Contra Costa Power Plant (CCPP) site. Construction laydown and parking areas (approximately 14 acres) will all be located on previously disturbed, graded, or paved areas of the CCPP site. The gas interconnection line will run west from PG&E's existing gas transmission line (Line 400), which is adjacent to the GGS site, across the CCPP site to the MLGS compressor station and fuel gas conditioning station. Electric transmission lines will connect directly

to the PG&E switchyard immediately adjacent to the MLGS site (see **Project Description Figure 3**).

The proposed project will connect to an existing potable water line that runs north-south through the CCPP property to the City of Antioch water line that is located along Wilbur Avenue. In addition, a wastewater pipeline will be constructed from the MLGS wastewater storage tank through the CCPP site to the interconnection point with the City of Antioch sewer line on Wilbur Avenue. Approximately 1,500 feet of the wastewater pipeline would run along Wilbur Avenue in the existing right-of-way, as shown on **Project Description Figure 3**.

Demolition of Above-ground Storage Tanks 1 through 5 is discussed and analyzed in the **WASTE MANAGEMENT** section of this document. The tanks were built in the early 1950s and have not been in regular use since 2003. Most of the contents (no. 6 fuel oil) have been removed with only residual amounts remaining below pump suction levels. In addition to the tanks, associated equipment, piping, and asphalt-covered earthen berms surrounding the tanks will be removed prior to construction. The demolition will occur within the footprint of the five existing tanks within the western portion of the MLGS site. The workforce and equipment associated with the demolition are included in the construction workforce and construction equipment usage tables (please see the **SOCIOECONOMICS** section of this document).

Project Purpose and Objectives

In general, the applicant's objectives are to design, build, own, and operate the Marsh Landing Generating Station (MLGS) to meet the need for additional electric generation capacity, energy, and ancillary services in Northern California and, in particular, quick-start peaking and shaping capacity in the regional service territory of Pacific Gas & Electric (PG&E). Applicant has entered into a long-term power purchase agreement with PG&E for the sale of generated electricity from the Marsh Landing facility.

The MLGS AFC and amendment identify several basic objectives for the development of the proposed power project. Key components of the MLGS project include the following:

- Installing new quick start and intra-day ramping capability within a local reliability area to displace less efficient and less flexible gas-fired resources.

- Backing up and supporting integration of renewable resources and the State's Renewable Portfolio Standard (RPS)/greenhouse gas reduction goals.

- Utilizing a brownfield and existing power plant site to construct new generating capacity without the need to disturb a greenfield site or construct significant new lateral facilities.

- Seeking approval for interconnecting the project to the Pacific Gas & Electric (PG&E) switchyard and down-stream transmission system and to upgrading its infrastructure if necessary to accommodate the new electrical generation.

If approved by the Energy Commission, project construction is expected to begin in the fourth quarter of 2010 and take approximately 27 months for project completion (single

phase construction schedule). Major milestones for the planned MLGS construction schedule are:

- Begin construction: fourth quarter 2010
- Startup and testing: first quarter 2013
- Commercial operations: May 1, 2013

The capital cost for the project is approximately \$550 million, and would employ over 20 full-time employees once operational. Construction employment is discussed in detail in the **SOCIOECONOMICS** section of this document.

Project-Related Features and Facilities

Features and facilities that would be developed as part of the proposed project are listed below.

Tank demolition and remediation: Five Contra Costa Power Plant (CCPP) above ground fuel oil tanks would be demolished.

Zoning/General Plan: The proposed power plant site is zoned HI (Heavy Industrial) in the County of Contra Costa General Plan and will have the same zoning when annexed into the City of Antioch. Electrical power-generating facilities are permitted uses within this zoning district and General Plan designation. A complete analysis contained in the **LAND USE** section of this document.

Transmission Lines: System Impact Studies for MLGS's interconnection to the adjacent PG&E switchyard and downstream effects of MLGS generation is discussed in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

Gas Line: To fuel the new MLGS turbines, an 8 ½-inch-diameter gas pipeline extension would be constructed (entirely within existing rights-of-way) to connect the project to the existing PG&E Line 400 pipeline currently used to provide natural gas to both the CCPP and Gateway Generating Station (GGS) facilities.

Potable Water Supply: The proposed project would include a new interconnection to the existing City of Antioch potable water supply line that serves both the CCPP and GGS facilities.

Process Water Supply: The proposed project would include two wells and pumps capable of providing full demand and full redundancy for the brackish groundwater supply. The wells would be located in the southern portion of the CCPP site and a new 2,200-foot-long pipeline would be constructed within the existing CCPP access road right-of-way to the MLGS site. City of Antioch water is available via the potable water supply line as an alternative primary source of process water. A complete water supply analysis can be reviewed in the **SOIL & WATER** section of this document.

PROJECT DESCRIPTION - FIGURE 5

Marsh Landing Generating Station - Existing Facility and Visual Simulation

APRIL 2010



Visual Simulation



Existing Facility

PROJECT DESCRIPTION

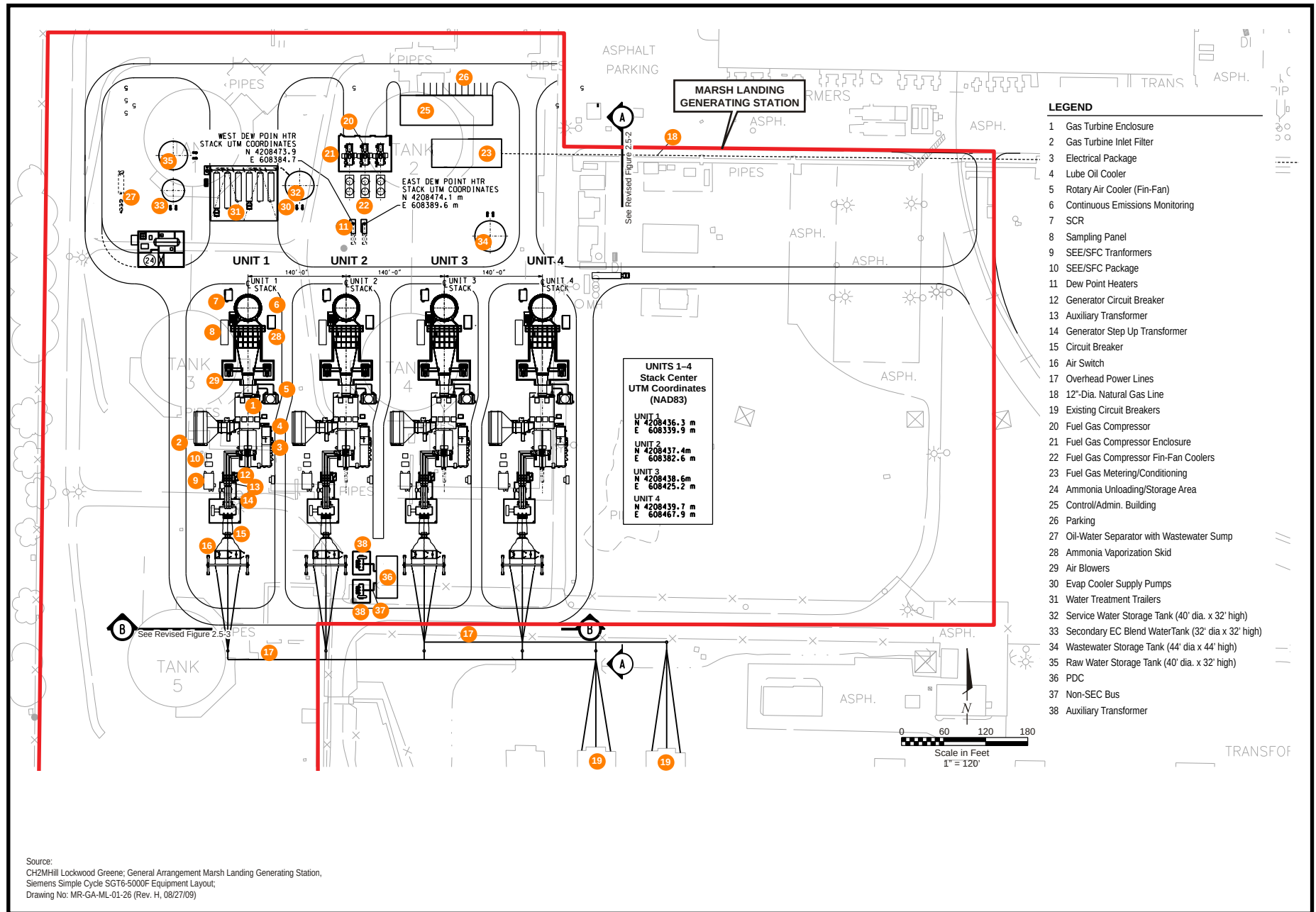
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: Mirant Marsh Landing 12/18/08 Site Visit Handout 1 and 2

PROJECT DESCRIPTION - FIGURE 4
Marsh Landing Generating Station - General Plot Plan

APRIL 2010

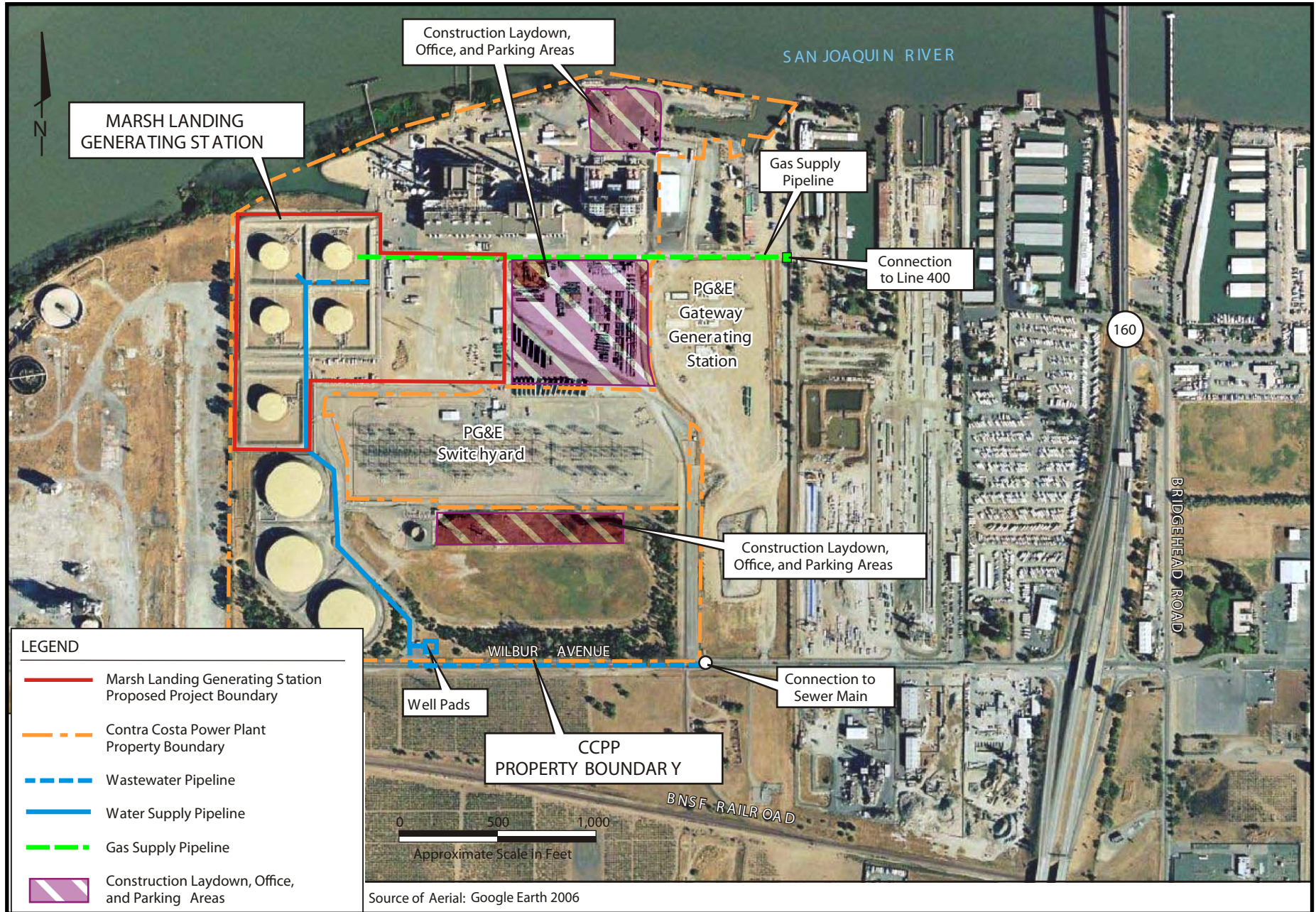
PROJECT DESCRIPTION



APRIL 2010

PROJECT DESCRIPTION

PROJECT DESCRIPTION - FIGURE 3
Marsh Landing Generating Station - Site Plan



Marsh Landing Generating Station - Project Location Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010
SOURCE: AFC Amendment Revised Figure 2.2-1

Marsh Landing Generating Station - Site Vicinity Map

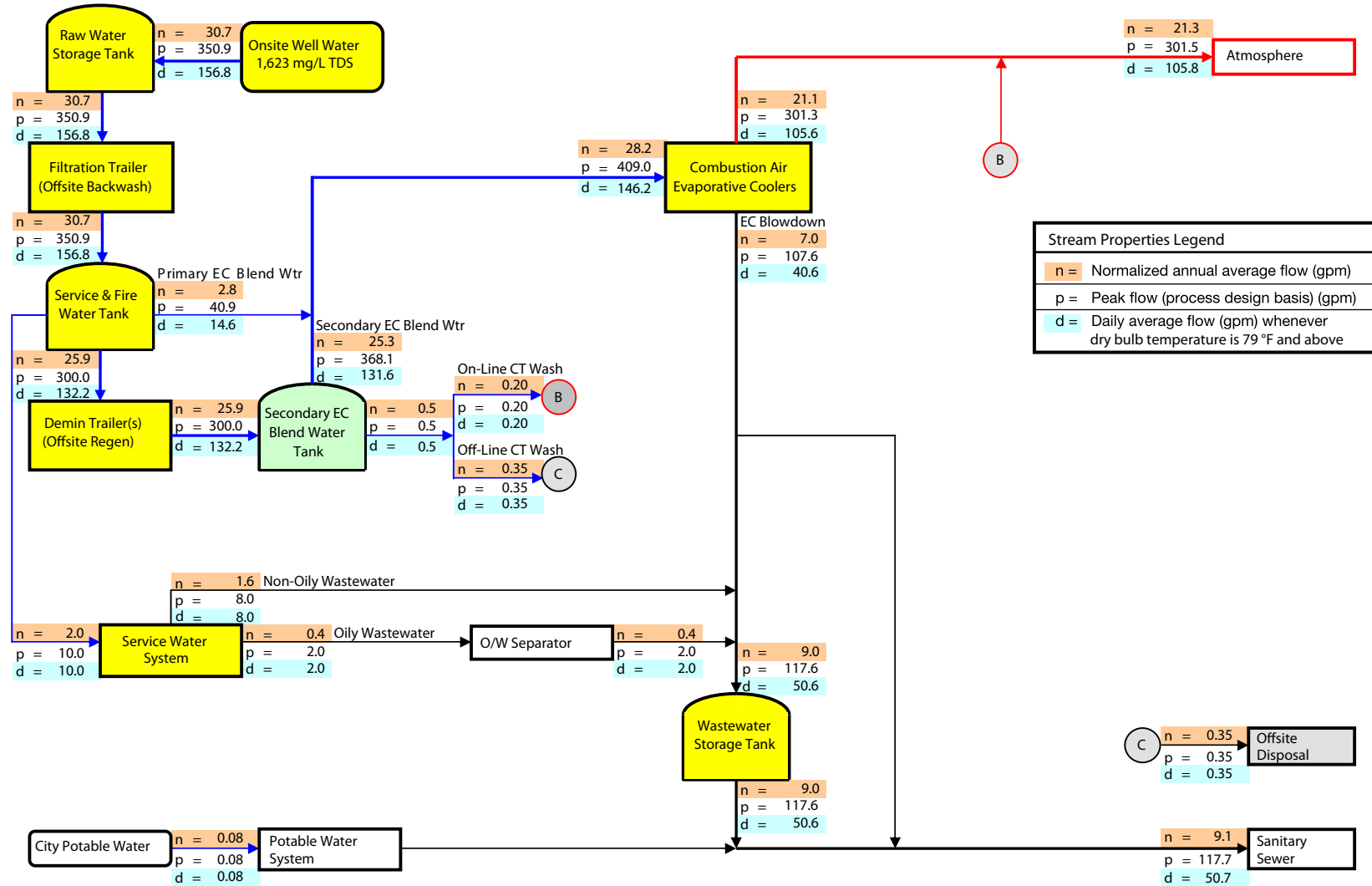


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: Mirant Marsh Landing 12/18/08 Site Visit Handout 1 and 2

PROJECT DESCRIPTION - FIGURE 6
Marsh Landing Generating Station - Water Balance

APRIL 2010



PROJECT DESCRIPTION

EC = Evaporative Cooler

Source:
CH2MHill Lockwood Greene; Water Balance Model:
WtrBalModel(Conceptual)-MLGS-Groundwater-4SCs_EvapClrs_MobileTrailers
(August 20, 2009)

Notes:

1. Water balance based on four Simple Cycle units with evaporative coolers using onsite groundwater treated by mobile trailers.
2. Flow rates on this drawing reflect operation of all four units.

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Brewster Birdsall, P.E., QEP

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification, the proposed Marsh Landing Generating Station (MLGS) 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 MLGS project would not result in significant air quality-related impacts. Staff also finds the following.

- The project would comply with New Source Review and Best Available Control Technology (BACT) requirements.
- In conjunction with offsets required by BAAQMD, additional emission reduction credits should be surrendered for mitigation of 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 MLGS would emit approximately 0.60 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 MLGS is not designed or intended for base load generation [Tit. 20, Cal. Code Regs., § 2901 (b)]. 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

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants from both the construction and operation of the proposed Marsh Landing Generating Station (MLGS) by Mirant Marsh Landing LLC (applicant). The new MLGS would be constructed adjacent to the existing Contra Costa Power Plant (CCPP) in northeastern Contra Costa County on a site owned by Mirant Delta LLC, which also holds the existing air permits for the CCPP (AFC p. 2-1, URS2008a).

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 (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), inhalable particulate matter less than 10 microns in diameter (PM₁₀), and fine particulate matter less than 2.5 microns in diameter (PM_{2.5}). In addition, nitrogen oxides (NO_x, consisting primarily of nitric oxide (NO) and NO₂), sulfur oxides (SO_x), and volatile organic compounds (VOC), also known as precursor organic compounds (POC), are also analyzed. NO_x and VOC readily react in the atmosphere as precursors to ozone. NO_x and SO_x 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 MLGS 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 MLGS 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 MLGS project because it would be neither a new major source nor a major modification to an existing major source. The existing Contra Costa Power Plant is owned and operated by Mirant Delta LLC, which is a separate and independent subsidiary of Mirant Corporation (BAAQMD 2010). The BAAQMD implements the PSD program for U.S. EPA within the San Francisco Bay Area.

Applicable Law	Description
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 15 parts per million (ppm) NOx or 0.43 pounds NOx per megawatt-hour (lb/MWh), achieve fuel sulfur standards, and provide reporting.
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 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.
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.
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.”

Applicable Law	Description
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 (NO _x , POC, PM ₁₀ , CO, or SO ₂). Requires surrendering offsets for facilities with the potential to emit more than 35 tons per year of NO _x or POC, or 100 tons per year of PM ₁₀ or SO _x .
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 ATC. The BAAQMD would issue the ATC after the Energy Commission certifies the MLGS 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	Particulate Matter – Limits particulate matter and visible emissions to less than 20% opacity. Prohibits emissions from any activity for more than 3 minutes in any one hour that result in visible emissions as dark or darker than Number 1 on the Ringlemann Chart.
BAAQMD Regulation 7	Odorous Substances – Prohibits the discharge of any odorous substances which remain odorous at the property line after dilution with four parts of odor-free air. Limits the emissions of ammonia to no more than 5,000 parts per million (ppm).
BAAQMD Regulation 8	Organic Compounds – Requires use of architectural coatings and solvents meeting POC limits and compliant coatings. Emissions from solvent use must not exceed 5 tons annually.
BAAQMD Regulation 8, Rule 40	Aeration of Contaminated Soil and Removal of Underground Storage Tanks – Prohibits aeration of soil contaminated with organic chemical or petroleum chemical spills except through a control device that is at least 90% effective. However, no remediation activities are currently proposed in conjunction with preparing the site for the MLGS. See Public Health .

Applicable Law	Description
BAAQMD Regulation 9, Rule 1	Sulfur Dioxide – Prohibits emissions causing SO ₂ 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 7	Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters – Specifies emission limits of 30 ppm NO _x and 400 ppm CO, applicable to the proposed fuel gas preheaters.
BAAQMD Regulation 9, Rule 7	Stationary Gas Turbines – Specifies emission limits of 5 ppmvd NO _x or 0.15 pounds NO _x per megawatt-hour (lb/MWh), applicable to the proposed combustion turbines.

SETTING

METEOROLOGICAL CONDITIONS

The climate in the San Francisco Bay Area is controlled by a semi-permanent subtropical high pressure system that is centered over the northeastern Pacific Ocean. In the summer, this high pressure system maintains clear skies inland and produces a band of cold ocean water off the California coast that promotes low inversion layers and morning coastal fog. In winter, the high pressure weakens and moves south, promoting offshore winds and allowing storm systems to move into the area. The climate of the Carquinez Strait region within the San Francisco Bay Area has hot dry summers and mild winters with precipitation almost exclusively in the winter. Very little precipitation occurs during the summer because storms are blocked by the high-pressure system. Temperature, winds and rainfall are variable during fall the winter months, and stagnant conditions occur more frequently than during summer.

Wind speeds are generally higher in spring, summer, and autumn, and are typically westerly. The stronger winds commonly 15 to 20 miles per hour are caused by a combination of high pressure offshore and a thermal low pressure resulting from higher temperatures inland. During the winter months, wind directions are more variable. The annual rainfall at the project site is around 13 inches and most precipitation (80%) occurs from November through March. During the summer, daily temperatures are typically between 50 and 90 °F. Winters have daily temperatures typically between 30 and 60 °F (WRCC 2010).

Along with the wind flow, atmosphere stability and mixing heights are important factors in the determination of pollution dispersion. Atmospheric stability is an indicator of the air turbulence and mixing. When the air is less stable, there is more turbulence and more mixing, resulting in more air pollutant dispersion and therefore usually reduced air quality impacts near any single air pollution source. The mixing height is the height of the atmospheric layer in which convection and mechanical turbulence promote mixing. A high mixing height and at least moderate wind speeds within the mixing layer result in good air pollutant dispersion. In general, the frequent temperature inversions over the San Francisco Bay Area limit the mixing height and consequently limit the air

dispersion. During the spring, summer, and autumn, the air pollution potential in the region is moderated by the strong westerly winds.

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 (PM ₁₀)	24 Hour	50 µg/m ³	150 µg/m ³
	Annual	20 µg/m ³	None
Fine Particulate Matter (PM _{2.5})	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)	None
	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>), February 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.

b. This new federal 1-hour NO₂ standard became effective April 12, 2010. The 1-hour NO₂ NAAQS is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations. Due to this regulation being promulgated after the MLGS application filing date, and due to a corresponding lack of established modeling tools for conducting impact analyses in compliance with the statistical form of the new standard, staff has not completed a full impact assessment for compliance with this federal standard, and instead staff treats the CAAQS as limiting.

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
SO ₂	Attainment	Attainment

Source: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed April 2010.

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 MLGS project site is in northeastern Contra Costa County near Antioch city limits. The monitoring stations closest to the proposed site with long-term records of ozone, NO_x, CO, SO₂, 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 NO_x 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
MLGS, 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
Bethel Island Road					
2000	0.115	1	0.085	6	9
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
Pittsburg-10th Street					
2000	0.107	1	0.080	2	5
2001	0.118	2	0.092	3	9
2002	0.111	4	0.096	5	12
2003	0.094	0	0.080	3	9
2004	0.090	0	0.081	1	2
2005	0.094	0	0.078	1	2
2006	0.105	3	0.093	6	10
2007	0.100	1	0.074	0	2
2008	0.106	1	0.083	1	2
Concord-2975 Treat Blvd					
2000	0.138	2	0.094	2	6
2001	0.134	6	0.087	5	11
2002	0.103	5	0.089	5	10
2003	0.101	5	0.085	8	11
2004	0.097	1	0.083	3	6
2005	0.098	1	0.080	2	2
2006	0.117	8	0.092	9	14
2007	0.105	1	0.081	1	4
2008	0.119	3	0.088	6	8

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

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 NO_x, SO_x, organic compounds, and ammonia (NH₃) from natural or man-made sources can form secondary particulate nitrates, sulfates, and organic solids. Secondary particulate matter is mostly finer PM₁₀, whereas particles 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
MLGS, Background PM₁₀ Air Quality Data (µg/m³)

Location, Year	Maximum 24-hr PM ₁₀ Concentration	Month of Maximum 24-hr Concentration	Days Above CAAQS	Days Above NAAQS	Annual Average PM ₁₀ Concentration
Bethel Island Road					
2000	62.0	NOV	11.8	0	19.8
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
Pittsburg-10th Street					
2000	55.5	NOV	-	0	16.3
2001	97.7	JAN	-	0	20.7
2002	73.2	NOV	18.0	0	23.8
2003	58.3	SEP	-	0	20.2
2004	61.9	APR	6.1	0	21.1
2005	54.1	FEB	6.0	0	19.5
2006	57.8	OCT	11.5	0	19.4
2007	55.6	JAN	24.2	0	18.8
2008	73.6	JUN	12	0	19.9
Concord-2975 Treat Blvd					
2000	53.8	NOV	11.8	0	17.8
2001	105.8	JAN	18.0	0	20.3
2002	62.8	NOV	18.4	0	21.1
2003	32.0	JAN	0.0	0	15.9
2004	48.3	NOV	-	0	18.1

2005	40.3	NOV	0.0	0	15.9
2006	83.6	JUL	17.6	0	18.1
2007	49.4	JAN	12.0	0	16.4
2008	49.4	JUN	-	-	16.7

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

Note: Concentrations shown are based upon federal reference methods. The number of days above the CAAQS (50 µg/m³) 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 (PM_{2.5})

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

PM_{2.5} 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 NO_x emissions from combustion sources. The nitrate ion concentrations during the winter make up a large portion of the total PM_{2.5}. Ammonium sulfate is also a concern because of the ready availability of ammonia in the atmosphere.

Air Quality Table 6 summarizes the ambient PM_{2.5} data collected from the only PM_{2.5} monitoring station in Contra Costa County.

Air Quality Table 6
MLGS, Background PM_{2.5} Air Quality Data (µg/m³)

Location, Year	Maximum 24-hr PM _{2.5} Concentration	Month of Maximum 24-hr PM _{2.5} Concentration	Days Above NAAQS	Annual Average PM _{2.5} Concentration
Concord-2975 Treat Blvd				
2000	52.6	DEC	15.1	11.1
2001	85.4	JAN	13.4	11.0
2002	76.7	NOV	27.3	13.0
2003	49.7	NOV	5.1	9.7
2004	73.7	DEC	-	-
2005	48.9	DEC	5.4	9.1
2006	62.1	DEC	5.5	9.3
2007	46.2	JAN	7.1	8.3
2008	60.3	JUN	7.0	9.3

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

Note: Concentrations shown are based upon federal reference methods.

Air Quality Table 6 shows that PM_{2.5} 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 PM_{2.5} concentrations (ARB 2009).

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
MLGS, Background Concentrations of 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
Bethel Island Road					
2000	1.53	0.043	0.010	0.008	0.002
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
Pittsburg-10th Street					
2000	2.45	0.054	0.013	0.009	0.002
2001	2.44	0.062	0.014	0.012	0.003
2002	2.51	0.054	0.013	0.016	0.002
2003	1.66	0.061	0.012	0.007	0.002
2004	1.91	0.048	0.011	0.008	0.002
2005	1.73	0.058	0.011	0.010	0.002
2006	1.92	0.052	0.011	0.009	0.002
2007	1.50	0.051	0.010	0.008	0.002
2008	1.44	0.056	0.010	0.006	0.002
Concord-2975 Treat Blvd					
2000	2.70	0.074	0.016	0.005	0.002
2001	2.67	0.065	0.015	0.005	0.001
2002	2.28	0.063	0.015	0.007	0.001
2003	1.99	0.062	0.013	0.003	0.001
2004	2.00	0.065	0.012	0.010	0.001
2005	1.51	0.055	0.012	0.008	0.001
2006	1.30	0.047	0.011	0.006	0.001

2007	1.41	0.049	0.011	0.005	0.001
2008	1.13	0.050	0.010	0.005	0.001

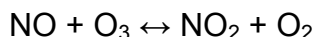
Source: ARB, Air Quality Data Statistics (<http://www.arb.ca.gov/adam/welcome.html>), Accessed April 2010.

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 NO_x emitted from combustion sources is in the form of nitric oxide, while the balance is NO₂. Nitric oxide (NO) is oxidized in the presence of ozone to form NO₂, but some level of photochemical activity is needed for this conversion. High concentrations of NO₂ 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 NO₂ 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 NO₂. The formation of NO₂ in the summer, with the help of the ozone, is according to the following reaction:



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 NO₂ 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 NO₂ became effective in early 2008, and the U.S. EPA adopted a new 1-hour standard of 0.100 ppm 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 NO₂ 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 NO₂ standards (ARB 2010). See **Air Quality Table 7** for maximum 1-hour and annual NO₂ 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, SO₂ leads to sulfite particulate formation and acid rain. Natural gas contains very little sulfur and therefore results in low SO₂ emissions when burned. By contrast, high sulfur fuels like coal emit large amounts of SO₂ when burned. Sources of SO₂ 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 SO₂ ambient air quality standards.

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 PM_{2.5}. Staff uses the highest local background ambient air concentrations as the baseline for analyzing potential ambient air quality impacts for the proposed project. Attainment with limiting standards for PM_{2.5} and NO₂ is based on a statistical form and multi-year averaging, which, if applied to the background, would reveal lower concentrations than shown here. The highest background concentrations are shown in **Air Quality Table 8**.

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

Air Quality Table 8
Staff-Recommended Background Concentrations (µg/m³)

Pollutant	Averaging Time	Background	Limiting Standard	Percent of Standard
PM₁₀	24 hour	84.0	50	168
	Annual	23.6	20	118
PM_{2.5}	24 hour	62.1	35	177
	Annual	9.3	12	78
CO	1 hour	4,686	23,000	20
	8 hour	2,194	10,000	22
NO₂	1 hour	105.7	339	31
	Annual	20.8	57	36
SO₂	1 hour	234.6	655	36
	24 hour	23.5	105	22
	Annual	5.2	80	7

Source: AFC Section 7.1 (URS 2008a); 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 MLGS would include the following new stationary sources of emissions (AFC Amendment Section 3.1.2, URS 2009b):

- Four Siemens SGT6-5000F natural gas-fired combustion turbine generators (CTG) with a nominal capacity of 190 MW and a heat input capacity of up to 1,984 MMBtu/hr for each gas turbine (lower heating value), in a simple-cycle configuration; and
- Two natural gas-fired fuel gas preheaters (also referred to as dew point heaters), each with a heat input capacity of 5 MMBtu/hr.

The proposed MLGS is designed to provide peaking power. It would operate at a capacity factor of up to 20%, equivalent to 1,752 hours annually.

The CTGs would each be equipped with evaporative coolers for chilling the inlet air under warm weather circumstances. The evaporated water would be drawn into the turbine combustion chamber and mixed with the CTG exhaust. The proposed MLGS also would include other facilities causing minor exempt levels of emissions. These include a new administration and control room building, one aqueous ammonia storage tank, an oil/water separator for wastewater management, 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 MLGS is expected to take about 33 months. Onsite construction activities include demolition, site preparation, grading, excavating, and erection of facility structures, including transmission 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. Demolition and construction would take place within the 27-acre MLGS site. About 14 acres within the existing CCPP site, but outside the MLGS site, would be used for temporary construction laydown, offices, and parking areas. These construction areas are previously disturbed or paved areas that do not require major grading. A total of six rail deliveries will occur over the course of the construction period (which averages two locomotive deliveries per year). It is assumed that only two rail cars per locomotive delivery would be needed for MLGS equipment (DR1, URS 2008c). Activities would generally be confined to a 10 hour work day, 5 days per week (Section 7.1.2.1, URS 2008a).

Fugitive dust emissions would result from:

- Dust released during demolition, 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 demolition, removal, 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 33-month construction period are shown in **Air Quality Table 9**.

Air Quality Table 9
MLGS, Estimated Maximum Construction Emissions

Construction Activity	NOx	VOC	PM10	PM2.5	CO	SOx
On-site Construction Equipment (lb/day)	217.4	40.4	9.5	8.6	644.1	0.3
On-site Fugitive Dust (lb/day)	---	---	12.7	2.7	---	---
Off-site (On-road) Worker Commutes (lb/day)	11.7	11.7	0.9	0.6	117.3	0.1
Material Deliveries (lb/day)	1.4	0.2	0.1	0.0	0.8	0.0
Rail Deliveries (lb/day)	0.3	0.0	0.0	0.0	0.1	0.0
Maximum Daily Construction Emissions (lb/day)	230.8	52.3	23.2	11.9	762.3	0.4
On-site Construction Equipment (tpy)	28.7	5.33	1.25	1.14	85.02	0.04
On-site Fugitive Dust (tpy)	---	---	1.68	0.35	---	---
Off-site (On-road) Worker Commutes (tpy)	1.54	1.55	0.12	0.08	15.49	0.01
Material Deliveries (tpy)	0.18	0.02	0.007	0.006	0.1	< 0.001
Rail Deliveries (tpy)	0.04	0.002	0.001	0.001	0.01	< 0.001
Peak Annual Construction Emissions (tpy)	30.5	6.9	3.1	1.6	100.6	0.1

Source: AFC Table 7.1-10 and Appendix J (URS 2008a); Appendix A-1, Responses to DR Set 1 (URS 2008c).

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 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 232 hours of operation of each CTG would be needed (AFC Table 7.1-18) to accomplish the various following commissioning activities:

- Full Speed No Load Tests (FSNL) – a test of the gas turbine ignition system, a test to ensure that the CTG is synchronized with its electric generator, and a test of the CTG's speed control system (without emission control systems).
- Partial and Full Load Tests – several days of tuning the CTG combustor and load testing to minimize emissions, test stability, and perform other checks (with partial and full installation of emission control systems and continuous emission monitors).
- Certification and Performance Tests – several days of performance testing the emission control systems and tuning to achieve NO_x and CO control at design levels.

Air Quality Table 10 presents the applicant's anticipated maximum hourly and daily short-term emissions of criteria pollutants. Maximum hourly emissions for NO_x, 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, PM_{2.5}, and SO_x during initial commissioning are not expected to be higher than normal operating emissions. This is because PM₁₀ and SO_x emissions are proportional to fuel use. The total initial commissioning emissions would be subject to all annual emission limitations applicable normal operations (BAAQMD 2010).

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

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG Maximum Commissioning (lb/hr)	188	145	9.0	2,405	6.21
Each CTG Maximum Commissioning (lb/day)	3,063	2,008	235	33,922	149
Each CTG Total Commissioning (ton)	10.2	2.5	1.1	43.1	0.8

Source: AFC Table 7.1-18 (URS 2008a); Response to DR73 (URS 2010b); PDOC Table 19 (BAAQMD 2010).

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 (N₂) and water vapor (H₂O) by injecting ammonia (NH₃) 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 (CO₂) 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 would also help 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 emissions from each CTG emission control system to 10 ppmvd.

PROPOSED OPERATION EMISSIONS

Air Quality Table 11 through **Air Quality Table 14** summarize the maximum (worst-case) criteria pollutant emissions associated with the MLGS 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% O₂;
- CO emissions controlled to 2.0 ppmvd at 15% O₂ for any 1-hour period;
- PM₁₀ emissions at 9.0 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 1 gr/100 scf in the short-term and annually averaging 0.4 gr/100 scf;
- A proposal to allow periodic combustor tuning with each duration not to exceed 8 hours, two times per year per CTG, for replacing components of the combustor that have a limited operational life (BAAQMD 2010); and
- Each CTG firing up to 1,752 hours annually 167 cold starts and shutdowns, allowing about 1,705 hours of normal full-load operation annually (URS 2009b), with 1,752 hours per year of operation of the fuel gas preheaters.

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. Emissions during transient hours would be within the levels of routine operation, when considered over a 3-hour period, which allows brief emissions similar to a startup due to a fast-changing load (more than 25 MW change per minute, BAAQMD 2010). Since PM₁₀ and SOx emissions are proportional to fuel use, PM₁₀ and SOx have higher emissions rates during full-load operation.

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

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG (maximum routine full-load)	20.83	2.9	9.0	10.0	6.21
Each CTG (typical routine operation)	18.89	2.6	9.0	9.0	2.25
Each CTG (startups)	45.10	28.5	9.0	541.3	6.21
Each CTG Combustor Tuning Hour	80	30	9.0	450	6.21
Total Four CTGs Maximum Hourly	180.4	114.0	36.0	2,165.2	24.8
Fuel Gas Preheaters Total	0.30	0.03	0.03	0.34	0.03

Source: AFC Revised Table 7.1-14 (URS 2009b); PDOC (BAAQMD 2010).

Air Quality Table 12 lists the worst-case emissions during any given day of operation of the proposed MLGS. Daily combustion turbine emissions are based on three startup/shutdown cycles in a day (or roughly ten minutes of shutdown in the day), and fully operating the remainder of the 24 hours (URS 2009b).

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

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG	548.3	115.1	214.4	1,200.5	146.1
Total Four CTGs Daily (without tuning)	2,309	476	864	4,858	596
Total Four CTGs Maximum Daily	2,783	693	864	8,378	596
Fuel Gas Preheaters Total	7.20	0.67	0.72	8.26	0.67

Source: AFC Revised Appendix J3 (URS 2009b); PDOC (BAAQMD 2010).

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 1,752 hours annually, including 167 startup events. The project would provide peaking power at a capacity factor of up to 20%, equivalent to 1,752 hours annually for each CTG (URS 2009b) or 7,008 CTG-hours per year (BAAQMD 2010).

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

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Total Four CTGs Maximum Annual	71.76	14.21	31.54	138.57	4.94
Fuel Gas Preheaters Total	0.26	0.02	0.03	0.30	0.02
Total Maximum Annual Emissions	72.0	14.2	31.6	138.9	4.96

Source: AFC Revised Appendix J3 (URS 2009b); PDOC (BAAQMD 2010).

Worker trips and material deliveries cause emissions of criteria pollutants from mobile sources operating offsite. These are shown in **Air Quality Table 14** based on eight plant operators and 12 other plant personnel commuting daily and about ten deliveries of ammonia and other materials per month (URS 2008c).

Air Quality Table 14
MLGS, Annual Offsite Emissions (tpy)

Source	NOx	VOC	PM10	PM2.5	CO	SOx
Worker Commutes (Offsite)	0.14	0.14	0.01	0.01	1.37	0.002
Material Deliveries (Offsite)	0.94	0.09	0.04	0.03	0.54	0.001
Total Annual Emissions (tpy)	1.07	0.22	0.05	0.04	1.91	0.003

Source: Response to DR2 (URS 2008c).

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 NH₃) 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 MLGS, the surface meteorological data used as an input to the dispersion model included five years (2000-2002 and 2004-2005) of hourly wind speeds and directions measured at the Contra Costa Power Plant meteorological station, combined with upper-air meteorological data from the Oakland International Airport monitoring station.

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 07026 for construction impacts and version 09292 for operation impacts). 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 and shoreline fumigation conditions, the U.S. EPA SCREEN3 model was used. The original modeling protocol was submitted in January 2008 (URS 2008a), in advance of the AFC and was subject to independent Energy Commission staff and BAAQMD review. The BAAQMD conducted a similar dispersion modeling impact assessment in preparation of the Preliminary Determination of Compliance (PDOC) (BAAQMD 2010). The worst-case results of the applicant’s and BAAQMD’s analyses are shown in this Staff Assessment.

The impact assessment for NO_x emissions is refined by using the Plume Volume Molar Ratio Method (PVMRM) or the Ozone Limiting Method (OLM), which determines NO₂ impacts from short-term emissions (1-hour averaging period) and concurrent hourly ozone data from the area, in this case the Bethel Island Road monitoring station. Because project NO_x emissions would be approximately 90% NO that could oxidize into NO₂ with sufficient time, sunlight, and availability of organic compounds or ozone, use of the PVMRM or OLM is appropriate. All 1-hour NO₂ results shown here are the maximum concentration for any one year. These 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 NO₂ concentrations. This federal standard was promulgated after the MLGS application filing date. Because modeling software at the time was not capable of generating concentration statistics in a form that can be used in a compliance demonstration for this new federal standard, staff has not completed a full impact assessment for compliance with this federal standard, and instead staff treats the 1-hour NO₂ CAAQS as limiting.

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 NO₂ are modeled using the ozone limiting method (OLM).

Air Quality Table 15 summarizes the results of the modeling analysis for 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 15
MLGS, Construction-Phase Maximum Impacts (µg/m³)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	45.9	84.0	129.9	50	260
	Annual	3.7	23.6	27.3	20	137
PM2.5	24 hour	9.9	62.1	72.0	35	206
	Annual	0.87	9.3	10.2	12	85
CO	1 hour	1,076	4,686	5,762	23,000	25
	8 hour	251	2,194	2,446	10,000	24
NO ₂	1 hour ^a	209.9	105.7	315.6	339	93
	Annual ^a	5.4	20.8	26.2	57	46
SO ₂	1 hour	1.2	234.6	235.8	655	36
	24 hour	0.15	23.5	23.6	105	22
	Annual	0.01	5.2	5.2	80	7

Source: AFC Table 7.1-27 (November 2008 update to URS 2008a).

Note: a. The maximum 1-hour NO₂ concentration is based on AERMOD OLM output, and the ambient ratio method (ARM) is applied for annual NO₂, using national default 0.75 ratio.

The maximum modeled project construction impacts would occur at the northern property boundary for the 1-hour NO₂ and the 24-hour PM10 construction dust impacts. The highest diesel exhaust combustion-related impact would be about 5 µg/m³ (24-hour PM10/PM2.5) at the eastern property boundary. For each pollutant, the concentrations would decrease rapidly with distance. The nearest residential receptors are located approximately 1,600 feet east and approximately 2,000 feet southwest of the project

boundary. Areas in the immediate vicinity of the on-site construction activities could experience maximum concentrations over the newly-established federal 1-hour NO₂ ambient air quality standard if the statistical form of the standard is ignored; application of multi-year averaging of the NO₂ impacts and backgrounds, as specified by the new federal 1-hour NO₂ standard would produce lower concentrations than shown here.

Staff believes that particulate matter emissions from construction would cause a significant impact because they will contribute to existing violations of PM₁₀ and PM_{2.5} 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, PM_{2.5}, and ozone because construction-phase emissions of particulate matter precursors (including SO_x) and ozone precursors (NO_x and VOC) would contribute to existing violations of these standards. The direct impacts of NO₂, in conjunction with worst-case background conditions, would not create a new violation of the California 1-hour or annual NO₂ ambient air quality standard. The direct impacts of CO and SO₂ 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, PM_{2.5}, SO_x, NO_x, and VOC to reduce PM₁₀, PM_{2.5}, NO₂, 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 (AFC p. 7.1-31, URS 2008a).

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 varies 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 MLGS project.

Operation Impacts and Mitigation

The following section discusses ambient air quality impacts that were estimated by MLGS 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 BAAQMD conducted an independent impact assessment (BAAQMD 2010). The worst case one-hour impacts reflect startup, transient, or combustor tuning activities, 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 of non-reactive pollutants are summarized in **Air Quality Table 16**. PM10 and PM2.5 values are shown in **bold** because they exceed ambient air quality standards due to high background levels.

Air Quality Table 16
MLGS, Routine Operation Maximum Impacts ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	1.1	84.0	85.1	50	170
	Annual	0.02	23.6	23.6	20	118
PM2.5	24 hour	1.1	62.1	63.2	35	181
	Annual	0.02	9.3	9.3	12	78
CO	1 hour	466.0	4,686	5,152	23,000	22
	8 hour	187.9	2,194	2,382	10,000	24
NO ₂	1 hour ^a	41.0	105.7	146.7	339	43
	Annual ^a	0.1	20.8	20.9	57	37
SO ₂	1 hour	5.3	234.6	240.0	655	37
	24 hour	0.7	23.5	24.2	105	23
	Annual	0.01	5.2	5.2	80	7

Source: AFC Revised Table 7.1-28 (URS 2009b); PDOC (BAAQMD 2010).

Note: a. The maximum 1-hour NO₂ concentration is based on AERMOD OLM output, and the ambient ratio method (ARM) is applied for annual NO₂, using national default 0.75 ratio.

The maximum 24-hour PM₁₀ impact due to MLGS occurs in the undeveloped and elevated terrain south of Pittsburgh, about 6 miles southwest of the project site. Because of the high exhaust temperature and velocity, impacts would be substantially lower at the closest residence, which is located approximately 1,600 feet to the east of the project boundary. Staff believes that particulate matter emissions from routine operation would cause a significant impact because they will contribute to existing violations of PM₁₀ and PM_{2.5} ambient air quality standards. Significant secondary impacts would also occur for PM₁₀, PM_{2.5}, and ozone because operational emissions of particulate matter precursors (including SO_x) and ozone precursors (NO_x and VOC) would contribute to existing violations of these standards. The direct impacts of NO₂, in conjunction with worst-case background conditions, would not create a new violation of the NO₂ ambient air quality standards; application of multi-year averaging of the NO₂ impacts and backgrounds, as specified by the new federal 1-hour NO₂ standard, would produce lower concentrations than shown here. The direct impacts of CO and SO₂ 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, PM_{2.5}, SO_x, NO_x, and VOC to reduce PM₁₀, PM_{2.5}, and ozone impacts.

Secondary Pollutant Impacts

The project's gaseous emissions of NO_x, SO_x, VOC, and ammonia are precursor pollutants that can contribute to the formation of secondary pollutants, including ozone, PM₁₀, and PM_{2.5}. 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 NO_x and VOC to ozone and of NO_x, SO_x, and ammonia emissions to secondary PM₁₀ and PM_{2.5} formation, unmitigated emissions of these pollutants would likely contribute to higher ozone and PM₁₀/PM_{2.5} levels in the region. Significant impacts of ozone and PM₁₀/PM_{2.5} precursors would be mitigated with offsets that would be provided under a recommended condition of certification (**AQ-SC7**).

Ammonia (NH₃) is a particulate precursor but not a criteria pollutant. Reactive with sulfur and nitrogen compounds, ammonia is abundant in the Bay Area due to natural sources 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 (BAAQMD 2010). 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 SO_x and NO_x emissions would avoid PM₁₀/PM_{2.5} 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. Energy Commission staff considered recommending offsets in sufficient quantities to eliminate any potential particulate matter formation due to NH_3 emissions, but rejected this approach because of the unclear, complex, and localized relationship of NH_3 reacting with other precursors. In lieu of offsetting this precursor, staff recommends limiting ammonia slip emissions to the extent feasible. This level of control is appropriate for avoiding unnecessary ammonia emissions, consistent with staff policy to reduce emissions of all nonattainment pollutant precursors to the lowest feasible levels. Levels of 5 ppmvd can be achieved during routine and steady operations (such as over a 24-hour basis) with a sufficiently designed catalyst and ammonia injection system (ARB 1999). Somewhat higher costs of installing sufficient catalyst material would be offset through lower costs of purchasing ammonia that would be wastefully emitted at higher slip levels. Staff reviewed previous cases to determine an NH_3 emission reduction strategy that represents an achievable, feasible, and best available level of ammonia control for the CTGs proposed for MLGS. Supported by the recent Energy Commission decision on the Orange Grove Energy Project (08-AFC-4, Final Commission Decision, April 2009), which requires a similar simple-cycle CTG system to achieve emissions under 5 ppmvd NH_3 except during startup and shutdown cycles, and consistent with the previously mentioned ARB guidance on ammonia slip, staff recommends a condition of certification establishing catalyst improvements if ammonia slip persistently exceeds 5 ppmvd over a 24-hour basis (**AQ-SC9**).

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. The applicant and the BAAQMD analyzed the air quality impacts of MLGS under shoreline fumigation conditions and thermal inversion breakup conditions.

Shoreline fumigation occurs when dense, cool air over water moves onshore and falls, displacing warmer, lighter air over land. The surface and the air over land both tend to heat and cool more rapidly than over water. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if a plume is likely to cross from the stable cooler air and cause elevated ground-level concentrations on the land.

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) (Response to DR Table 8-1 and Table 8-3, URS 2009b; BAAQMD 2010). The maximum impacts under shoreline fumigation conditions would occur approximately 1.4 km from MLGS, and the maximum impacts under inversion breakup fumigation conditions would occur more than 40 km from

MLGS. These short-term fumigation impacts for NO₂ shown in **Air Quality Table 17** would be higher than the impacts under routine operation but would not create any new violation of the limiting standard.

Air Quality Table 17
MLGS, Maximum Impacts During Shoreline Fumigation (µg/m³)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM ₁₀	24 hour	0.7	84.0	84.7	50	169
PM _{2.5}	24 hour	0.7	62.1	62.8	35	179
CO	1 hour	576.0	4,686	5,262	23,000	23
	8 hour	82.0	2,194	2,276	10,000	23
NO ₂	1 hour	64.0	105.7	169.7	339	50
SO ₂	1 hour	6.3	234.6	240.9	655	37
	24 hour	0.5	23.5	24.0	105	23

Source: Revised Table DR 8-3 (URS 2009b); PDOC (BAAQMD 2010).

Commissioning-Phase Impacts

Commissioning impacts would occur over short-terms within a window of 90 days allowed for completing the commissioning period (BAAQMD 2010). 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, PM_{2.5}, and SO₂ during commissioning would occur under similar exhaust conditions as those for startup while in routine operation because these emissions are proportional to fuel use.

MLGS indicates that it would agree to a condition of certification specifying that no more than two combustion turbines would operate simultaneously in the no-load and partial-load testing phases of commissioning (Response to DR74, URS 2010b), and staff recommends this as **AQ-SC10**.

Air Quality Table 18 shows that under this condition the commissioning-phase impacts of CO and NO₂ 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 only the 90-day window before commercial operation of each CTG. Commissioning-phase impacts to particulate matter and ozone concentrations would be addressed with the mitigation identified above for routine operations.

Air Quality Table 18
MLGS, Commissioning-Phase Maximum Impacts ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
CO	1 hour	3,053.0	4,686	7,739	23,000	34
	8 hour	1,248.0	2,194	3,442	10,000	34
NO ₂	1 hour ^a	86.0	105.7	191.7	339	57

Source: Response to DR Set 3, Table 74-1 (URS 2010b).

Note: a. The maximum 1-hour NO₂ concentration is based on AERMOD OLM output.

Visibility Impacts

A visibility analysis of the project's gaseous emissions would not be required because the MLGS 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, 82 kilometers (51 miles) away. The applicant contacted the National Park Service, and the agency did not request an additional analysis of Air Quality Related Values such as visibility for the proposed MLGS (AFC p. 7.1-21, URS 2008a). The BAAQMD conducted a screening analysis to conclude that MLGS would not cause any impairment of visibility at Point Reyes National Seashore (BAAQMD 2010). Due to its distance from Class I areas being approximately 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 MLGS 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 MLGS would include two catalyst systems: the SCR and water injection system to reduce NO_x; and the oxidation catalyst system to reduce CO and VOC. Operating exclusively with pipeline quality natural gas limits SO_x 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, MLGS proposes to provide offsets in the form of emission reduction credits (ERCs). BAAQMD Rule 2-2-302 requires MLGS to provide emission reduction credits to offset the new emissions of NO_x and VOC (also known as POC).

The original MLGS AFC (in Section 7.1.4 of URS 2008a) describes the proposed strategy of providing emission reduction credits to offset operational emissions. The AFC (in Table 7.1-30 and Revised Table 7.1-31 of URS 2009b) and public records at BAAQMD demonstrate that Mirant California LLC has sufficient holdings of ERCs to offset the proposed emission increases of NO_x, VOC, SO₂, and PM₁₀/PM_{2.5} for MLGS. These are the same ERCs that would be used by Mirant California for the proposed Willow Pass Generating Station (WPGS), and Mirant holds sufficient ERCs to offset both MLGS and Willow Pass projects (as shown in 08-AFC-6 for Willow Pass, AFC Table 7.1-28, June 2008).

The original AFC provides the following language (AFC p. 7.1-21, URS 2008a):

AIR-1 Emission Reduction Credits. *Per Bay Area Air Quality Management District Regulations 2-2-215, 302, and 303, the project is required to provide emission offsets in the form of emissions reduction credits (ERC) for increases in emissions of nonattainment pollutants in excess of specified thresholds that will result from the operation of the proposed facility on a pollutant-specific basis. Per District Regulations 2-2-302 VOC and NO_x ERCs are required to be provided at an offset ratio of 1.0:1.0 or 1.15:1.0, depending on the amount of emissions levels. Since both VOC and NO_x are ozone precursors, Regulations 2-2-302.2 allows ERCs of VOCs to be used as an interpollutant offset for NO_x, at the required offset ratios.*

Sections 2-2-304 and 2-2-305 impose emissions offset requirements, or require project denial, if SO₂, NO₂, PM₁₀/2.5, or CO air quality modeling results indicate emissions will either interfere with the attainment or maintenance of the applicable [ambient air quality standard] AAQS, or exceed PSD increments. The modeling analyses show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards.

For major sources subject to PSD review, Regulation 2-2-305 requires an applicant to either demonstrate through modeling that its emissions will comply with the CO AAQS, or provide contemporaneous emission offsets. The project will not cause a violation of any applicable CO ambient air quality standard. Therefore, CO emission offsets are not required.

Mirant California emission offsets inventory and estimated required ERCs due to project operations are shown in [AFC] Tables 7.1-30 and 7.1-31, respectively. As shown in [AFC] Table 7.1-30, Mirant California demonstrated its capability to provide the required emission offsets for the project.

Since the time of the original AFC, Mirant changed the design of the proposed MLGS, and it now ensures it would emit PM₁₀ and SO₂ at levels below the BAAQMD

thresholds for requiring offsets (BAAQMD 2010). **Air Quality Table 19** summarizes the BAAQMD Rule 2-2-302 offset requirements for the MLGS (including the mandatory NOx offset ratio of 1.15-to-1) and the offsets held by Mirant California. Staff interprets Mirant California's demonstrated capability to provide offsets as its proposed strategy for mitigating all criteria pollutant impacts including PM10 and SO₂.

Air Quality Table 19
MLGS, BAAQMD Offset Requirements and Mirant Offset Holdings (tpy)

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Total Four CTGs Maximum Annual	71.76	14.21	31.54	138.57	4.94
Fuel Gas Preheaters Total	0.26	0.02	0.03	0.30	0.02
MLGS Potential to Emit	72.02	14.23	31.57	138.9	4.96
Offset Requirements					
BAAQMD Offset Requirements	82.527 ^a	14.210 ^b	0 ^c	0 ^d	0 ^e
Mirant Offset Holdings Certificate, Site of Reduction					
756, Hudson ICS, San Leandro	1.173	0.390	6.443	14.602	---
831, Crown Zellerbach, Antioch	66.060	72.280	202.530	450.600	---
863, PG&E, Martinez	247.500	5.300	25.270	114.000	130.179
918, Crown Zellerbach, Antioch	171.000	---	---	---	---
MLGS Mitigation Total	485.733	77.970	234.243	579.202	130.179
Staff Recommended Mitigation	72.02	14.23	31.57	---	4.96
Fully Offset?	Yes	Yes	Yes		Yes

Source: Independent Staff Assessment; PDOC (BAAQMD 2010); and BAAQMD website accessed April 2010:
http://hank.baaqmd.gov/pmt/emissions_banking/banking.htm.

Notes:

a. Offset requirements for NOx in BAAQMD for MLGS include an offset ratio of 1.15-to-1. In BAAQMD, VOC (POC) offsets may be used to offset emission increases of NOx.

b. Offset requirements for VOC (POC) in BAAQMD for MLGS are at a ratio of 1-to-1.

c. Offsets are not required by BAAQMD for PM10 or PM2.5 since MLGS 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 MLGS would not be subject to PSD review for CO. This Staff Assessment demonstrates that MLGS would not cause or contribute to a violation of the CO ambient air quality standards.

e. Offsets are not required by BAAQMD for SO₂ since MLGS would not exceed 100 tons per year.

Emission Offsets for Ozone Impact

Air Quality Table 19 summarizes NOx and VOC offset requirements established by the BAAQMD and identifies the offset holdings offered by Mirant. By satisfying the local air district offset requirements, MLGS would surrender more than 96 tons per year of NOx and VOC combined offsets. Both NOx and VOC emissions are recognized precursors to

the formation of ambient ozone, and NO_x is also a recognized precursor to the formation of the nitrate fraction of fine particulate matter. MLGS would comply with BAAQMD's NO_x and VOC offset requirements and would provide overall total ERCs for the proposed ozone precursor emissions at an offset ratio of greater than 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).

Emission Offsets for Particulate Matter Impact

Air Quality Table 19 shows that the BAAQMD would not require offsets for particulate matter or SO_x, which is a recognized precursor to the formation of the sulfate fraction of fine particulate matter. The original AFC, however, identify the offset holdings offered by Mirant for mitigating the particulate matter impacts. The AFC and public records available from the BAAQMD show the numerous PM₁₀ and SO₂ ERCs held by Mirant from its long-term involvement in operating and owning power plants in the BAAQMD. The bulk of the emission reductions occurred in the Carquinez Strait region, which directly benefits the MLGS project area. There are no separate offset requirements for the proposed PM_{2.5} emissions from MLGS. Investigation of the ERC certificates held by Mirant reveals that each was created by shutting down a large combustion source, such as a boiler or a furnace fired on wood, gas, or oil, and these reductions of combustion-related PM₁₀ provide substantial PM_{2.5} benefits, since nearly all combustion-related PM₁₀ is categorized as PM_{2.5}. In other words, Mirant's PM₁₀ offsets also offset PM_{2.5}.

Although MLGS would satisfy the local air district requirements without surrendering any PM₁₀ or SO₂ offsets, the offsets held by Mirant can be used as mitigation for the PM₁₀/PM_{2.5} impacts. Providing overall total PM₁₀ and SO₂ ERCs for the proposed PM₁₀/PM_{2.5} plus SO_x emissions at an offset ratio of greater than 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 19**). Staff proposes additional mitigation to ensure that all nonattainment pollutant and precursor emissions are offset by at least one-to-one.

Staff's review of the offset package was determined 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 a sufficient quantity of BAAQMD offsets as specified by staff and to ensure agency consultation if substitutions are made to the proposed emission reduction credits.

Staff also proposes mitigation to ensure ongoing compliance during commissioning and 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

- **Bay Area Ozone Strategy.** The 2005 Ozone Strategy describes how the Bay Area will fulfill California Clean Air Act planning requirements to attain state ozone standards and mitigate ozone transport to downwind air districts. This plan was formerly known as the “Clean Air Plan,” and BAAQMD is updating it as the 2010

Clean Air Plan, issued in draft form March 2010. 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 updating Clean Air Plan. 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.

- **Draft 2010 Clean Air Plan.** This plan is under development to update 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 provide a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases in a single, integrated plan. The regional emission inventory used for attainment planning indicates that NOx emissions from power plants in the Bay Area are forecasted to grow between 13% and PM10/PM2.5 emissions are forecasted to grow 17% from 2009 to 2020.
- **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 MLGS 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 for 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 that is under development provides an outline of achieving reductions in particulate matter, but it would not be 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 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 (Response to DR 9, URS 2008c; URS 2009b), in conjunction with Energy Commission and BAAQMD staff (BAAQMD 2010), identified the following present and proposed sources, along with other existing major electric generating facilities of concern (although they are also included in the background concentrations), for the analysis of localized cumulative impacts:

- Calpine Natural Gas, Ryer Island Station, Bay Point – water pump, condensate tank
- Silgan Containers Manufacturing Corporation, Antioch – thermal oxidizer modification
- Ameresco Keller Canyon LLC, Bay Point – two landfill gas-fired internal combustion engines and one waste gas flare
- United Spiral Pipe LLC Manufacturing Plant, Pittsburg – plant welding, cleaning, miscellaneous particulate matter
- Freedom High School, Oakley – diesel generator set
- Contra Costa Power Plant, Antioch – natural gas fired boilers 9 and 10 stacks: Units 6 and 7
- Gateway Generating Station, Antioch – natural gas-fired combustion turbines with heat recovery steam generators A and B
- Pittsburg Power Plant, Pittsburg – natural gas-fired boilers 5, 6, and 7

- Proposed Willow Pass Generating Station, Pittsburg – two combined cycle combustion turbines and one heater.

The following existing and proposed sources are not included in this version of the analysis of localized cumulative impacts:

- Proposed Oakley Generating Station (also known as Contra Costa Generating Station LLC) – not presently considered as “foreseeable” due to an incomplete, uncertain, and/or changing proposal with emission limits not being clearly defined; this proposed power plant filed an application for Energy Commission review one year after MLGS (09-AFC-4); based on February 2010 information, staff expects the applicant for the Oakley Generating Station to conduct a full cumulative impacts analysis, including MLGS, sometime in 2010.
- GWF #3 & #4 Wilbur Avenue East Power Plant – existing facility impacts are included as part of the background concentrations
- Calpine Riverview Energy Center – existing facility impacts are included as part of the background concentrations
- Calpine Los Medanos Project – existing facility impacts are included as part of the background concentrations
- Calpine Delta Project – existing facility impacts are included as part of the background concentrations

The maximum modeled cumulative impacts are presented below in **Air Quality Table 20**. The total impact is conservatively estimated by the maximum modeled impact plus existing maximum background pollutant levels.

Air Quality Table 20
MLGS, Ambient Air Quality Impacts from Cumulative Sources ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	5.8	84.0	89.8	50	180
	Annual	0.99	23.6	24.6	20	123
PM2.5	24 hour	5.8	62.1	67.9	35	194
	Annual	0.99	9.3	10.3	12	86
CO	1 hour	410.8	4,686	5,096	23,000	22
	8 hour	264.4	2,194	2,459	10,000	25
NO ₂	1 hour ^a	94.7	105.7	200.4	339	59
	Annual ^a	1.7	20.8	22.4	57	39
SO ₂	1 hour	37.1	234.6	271.7	655	41

	24 hour	8.6	23.5	32.1	105	31
	Annual	0.51	5.2	5.7	80	7

Source: Revised DR Table 9-2 (URS 2009b); PDOC (BAAQMD 2010).

Note: a. The maximum 1-hour NO₂ concentration is based on AERMOD OLM output, and the ambient ratio method (ARM) is applied for annual NO₂, using national default 0.75 ratio.

Compared with the impacts from the proposed MLGS project alone, maximum cumulative impacts caused by the sources in this assessment would be substantially higher for PM₁₀/PM_{2.5} and NO₂ but would not create any new violation of the limiting standards. The maximum combined impacts for all pollutants would generally be dominated by the United Spiral Pipe and Ameresco Keller Canyon facilities, in Pittsburg and Bay Point. Modeled concentrations of NO₂ are highest near the Ameresco facility, in the elevated terrain south of Pittsburg.

Staff believes that particulate matter emissions from MLGS would be cumulatively considerable because they would contribute to existing violations of the PM₁₀ and PM_{2.5} ambient air quality standards. Secondary impacts would also be cumulatively considerable for PM₁₀, PM_{2.5}, and ozone because emissions of particulate matter precursors (including SO_x) and ozone precursors (NO_x and VOC) would contribute to existing violations of the PM₁₀, PM_{2.5}, and ozone standards. To address the contribution caused by MLGS 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 MLGS was dated March 22, 2010 (BAAQMD 2010) and staff expects a Final Determination of Compliance (FDOC) will be released sometime before July 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 MLGS.

40 CFR 52.21, Prevention of Significant Deterioration (PSD). A PSD permit would not be required for the proposed MLGS project because it would be neither a new major source nor a major modification to an existing major source. The existing Contra Costa Power Plant is a major stationary source. However, it is owned and operated by Mirant Delta LLC, which is a separate and independent subsidiary of Mirant Corporation (BAAQMD 2010). MLGS proposes to have its own gas supply line and metering station, its own electrical interconnection, its own control room, its own water supply and wastewater discharge connection, and its own independent contractual arrangements covering the sale of its power output, each separate from CAPP (Resp. to DR 70, URS

2010b). The two facilities are likely to satisfy the test of separate control as described in the PDOC, meaning that contrary to the original AFC, PSD review does not apply to MLGS.

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.

Representatives of Mirant California have indicated to various public agencies, including Energy Commission siting committee (letter dated March 25, 2010), the California Public Utilities Commission (Mirant 2010), and the BAAQMD, that Mirant expects to shut down and permanently retire CCPP Units 6 and 7 from service before May 2013. The Preliminary Determination of Compliance (p.62 of BAAQMD 2010) notes that Mirant Delta has agreed that prior to the BAAQMD issuing the Final Determination of Compliance for MLGS, Mirant Delta will submit an application for an amendment to its Air District permit to incorporate permit language specifying the CCPP shut down. Staff expects the MLGS applicant to provide evidence that Mirant Delta has applied to the BAAQMD to establish the conditional shut-down requirement for CCPP Units 6 and 7.

40 CFR 60, NSPS Subpart KKKK. The four CTGs proposed for MLGS 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, shutdown, and transient periods and during combustor tuning.

STATE

MLGS 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 2010) and the Energy Commission staff's Conditions of Certification enable staff's affirmative finding.

LOCAL

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

FACILITY CLOSURE

Eventually the MLGS 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.
- The project would neither cause new violations of any NO₂, CO, or SO₂ ambient air quality standards nor contribute to existing violations for these pollutants. Therefore, the project's direct NO₂, CO, and SO₂ impacts are less than significant. However, this assessment does not include full evaluation of this project's compliance with the 2010 federal 1-hour NO₂ standard because the standard was promulgated after this application was filed, and there is a corresponding lack of guidance and modeling tools for conducting impact analyses and determining existing background concentrations for compliance with this standard.
- The project NO_x 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 ozone impact to a less than significant level.
- The project PM₁₀ and PM_{2.5} emissions and the PM₁₀/PM_{2.5} precursor emissions of SO_x would contribute to the existing violations of state PM₁₀ and state and federal PM_{2.5} ambient air quality standards. Mirant holds numerous ERCs from shutting down large combustion sources in the Carquinez Strait region that would mitigate the PM₁₀/PM_{2.5} 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, additional offsets would be surrendered in sufficient quantities 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 limit ammonia slip from the simple-cycle system to the extent feasible.
- Staff recommends Condition of Certification **AQ-SC10** to ensure that the applicant would conduct initial commissioning on no more than two CTGs of the four CTGs simultaneously.
- Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in **AIR QUALITY APPENDIX AIR-1**. The MLGS would exceed the Emission Performance Standard established by SB 1368 for base load generation. However, as a simple-cycle power plant, MLGS 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 the Air Resources Board mandatory GHG reporting requirements and any GHG reduction or trading requirements developed by the ARB as GHG regulations are implemented.

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 mitigation during the construction phase of 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 at least twice daily (or less during periods of precipitation) 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 AQCM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

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 AQCM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

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 71.02 tons per year (tpy) NO_x, 14.23 tpy VOC, 31.57 tpy PM₁₀, and 4.96 tpy SO_x emissions. The project owner shall demonstrate that the reductions are provided in the form required by the Bay Area Air Quality Management District.

The project owner shall surrender the ERCs from among Bay Area Air Quality Management District Certificate Numbers 756, 831, 863, and 918, or a modified list, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit an updated table including the additional ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions to the listed credits.

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. 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 ammonia (NH₃) emissions from each combustion turbine (S-1, S-2, S-3, and S-4) shall not exceed 10 ppmvd @ 15% O₂ averaged over a 24 hour rolling average. In addition, the selective catalytic reduction (SCR) system catalyst shall be replaced, repaired, or otherwise reconditioned within 12 months if the ammonia slip exceeds 5 ppmvd @ 15% O₂ over a 24 hour rolling average. The SCR ammonia injection grid replacement, repair, or reconditioning scheduled event may be cancelled if the owner or operator can demonstrate that, subsequent to the initial exceedance, the ammonia slip consistently remains below 5 ppmvd @ 15% O₂ averaged over 24 hours, and that the initial exceedance does not accurately indicate expected future operating conditions.

Verification: The ammonia injection rate shall be monitored, and ammonia emissions calculated and recorded hourly (**AQ-17** and **AQ-24**). A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-SC10 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.

BAAQMD PROPOSED PERMIT CONDITIONS

The following conditions would be applicable to the proposed SGT6 5000F Simple-Cycle Gas Turbines. Conditions **AQ-1** through **AQ-10** shall only apply during the commissioning period. Unless otherwise indicated, **AQ-11** through **AQ-40** shall apply after the commissioning period has ended.

Conditions for the Commissioning Period for SGT6-5000F Gas Turbines

AQ-1 The owner/operator of the MLGS 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 MLGS 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 Dry-Low-NOx combustors, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NOx 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 MLGS 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 232 hours 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 232 firing hours 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, PM₁₀, 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-22**. (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)

NOx (as NO ₂)	3,063 pounds per calendar day	188 pounds per hour
CO	33,922 pounds per calendar day	2,405 pounds per hour
POC (as CH ₄)	2,008 pounds per calendar day	
PM10	235 pounds per calendar day	
SO ₂	149 pounds per calendar day	

Verification: 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 NOx, 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 to the CPM and APCO for approval the commissioning plan as required in **AQ-4**.

Conditions for the SGT6-5000F 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 MLGS. (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 2,202 MMBtu (HHV) per hour. (Basis: BACT for NOx)

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 52,848 MMBtu (HHV) per day. (Basis: Cumulative Increase for PM10)

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

AQ-14The 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 13,994,976 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-15The owner operator shall not operate S-1, S-2, S-3, and S-4 such that the combined hours for all four units exceeds 7,008 hours per year (excluding operations necessary for maintenance, tuning, and testing). (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-16The owner/operator shall ensure that the 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-17The owner/operator shall ensure that the Gas Turbines (S-1, S-2, S-3, S-4) comply with requirements (a) through (j). Requirements (a) through (f) do not apply during a gas turbine start-up, combustor tuning operation or shutdown. (Basis: BACT and Regulation 2, Rule 5)

a) Nitrogen oxide mass emissions (calculated as NO₂) 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 20.83 pounds per hour or 0.00946 lb/MMBtu (HHV) of natural gas fired. Limits are averaged over one hour except during transient hours where a 3-clock hour average is calculated as the average of the

transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient 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% O₂, averaged over any 1-hour period except during periods with a transient hour. Limits are averaged over one hour except during transient hours where a 3-clock hour average is calculated as the average of the transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient hour. (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 10.0 pounds per hour or 0.00454 lb/MMBtu of natural gas fired, averaged over any 1-hour period. (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% O₂ averaged over any 1-hour period. (Basis: BACT for CO)

e) Ammonia (NH₃) emission concentrations at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 10 ppmv, on a dry basis, corrected to 15% O₂, 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-27** or District approved alternative method. (Basis: Regulation 2, Rule 5)

f) Precursor organic compound (POC) mass emissions (as CH₄) at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.9 pounds per hour or 0.00132 lb/MMBtu of natural gas fired. (Basis: BACT for POC)

g) Sulfur dioxide (SO₂) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 6.21 pounds per hour or 0.0028 lb/MMBtu of natural gas fired. (Basis: BACT for SO₂)

h) Particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM₁₀) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 9.0 pounds per hour. (Basis: BACT for PM₁₀)

i) Total particulate matter mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 9.0 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 Non-Normal Operation)

	Maximum Emissions Per Startup	Maximum Emissions During Hour Containing a Startup	Maximum Emissions Per Shutdown
Pollutant	(lb/startup)	(lb/hour)	(lb/shutdown)
NOx (as NO ₂)	18.6	45.1	13.1
CO	216.2	541.3	111.5
POC (as CH ₄)	11.9	28.5	5.4

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 perform combustor tuning on each Gas Turbine (S-1, S-2, S-3, or S-4) more than twice every consecutive 12 month period. Each tuning event shall not exceed eight hours. Combustor tuning shall only be performed on one gas turbine per day. The owner/operator shall notify the District no later than seven days prior to combustor tuning activity. The emissions during combustor tuning from each gas turbine shall not exceed the limits established below. (Basis: Offsets, Cumulative Increase)

Pollutant	Combustor Tuning (lb/hour)
NOx (as NO ₂)	80
CO	450
POC (as CH ₄)	30

Verification: The project owner shall notify both the District and CPM at least 7 days prior to the combustor tuning. 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 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 (except for days during which combustor tuning events occur, which are subject to Paragraph 21 below):

- (a) 2,309 pounds of NOx (as NO₂) per day (Basis: Cumulative Increase)
- (b) 4,858 pounds of CO per day (Basis: Cumulative Increase)
- (c) 476 pounds of POC (as CH₄) per day (Basis: Cumulative Increase)
- (d) 864 pounds of PM10 per day (Basis: Cumulative Increase)
- (e) 596 pounds of SO₂ 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-21 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, shutdowns, and combustor tuning events to exceed the following limits during any calendar day on which a tuning event occurs:

(a) 2,783 pounds of NO _x (as NO ₂) per day	(Basis: Cumulative Increase)
(b) 8,378 pounds of CO per day	(Basis: Cumulative Increase)
(c) 693 pounds of POC (as CH ₄) per day	(Basis: Cumulative Increase)
(d) 864 pounds of PM ₁₀ per day	(Basis: Cumulative Increase)
(e) 596 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-22 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, combustor tuning, shutdowns, and malfunctions to exceed the following limits during any consecutive twelve-month period:

(a) 71.76 tons of NO _x (as NO ₂) per year	(Basis: Offsets)
(b) 138.57 tons of CO per year	(Basis: Cumulative Increase)
(c) 14.21 tons of POC (as CH ₄) per year	(Basis: Offsets)
(d) 31.54 tons of PM ₁₀ per year	(Basis: Cumulative Increase)
(e) 4.94 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-23 The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions (per **AQ-26**) from the Gas Turbines (S-1, S-2, S-3, S-4) combined to exceed the following limits:

– formaldehyde	7,785 pounds per year
– benzene	202 pounds per year
– Specified polycyclic aromatic hydrocarbons (PAHs)	1.98 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-26** and **AQ-30** shall confirm the toxic air contaminant emission rates or the project owner shall submit an updated health risk assessment.

AQ-24 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** (NO_x and CO limits), **AQ-20(a)**, **AQ-20(b)**, **AQ-21(a)**, **AQ-21(b)**, **AQ-22(a)** and **AQ-22(b)** by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up, combustor tuning, 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 (O₂) 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 NO₂), 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, exhaust point, the owner/operator shall record the parameters specified in **AQ-24(d)** and **AQ-24(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 NO₂), 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 NO₂) 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 NO₂), 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 NO₂) 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-25 To demonstrate compliance with **AQ-17(f)**, **AQ-17(g)**, **AQ-17(h)**, **AQ-17(i)**, **AQ-17(j)**, **AQ-20(c)**, **AQ-20(d)**, **AQ-20(e)**, **AQ-21(c)**, **AQ-21(d)**, **AQ-21(e)**, **AQ-22(c)**, **AQ-22(d)**, **AQ-22(e)**, the owner/operator shall calculate and record on a daily basis, the precursor organic compound (POC) mass emissions, fine particulate matter (PM₁₀) mass emissions (including condensable particulate matter), and sulfur dioxide (SO₂) mass emissions from each power train. The owner/operator shall use the actual heat input rates measured pursuant to **AQ-24**, 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-28** to calculate these emissions. The owner/operator shall present the calculated emissions in the following format:

(a) For each calendar day, POC, PM₁₀, and SO₂ 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, PM₁₀, and SO₂ 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-26 To demonstrate compliance with **AQ-23**, 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 13,994,976 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-27 Within 90 days of start-up of each of the MLGS SGT6-5000F 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 (NH₃) 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 NH₃ 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-29**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-28 Within 90 days of start-up of each of the MLGS SGT6-5000F 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)**, **AQ-17(i)** and **AQ-17(j)** 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-24**. 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 NO₂), 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-29**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-29 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 PM10 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.

AQ-30 Within 90 days of start-up of each of the MLGS SGT6-5000F 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-23**. 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-26** 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-29**). Testing for toxic air contaminant emissions shall be conducted upon initial operation and at least once every 24 months.

AQ-31 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-32**. If this SAM mass emission limit of **AQ-33** is exceeded, the owner/operator must utilize air dispersion modeling to determine the impact (in $\mu\text{g}/\text{m}^3$) 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-32 Within 90 days of start-up of each of the MLGS SGT6-5000F 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-33**. The owner/operator shall test for (as a minimum) SO₂, SO₃, and H₂SO₄. 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-29**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-33 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-34 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 165 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-35 The owner/operator of the MLGS shall submit all reports (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-36 The owner/operator of the MLGS shall maintain all records and reports on site for a minimum of five 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-37 The owner/operator of the MLGS 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-38 The Owner/Operator of MLGS 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-39 Within 180 days of the issuance of the Authority to Construct for the MLGS, 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-27**, **AQ-28**, **AQ-30** and **AQ-32**. 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-29**).

AQ-40 The owner/operator shall ensure that the MLGS complies with 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**).

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-clock hour period, not including start-up or shutdown periods

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
Start-up Mode	The lesser of the first 30 minutes of continuous fuel flow to the Gas 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 conditions 17(b) and 17(d).
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 Conditions 17(b) and 17(d) until termination of fuel flow to the Gas Turbine
Combustor Tuning Mode	The period of time, not to exceed 8 hours, in which testing, adjustment, tuning, and calibration operations are performed, as recommended by the gas turbine manufacturer, to insure safe and reliable steady-state operation, and to minimize NO _x and CO emissions. The SCR and oxidation catalyst are not operating at their design control effectiveness during the tuning operation.
Transient Hour	A transient hour is any clock hour during which the change in gross electrical output produced by the gas turbine exceeds 25 MW per minute for one minute or longer during any period that is not part of a startup, shutdown, or combustor tuning period.
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 NO _x , CO, or NH ₃) 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% O ₂ by volume on a dry basis

Commissioning Activities	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the MLGS 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.
POCs	Precursor Organic Compounds, 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
MLGS	Marsh Landing Generating Station
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
CO ₂	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
N ₂	Nitrogen
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NSR	New Source Review
O ₂	Oxygen
LAER	Lowest Achievable Emissions Rate
LLC	Limited Liability Company
MLGS	Marsh Landing Generating Station
MMBtu	Million Btu
NAAQS	National Ambient Air Quality Standard
PAH	Polycyclic Aromatic Hydrocarbon
PDOC	Preliminary Determination of Compliance
PG&E	Pacific Gas & Electric Company
PM ₁₀	Particulate Matter less than 10 Microns in Diameter
PM _{2.5}	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
SO _x	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 Marsh Landing Generating Station (MLGS) 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 and slower starting plants and facilitate the integration of renewable resources. Because the project will improve the efficiency of existing system resources, the addition of MLGS would contribute to a reduction of the California and overall Western Electricity Coordinating Council system GHG¹ 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 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 MLGS would affect the overall electricity system operation and GHG emissions in several ways:

- MLGS would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- MLGS would displace some less efficient 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.

¹ Fuel-use closely correlates to carbon dioxide (CO₂) emissions from natural gas-fired power plants. And since CO₂ emissions from the fuel combustion dominate greenhouse gas (GHG) emissions from power plants, the terms CO₂ and GHG are used interchangeably in this section.

- MLGS 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.
- MLGS would facilitate the replacement of generation provided by power plants that are aging and/or using once-through cooling.

The proposed MLGS 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) (Title 20, California Code of Regulations, Section 2900 et seq.) because MLGS is a simple-cycle power plant, designed and intended to provide electricity at an annualized plant capacity factor of less than 60% (URS 2009b).

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 may be furthered by the Prevention of Significant Deterioration (PSD) program and New Source Review (NSR) rule changes proposed by U.S. EPA on September 30, 2009. These requirements could eventually apply to new facilities whose carbon dioxide-equivalent emissions exceed 25,000 tons per year (U.S.EPA2009c). Federal rules that became effective December 29, 2009 (40 CFR 98) already require 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 through research, adaptation,² 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.

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.

² 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).

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 change³ 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 reductions to be achieved by 2020.⁴ 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.

³ 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.

⁴ Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

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.

SB 1368,⁵ 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 CO₂ per

⁵ California Code of Regulations, Title 20 § 2900 and Public Utilities Code § 8340 et seq.

megawatt-hour⁶ (1,100 pounds CO₂/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, in-state 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 services⁷ 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.

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

⁶ The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

⁷ See CEC 2009b, page 95.

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 NO_x 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 (CO_2E) 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 MLGS would involve 33 months of activity. The applicant provided a GHG emission estimate for the entirety of the construction phase (URS 2008c). The GHG emissions estimate, presented below in **Greenhouse Gas Table 2**, includes the total emissions for the 33 months of construction activity in terms of CO_2 -equivalent.

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

Construction Source	Construction-Phase GHG Emissions (MTCO₂E) ^a
Onsite construction equipment	6,526
Worker travel to/from construction site	3,729
Deliveries to construction site	43
Rail deliveries to construction site	5
Construction Total	10,303

Source: Response to Data Request 1 (URS 2008c).

Notes: a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

OPERATIONS

The proposed MLGS would provide a nominal capacity of 760 megawatts (MW) through four stationary combustion turbine-generators (four Siemens SGT6-5000F) operating in simple-cycle mode with associated equipment. The MLGS would provide peaking power, and it would be permitted to operate at a capacity factor of up to 20%. The operational profile of this peaking plant will depend on the variable demand for electricity within the control area, most likely for portions of days during the peak demand months of July to December (URS 2009b) and as needed 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 would be the natural gas fired combustion turbines. There would also be a small amount of GHG emissions from the natural gas-fired fuel gas preheaters and sulfur hexafluoride (SF₆) 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. All emissions are converted to CO₂-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO₂ 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 SF₆ containing equipment would be required for this project, and the leakage of SF₆ and its CO₂ equivalent emissions have been estimated.

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

Emissions Source	Operational GHG Emissions (MTCO₂E/yr) ^a
Combustion Turbine Generators (Four CTGs)	756,007
Fuel Gas Preheaters	946
Worker Commutes (Off-Site)	143
Material Deliveries (Off-Site)	108
Equipment Leaks (SF ₆)	28
Total Project GHG Emissions, excluding Off-Site Emissions (MTCO₂E/yr)	756,981
Estimated Annual Energy Output (MWh/yr) ^b	1,260,000
Estimated Annualized GHG Performance (MTCO₂/MWh)	0.601

Sources: Response to Data Request 2 (URS 2008c); Revised AFC Appendix J3 (URS 2009b); (BAAQMD 2010).

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 up to 20% annually (URS 2009b).

The proposed project would be permitted, on an annual basis, to emit nearly 757,000 metric tonnes of CO₂-equivalent per year if operated at its maximum permitted level. The proposed MLGS, at 0.60 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 less than a 20% capacity factor (BAAQMD 2010). This demonstrates that the facility would not be base load generation and that the MLGS is not designed or intended to operate at greater than 60% capacity factor. Therefore, the project does not have to meet the EPS.

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 MLGS is analyzed here for its role in

providing local capacity and generation 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 MLGS 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 MLGS in Local Generation Displacement

The proposed MLGS would have a net worst-case heat rate of approximately 11,124 Btu/kWh⁸, which leads to a maximum estimated GHG performance factor of 0.60 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 MLGS would be likely to displace, the proposed MLGS would be more efficient, and emit fewer GHG emissions during any hour of operation. 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 start and come up to full load quickly. Even though Contra Costa Power Plant Unit 7 has a similar heat rate to MLGS, it can take hours to start, and it uses marine water for once-through cooling. The flexibility of MLGS to quickly respond to changing grid conditions would make it preferential to the Contra Costa Power Plant in the dispatch order.

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

Plant Name	Heat Rate (Btu/kWh) ^a	2009 Energy Output (GWh)	GHG Performance (MTCO₂/MWh)
Moss Landing, Unit 6	10,211	227.2	0.541
Moss Landing, Unit 7	9,958	477.1	0.528
Contra Costa Power Plant, Unit 6	13,499	21.1	0.716
Contra Costa Power Plant, Unit 7	11,182	176.9	0.593
Pittsburg Power Plant, Unit 5	11,461	103.2	0.608
Pittsburg Power Plant, Unit 6	11,918	84.4	0.632
Pittsburg Power Plant, Unit 7	14,629	29.3	0.776
Potrero Power, Peaker, Unit 4	16,708	1.47	0.886
Potrero Power, Peaker, Unit 5	15,780	1.79	0.837
Potrero Power, Peaker, Unit 6	16,057	1.43	0.851
Proposed MLGS	11,124	1,260 (max est.)	0.60

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); shows the proposed MLGS at a 20% capacity factor (1,752 hours) of net 719 MW net output.

Notes: a. Based on the Higher Heating Value or HHV of the fuel.

The proposed MLGS would be within the Greater Bay Area, which is a major local reliability area, and it would provide local reliability that would be likely to displace other existing power plants within the area. Local reliability is partially provided by the existing

⁸ 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.

and adjacent Contra Costa Power Plant (CCPP), although it was not designed to be a peaker power plant. The MLGS project owner has indicated that it would be likely to shut down and permanently retire CCPP Units 6 and 7 after MLGS becomes operational (p. 3-8, URS 2009b).

The Role of MLGS in the Integration of Renewable Energy

As California moves towards an increased reliance on renewable energy, the bulk of 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, p. 14).

MLGS would provide flexible, highly dispatchable and fast ramping⁹ power consistent with the CAISO use of this term, and it would not obstruct penetration of renewable energy. MLGS is likely to serve as an important firming source for intermittent renewable resources in support of California's RPS and GHG goals. The proposed simple-cycle gas turbines would provide the CAISO with quick starting and fast ramping power that would support the CAISO need for flexible and dispatchable resources.

The amount of dispatchable fossil fuel generation will have to be significantly increased to meet the statewide 20% RPS (CAISO 2007, p.113); the 33% RPS will require even more dispatchable resources to integrate the renewables. However, this does not suggest the existing and new fossil fuel capacity will operate more. **Greenhouse Gas Table 5** shows how the build-out of either the 20% or the 33% statewide RPS goal will affect generation from new and existing non-renewable resources. Should California reach its goal of meeting 33% of its retail demand in 2020 with renewable energy, non-renewable, most likely fossil-fueled, energy needs will fall by over 36,000 GWh/year. In other words, all growth will need to come from renewable resources to achieve the 33% RPS. And some existing and new fossil units will generate less energy than they currently do, given the expected growth in retail sales.

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the retail sales forecast.¹⁰ Energy Commission staff estimates that as much as 18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming.¹¹ This would reduce non-renewable energy needs by a further 12,000 GWh given a 33% RPS.

⁹ 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.

¹⁰ Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC2009c).

¹¹ See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25% to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

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

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

Source: Energy Commission staff 2010.

Notes:

- a. 2009 IEPR Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
- b. 2009 IEPR Demand Forecast, Form 1.5a.
- c. RPS requirements are a percentage of retail sales.

The Role of MLGS in Retirements/Replacements

MLGS would be permitted to provide about 1,332 GWh of natural gas-fired generation that could replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007a). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

Replacement of Coal-Fired Generation

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

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder¹², 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

¹² 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.

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

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800

GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 7** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

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

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

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

Notes:

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating

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- Station (not ocean-cooled), currently under construction, enters commercial operation.
 - 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 filings 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 average 0.6 to 0.7 MTCO₂/MWh, generally higher than the proposed MLGS. When project provides energy and capacity, depending on its location, it can provide a significant net reduction in GHG emissions from the electricity sector. The MLGS would be located in a major load pocket and would provide local reliability support as well as facilitate the retirement of aging and/or OTC power plants, specifically the Contra Costa Power Plant Units 6 and 7.

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. That regulatory approach may 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 this agency 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 codifies accurate 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 MLGS would exceed the Emission Performance Standard in SB 1368 for base load generation, but as a simple-cycle power plant MLGS is not designed or intended for base load generation. Therefore, the SB 1368 limitation does not apply to this facility.

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 MLGS would affect the overall electricity system operation and GHG emissions in several ways:

- MLGS would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- MLGS would displace some less efficient 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.
- MLGS 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.
- MLGS 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, 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 MLGS 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 MLGS 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
MLGS , Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, Marsh Landing Generating Station
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. • <i>Would not</i> provide black start capability.
Ancillary Services, Grid System, and Emergency Support	• Would provide fast start-up capability (within 2 hours). • Would have low minimum load levels. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves. • <i>Would not</i> 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

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

PROPOSED CONDITIONS OF CERTIFICATION

None proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (California Code of Regulations, 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 Heather Blair

SUMMARY OF CONCLUSIONS

The proposed Marsh Landing Generating Station (MLGS) would occupy approximately 27 acres within the existing Contra Costa Power Plant property where five retired fuel oil tanks are currently located. Impacts to biological resources would be largely avoided because the proposed power plant site, construction laydown areas, and routes of proposed linear facilities (i.e., transmission, water, and natural gas) are highly disturbed or developed and surrounded by heavy industrial uses including the Contra Costa Power Plant and the Gateway Generating Station. The potential for the project area to support sensitive biological resources is low; the immediate vicinity supports wildlife that is likely habituated to frequent disturbance. With implementation of applicant-proposed impact avoidance and minimization measures and staff's proposed conditions of certification, direct impacts to biological resources would be less than significant.

Indirect impacts to the nearby Antioch Dunes National Wildlife Refuge (NWR) would result from nitrogen deposition caused by MLGS emissions. The Antioch Dunes NWR contains the last known populations of the federally endangered Lange's metalmark butterfly, federally and state endangered Antioch Dunes evening primrose, and federally and state endangered Contra Costa wallflower. The greatest threat to these listed species is noxious weed invasion and the resultant cascading effects (e.g., competition, wildfire). Noxious weed proliferation is exacerbated by nitrogen deposition. Because the Antioch Dunes NWR is already experiencing habitat degradation likely caused by nitrogen fertilization, additional nitrogen deposition from MLGS at this already stressed ecosystem would be a significant impact.

It is staff's determination that an annual payment toward the operation and maintenance budget of Antioch Dunes NWR that is proportional to the proposed MLGS project's contribution to cumulative total nitrogen deposition (as described in **BIO-8** (Antioch Dunes National Wildlife Refuge Funding)) would mitigate adverse impacts to Antioch Dunes NWR and the Antioch Dunes evening primrose, Contra Costa wallflower, and Lange's metalmark butterfly from noxious weed proliferation exacerbated by MLGS nitrogen deposition to less than significant.

Staff concludes that the proposed project would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining protection of biological resources and with implementation of staff's proposed conditions of certification would not cause a significant impact under the California Environmental Quality Act (CEQA).

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 Marsh Landing Generating Station (MLGS or project) as proposed by Mirant Marsh Landing, LLC (applicant). This analysis addresses potential impacts to special-status species, wetlands and other waters of the U.S., and areas of critical biological

concern. Information contained in this document includes a detailed description of the existing biotic environment, an analysis of potential impacts to biological resources and, as necessary, specifies mitigation measures (conditions of certification) to 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 MLGS Application for Certification – Volumes 1 and 2 (URS 2008a), Application for Certification Amendment (URS 2009e), public workshops, responses to data requests (URS 2008b; URS 2009d; URS 2010), staff's observations during a field visit on March 17, 2009, and ongoing 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 will need to abide by the LORS listed in **BIOLOGICAL RESOURCES Table 1** during project construction and operation.

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

Applicable Law	Description
Federal	
Clean Water Act of 1977 (Title 33, United States Code, sections 1251–1376, and Code of Federal Regulations, part 30, Section 330.5(a)(26))	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.
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 NMFS.
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.
State	
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Protects California's rare, threatened, and endangered species. The administering agency is CDFG.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals that are classified as rare, threatened, or endangered in California. The administering agency is CDFG.
California Code of Regulations (Title 20, sections 1702(q) and (v))	Protects "areas of critical concern" and "species of special concern" identified by local, state, or federal resource agencies within the project area, including the CNPS. The administering agencies are USFWS and CDFG.
Natural Communities	Established the NCCP program, which is a cooperative effort

Applicable Law	Description
Conservation Planning (NCCP) Act of 2002 (Fish and Game Code, sections 2800 through 2835)	between public and private partners that uses a broad-based ecosystem approach to protecting multiple habitats and species. The administering agency is CDFG.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits take of such species. The administering agency is CDFG.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Designates rare, threatened, and endangered plants in California and prohibits the taking of listed plants. The administering agency is CDFG.
Nest or Eggs (Fish and Game Code, section 3503)	Prohibits take, possession, or needless destruction of the nest or eggs of any bird. The administering agency is CDFG.
Birds of Prey (Fish and Game Code, section 3503.5)	Specifically protects California's birds of prey in the orders Falconiformes and Strigiformes by making it unlawful to take, possess, or destroy any such birds of prey or to take, possess, or destroy the nest or eggs of any such bird. The administering agency is CDFG.
Migratory Birds (Fish and Game Code, section 3513)	Prohibits take or possession of any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird. The administering agency is CDFG.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat. The administering agency is CDFG.
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	
East Contra Costa County Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP)	Provides for the protection of natural resources, while streamlining the environmental permitting process for impacts on endangered species; allows permittees to control endangered species permitting within their respective jurisdictions; and provides for species, wetland, and ecosystem conservation and contributes to endangered species recovery. The MLGS site currently lies within the planning area covered by the East Contra Costa County HCP/NCCP.
Contra Costa County General Plan – Conservation Element	Provides a planning framework for protection of natural resources and their uses. Goal 8-D requires protection of ecologically significant lands, wetlands, plants, and wildlife habitat; Goal 8-E requires protection of rare, threatened, or endangered species and a net increase in wetland values and functions; Goal 8-F requires preservation and restoration of natural characteristics of the Bay-Delta. The proposed project is located within Contra Costa County.
City of Antioch General Plan – Resource Management Element	Provides a planning framework for protection of conservation of resources and preservation of open space in consideration of providing adequate resources and infrastructure for project population growth. The MLGS site currently is not within the jurisdiction of the City of Antioch. Annexation of the site and

Applicable Law	Description
	surrounding area to the City of Antioch is expected in 2010 (COA 2009).

SETTING

REGIONAL SETTING

The proposed MLGS site is located in unincorporated Contra Costa County, California, immediately north of the City of Antioch and just west of Highway 160 and the city of Oakley. The proposed MLGS is located along the southern bank of the San Joaquin River, approximately two miles east of its confluence with the Sacramento River. Regionally, the confluence of these two major river systems comprise the Sacramento-San Joaquin River Delta, which extends east from Suisun Bay, north to the city of Sacramento and east to the city of Stockton. The brackish and slow flowing water in this region is due to a mixture of saltwater inflow from the San Francisco Bay and freshwater outflow from the Sacramento and San Joaquin rivers and creates productive and biologically diverse habitat. The Sacramento-San Joaquin River Delta is the largest estuary on the Pacific coast of the United States. It encompasses approximately 1,600 square miles, drains over 40% of the State of California, and provides habitat for numerous species of fish and wildlife, including many federally and state listed species. Two-thirds of salmon that migrate into California pass through the Delta, as do nearly half the migrating waterfowl and shorebirds (USFWS 2001a).

Significant ecological areas within five miles of the proposed MLGS include the following (CCCCDD 2005; URS 2008a):

- **DOW Wetlands Preserve.** Comprises over 400 acres and supports known populations of at least three listed species, including the federally and state endangered salt marsh harvest mouse (*Reithrodontomys raviventris*).
- **Kimball Island.** Includes a 109-acre preserve/mitigation bank with diverse aquatic, wetland, and riparian habitats (e.g., riverine aquatic bed, riparian forest, tidal perennial marsh, shaded riverine aquatic).
- **Sherman Island Waterfowl Management Area.** Comprises over 3,000 acres of natural marsh and open delta water. Supports six known populations of special-status plant and wildlife species.
- **Antioch Dunes National Wildlife Refuge.** Contains the only remaining remnants of riverine dunes, which originally covered 10 miles of the southern shore of the San Joaquin River. Supports 14 special-status and/or endemic species, including the last known natural populations of Lange's metalmark butterfly (*Apodemia mormo langei*), Antioch Dunes evening primrose (*Oenothera deltoides ssp. howellii*), and Contra Costa wallflower (*Erysimum capitatum var. angustatum*).
- **Big Break.** This emergent marsh supports the federal and state endangered California clapper rail (*Rallus longirostris obsoletus*).

PROJECT AREA AND VICINITY DESCRIPTION

The project area consists of the proposed MLGS power plant site (MLGS site) and all associated linear facilities (i.e., transmission lines, water supply and discharge pipelines, and gas supply pipeline). The MLGS site would occupy 27 acres within the western portion of the existing Contra Costa Power Plant (CCPP), which is currently occupied by five decommissioned fuel oil tanks. Surrounding land uses include the PG&E electrical switchyard and retired CCPP fuel oil tanks to the south, the PG&E Gateway Generating Station to the east, a large vacant lot that was previously used for industrial (paper making) purposes to the west, and the San Joaquin River and CCPP generation units to the north.

The project consists of various components related to the generation and transmission of electricity, including those described below. With the exception of 500 feet of the wastewater discharge pipeline within Wilbur Avenue, all other proposed project components would be within the existing CCPP property boundary.

- **Four air-cooled power blocks** (simple-cycle units), each with a 165-foot-tall exhaust stack.
- **Two single-circuit 230 kilovolt (kV) transmission lines** to directly interconnect from the MLGS to the adjacent PG&E switchyard. The combined length of the proposed transmission lines is approximately 900 feet and would be supported by six, 100-foot-tall steel poles.
- **Natural gas pipeline connection** (12-inch-diameter, approximately 2,100 feet long) from MLGS within an existing access road easement across Gateway Generating Station to the existing PG&E natural gas transmission pipeline.
- **Water supply and discharge pipelines** to convey brackish groundwater from two new wells on CCPP property to the MLGS raw water storage tank and to the point of interconnection with the City of Antioch's sewer line. A 6-inch-diameter, 2,200-foot-long water supply pipeline would be constructed within the existing CCPP access road from the wells to the raw water storage tank. A 6-inch-diameter, 3,000-foot-long water discharge pipeline would be constructed in the same access road, between the raw water storage tank and the point of interconnection at Wilbur Avenue.
- **Construction laydown and staging areas** comprising approximately 14 acres within the existing CCPP property that is currently disturbed, graded, or paved. Three separate laydown and staging areas are proposed: 2.9, 3.5, and 7.5-acre lots.

Existing Vegetation and Wildlife

The applicant conducted a reconnaissance-level survey of biological resources within the proposed project area on March 6, 2008. The applicant's survey of the proposed MLGS site included an inventory of all plant and wildlife species observed and an assessment of potential habitat suitability for special-status species. The following description of biological resources presents the results of previous surveys of the MLGS site and vicinity (Southern 2000; URS 2006) as well as observations from staff's site visit on March 17, 2009.

Project Site, Construction Laydown Areas, and Project Linear Routes

The proposed MLGS site, construction laydown areas, and project linear routes are mostly contained within the existing CCPP property and are highly disturbed or developed due to ongoing CCPP operations and recent construction of the Gateway Generating Station. A 500-foot segment of the proposed wastewater discharge pipeline that extends beyond CCPP property would be located within Wilbur Road, which is also highly disturbed.

The majority of the MLGS site is composed of paved, graveled, or bare ground surfaces with very sparse ruderal and ornamental vegetation. Herbaceous cover, when present, is limited to weedy annuals including willow herb (*Epilobium brachycarpum*), prickly lettuce (*Lactuca serriola*), black mustard (*Brassica juncea*), bur clover (*Medicago polymorpha*), and short pod mustard (*Hirschfeldia incana*). A fencerow of Tasmanian bluegum (*Eucalyptus globulus*) occurs along the western perimeter of the MLGS site. These plantings are mature eucalyptus trees approximately 50 feet tall and of sufficient canopy cover to potentially support nesting raptors.

Due to the frequency and intensity of disturbance from operation of the existing CCPP, the proposed MLGS site does not provide habitat capable of supporting a diverse assemblage of wildlife. Observations in the project area included various non-sensitive wildlife species such as coyote (*Canis latrans*), raccoon (*Procyon lotor*), jackrabbit (*Lepus californicus*) and a variety of bird species typically found in disturbed/developed areas such as house finch (*Carpodacus mexicanus*), northern mocking bird (*Mimus polyglottus*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferous*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and American crow (*Corvus branchyrhynchos*).

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 USFWS or CDFG or other agency as unique or rare.

Special-status plant and wildlife species were not observed within the MLGS project area during biological surveys, and the proposed project area does not provide suitable habitat for special-status species. However, adjacent sensitive habitats associated with the San Joaquin River and the Sacramento-San Joaquin River Delta provide suitable habitat for various special-status species that have the potential to be affected by construction and operation of the proposed project.

Biological Resources Table 2 identifies the special-status species that were reported to or potentially occur within five miles of the project area, based on surveys of the proposed project area and vicinity, and searches of the California Natural Diversity Database (CNDDB) (CDFG 2010) and California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 2010). A lack of suitable, natural habitat in the project area reduces the likelihood of occurrence of the majority of these species. However, staff's analysis considers potential impacts to all species listed in **Biological Resources Table 2**.

BIOLOGICAL RESOURCES Table 2
Special-status Species Potentially Occurring in MLGS Project Area and Vicinity

Common Name	Scientific Name	Status*
Plants		
Antioch Dunes evening-primrose	<i>Oenothera deltoides</i> ssp. <i>howellii</i>	FE; SE; 1B.1
Big tarplant	<i>Blepharizonia plumosa</i>	1B.1; HCP
Brewer's western flax	<i>Hesperolinon breweri</i>	1B.2; HCP
Contra Costa goldfields	<i>Lasthenia conjugens</i>	FE; 1B.1
Contra Costa wallflower	<i>Erysimum capitatum</i> var. <i>angustatum</i>	FE; SE; 1B.1
Delta mudwort	<i>Limosella subulata</i>	2.1
Delta tule pea	<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	1B.2
Diamond-petaled California poppy	<i>Eschscholzia rhombipetala</i>	1B.1
Hoover's cryptantha	<i>Cryptantha hooveri</i>	1A
Mason's lilaeopsis	<i>Lilaeopsis masonii</i>	SR; 1B.1
Mt. Diablo buckwheat	<i>Eriogonum truncatum</i>	1B.1
Mt. Diablo manzanita	<i>Arctostaphylos auriculata</i>	1B.3; HCP
Round-leaved filaree	<i>Erodium macrophyllum</i>	1B.1; HCP
Showy madia	<i>Madia radiata</i>	1B.1; HCP
Soft bird's-beak	<i>Cordylanthus mollis</i> ssp. <i>mollis</i>	FE; SR; 1B.2
Suisun marsh aster	<i>Symphyotrichum lentum</i>	1B.2
Invertebrates		
Lange's metalmark butterfly	<i>Apodemia mormo langei</i>	FE
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	FT; HCP
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	FE; HCP
Fish		
Central Valley spring-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	FT; ST
Central Valley steelhead	<i>Oncorhynchus mykiss</i>	FT
Winter-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	FE; SE
Delta smelt	<i>Hypomesus transpacificus</i>	FT; ST (SCE)
Green sturgeon	<i>Acipenser medirostris</i>	FT; CSC
Sacramento perch	<i>Archoplites interruptus</i>	CSC
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	CSC
Amphibians		
California tiger salamander	<i>Ambystoma californiense</i>	FT; CSC (SCE); HCP
California red-legged frog	<i>Rana draytonii</i>	FT; CSC; HCP
Reptiles		
Giant garter snake	<i>Thamnophis gigas</i>	FT; ST; HCP
Silvery legless lizard	<i>Anniella pulchra pulchra</i>	CSC; HCP

Common Name	Scientific Name	Status*
Western pond turtle	<i>Actinemys marmorata</i>	CSC; HCP
Birds		
Burrowing owl	<i>Athene cunicularia</i>	CSC; HCP
California black rail	<i>Laterallus jamaicensis coturniculus</i>	ST; FP
Loggerhead shrike	<i>Lanius ludovicianus</i>	CSC
Salt-marsh common yellow throat	<i>Geothlypis trichas sinuosa</i>	CSC
Suisun song sparrow	<i>Melospiza melodia maxillaris</i>	CSC
Swainson's hawk	<i>Buteo swainsoni</i>	ST; HCP
Tricolored blackbird	<i>Agelaius tricolor</i>	CSC; HCP
White-tailed kite	<i>Elanus leucurus</i>	FP
Mammals		
American badger	<i>Taxidea taxus</i>	CSC
Salt-marsh harvest mouse	<i>Reithrodontomys raviventris</i>	FE; SE; FP
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	FE; ST; HCP
Western red bat	<i>Lasiurus blossevillei</i>	CSC

***Status Legend** (Federal/State/California Native Plant Society (CNPS) lists, CNPS list is for plants only):

FE = Federally listed Endangered; **FT** = Federally listed Threatened; **FC** = Candidate Species for Listing; **SE** = State-listed Endangered; **ST** = State-listed Threatened; **SCE** = State Candidate Endangered; **CSC** = California Species of Concern; **FP** = Fully Protected; **SR** = State Rare; **List 1A** = Plant presumed extinct in California **List 1B** = Rare or Endangered in California and elsewhere; **.1** = Very endangered in California; **.2** = Rare, threatened, or endangered in California, more common elsewhere; **HCP** = covered species in the East Contra Costa County HCP/NCCP. (Sources: URS 2008a; CDFG 2010; CNPS 2010; ECCHCPA 2006).

Sensitive Habitat

Critical Habitat

Critical habitat is a formal designation under the federal Endangered Species Act. It is a specific area designated as essential to the conservation and recovery of a federally listed species. These areas may require special management consideration or protection. The Antioch Dunes National Wildlife Refuge provides critical habitat for three federally endangered species: Lange's metalmark butterfly, Antioch Dunes evening primrose, and Contra Costa wallflower (USFWS 2001b). The Sardis Unit of the Antioch Dunes National Wildlife Refuge is on PG&E-owned property approximately 0.75 mile west of the proposed MLGS site. Additionally, the San Joaquin River provides critical habitat for delta smelt (*Hypomesus transpacificus*), Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), and winter-run Chinook salmon (*Oncorhynchus tshawytscha*).

Sensitive Aquatic Habitat

No wetlands or other waters of the United States were identified within the project area. However, potential wetlands and other waters of the U.S. occur adjacent to the project area. The San Joaquin River, a traditional navigable water, is located immediately north of the MLGS site. The shoreline along the San Joaquin River north of the project site supports freshwater/brackish marsh habitat. Plant species include California blackberry (*Rubus ursinus*), fennel (*Foeniculum vulgare*), willow (*Salix* sp.), coast live oak (*Quercus agrifolia*), bulrush (*Scirpus* spp.), cattail (*Typha* sp.), and saltgrass (*Distichlis spicata*). This shoreline area provides habitat for several bird species including ducks, grebes,

and coots, and the willows provide suitable nesting habitat for resident and migratory riparian birds.

There is a detention basin in the southern portion of the CCpp property, south of the PG&E switchyard and immediately south of one of the proposed construction laydown areas. This detention basin was intended as secondary containment for the CCpp fuel oil tanks and seasonally supports water after precipitation events. There are patches of hydrophytic (i.e., water-loving) vegetation and although a formal delineation was not conducted, it is assumed that there are isolated wetlands within the detention basin. This detention basin provides suitable habitat for several bird species, including various waterfowl.

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 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, to reduce the severity of potentially adverse impacts. 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 of the Designated Biologist is described in staff’s proposed Conditions of Certification **BIO-1** (Designated Biologist Selection); their duties

and authority are described in staff's proposed Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-3** (Designated Biologist Authority), respectively. The Designated Biologist would be responsible, in part, for developing and implementing the Worker Environmental Awareness Program (WEAP) (see Condition of Certification **BIO-4**), which is a mechanism for training the workers on protection of the biological resources described in this document.

Construction-Related Impacts and Mitigation

Construction Impacts to General Vegetation

Construction impacts to vegetation could occur through the direct removal of plants during construction. As these impacts are generally localized and are primarily temporary, they are not usually considered significant unless the habitat type is regionally unique or is known to support special-status species. The proposed project would result in the permanent disturbance of approximately 27 acres. Because the proposed MLGS is located entirely within a highly disturbed and previously graded or paved area that is primarily devoid of vegetation, impacts to native vegetation would not occur and no mitigation is proposed.

Construction Impacts to General Wildlife

Direct loss of small mammals, reptiles, and other less mobile species could occur during construction of the proposed project. This would result primarily from the use of construction vehicles and equipment at the MLGS site. Due to a lack of vegetation, suitable habitat for most wildlife species does not occur on site. As described above, only those species acclimated to highly disturbed areas would occur within the proposed project area.

The MLGS site provides marginally suitable nesting habitat for a variety of common bird species. Birds could nest in the eucalyptus trees along the western border of the MLGS site, the riparian habitat north of the proposed site, and in ornamental trees along the pipeline route. Additionally, some bird species adapted to disturbed environments could nest in equipment or other available substrate in the areas surrounding the site.

Construction activities during the nesting season (March through August) could adversely affect breeding birds through direct injury or mortality or indirectly through disruption or harassment. The applicant proposes to conduct breeding bird surveys and monitor the nest, should one be discovered (URS 2008a, p. 7.2-18). Staff incorporated this applicant-proposed measure into Condition of Certification **BIO-7** (Pre-Construction Nest Surveys and Impact Avoidance and Minimization Measures for Breeding Birds), which provides additional detail on survey timing and recommendations to avoid disturbance to active nests and ensure compliance with the Migratory Bird Treaty Act. With implementation of Condition of Certification **BIO-7**, significant impacts to nesting birds would not result from proposed project construction activities.

The detention basin in the southern portion of the CCPP property is assumed to contain several isolated wetlands and provides suitable foraging habitat for several bird species, including various waterfowl. Construction activities near the detention basin, including staging activities at the proposed construction laydown area adjacent to the basin, may result in indirect impacts (i.e., contamination) to the habitat and wildlife species therein.

The applicant proposed several impact avoidance and minimization measures, which staff has determined are adequate to reduce potential impacts to biological resources at the detention basin to less than significant. These measures include clearly delineating the environmentally sensitive area, using a biological monitor, prohibiting construction discharges, maintaining equipment at least 100 feet from the basin, installing erosion control measures, complying with best management practices, and controlling introduction of weeds. These measures from Responses to Energy Commission Data Requests Set 1 – Data Response #53 (URS 2008b) are incorporated by reference into staff's proposed Condition of Certification **BIO-5** (Biological Resources Mitigation Implementation and Monitoring Plan).

Construction Impacts to Special-Status Species

The proposed project area does not support suitable habitat for special-status species. However, nearby brackish/freshwater marsh, riparian, and dune habitats associated with the San Joaquin River provides suitable habitat for several listed plants and animals. Construction activities would not directly affect the San Joaquin River or associated habitats. Therefore, direct construction impacts to special-status species would not occur. Indirect construction impacts to special-status species that occur within the marsh, riparian, and dune habitat associated with the San Joaquin River are discussed under "General Construction Impacts" below.

General Construction Impacts

Construction activities, including noise and lighting impacts, have the potential to create a variety of temporary impacts to biological resources.

Noise

Construction activities would result in a short-term, temporary increase in the ambient noise level. The existing CCPP, Gateway Generating Station, traffic on Wilbur Road, and the Burlington Northern Santa Fe Railroad in the immediate vicinity of the MLGS site create elevated ambient noise levels to which most local wildlife species have acclimated. However, excessive construction noise has the potential to disrupt the nesting, roosting, or foraging activities of sensitive wildlife, especially wildlife along the San Joaquin River, which is approximately 100 feet north of the MLGS site. The detention basin is another sensitive area that supports a diversity of waterfowl and is located immediately south of a proposed construction laydown area in the southern portion of the CCPP property.

Pile driving is the loudest proposed construction activity and it would occur approximately 800 feet from the detention basin and 300 feet from the shoreline. Pile driving sound levels could reach approximately 71 dBA at the detention basin and 79 dBA at the shoreline (URS 2009a). It was estimated that ambient sound levels at the detention basin are approximately 59 dBA, this is a conservative estimate based on the lowest ambient sound level measured for the project area. It is assumed that the ambient sound level at the detention basin is higher than at the shoreline because the detention basin is exposed to more ambient noise due to its centralized location within the CCPP property and adjacency to Wilbur Avenue.

To minimize noise impacts to breeding birds at the shoreline and detention basin, staff recommends Condition of Certification **BIO-7**, which requires a qualified biologist to monitor any nest locations exposed to excessive construction noise. With implementation of this condition, impacts to nesting birds from proposed project construction activities would be less than significant. For a complete analysis of construction noise impacts, refer to the **Noise** section of this Staff Assessment.

Lighting

Project construction activities are planned to occur between 6:00 a.m. and 6:00 p.m.; however, during some construction periods and during the start-up phase of the project, construction activities may continue 24 hours a day, seven days per week (URS 2008a). 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 and, if placed on tall structures, may increase the likelihood of collision, as discussed below. Existing operations at the CCP and Gateway Generating Station as well as traffic on Wilbur Road provide an elevated ambient level of lighting to which some local wildlife species have acclimated.

The following applicant-proposed impact avoidance and minimization measures pertain to project lighting (URS 2008a; pp. 7.11-19):

- Lighting on the project site will be limited to areas required for safety, will be directed onsite to avoid backscatter, and will be shielded from public view to the extent practical;
- All lighting that is not required to be on during nighttime hours will be controlled with sensors or switches operated so that the lighting will only be on when needed; and
- High-pressure sodium vapor fixtures will be used. These lights typically produce low-intensity amber light, which will reduce visual contrast with the night sky.

The existing industrial environment provides several light sources. Implementation of these applicant-proposed measures will ensure that temporary construction lighting will not create substantial sources of new light. These measures are incorporated by reference into staff's proposed Condition of Certification **BIO-5**. In addition, staff recommends that lighting be specifically directed away biologically sensitive areas (i.e., the San Joaquin River shoreline) (refer to Condition of Certification **BIO-6**). With implementation of these conditions, impacts to sensitive wildlife from increased night lighting during construction would not occur.

Operation Impacts and Mitigation

Potential operation-related impacts include impacts to birds due to collision with and/or electrocution by the transmission lines, disturbance to wildlife due to increased noise and lighting, storm water runoff, and indirect impacts to sensitive habitats from air emissions.

Avian Collision and Electrocution

Proposed project components that may present an electrocution and/or collision hazard to wildlife include exhaust stacks and transmission line support structures. The MLGS

project would construct four generation units, each with an associated 165-foot-tall, 30-foot-diameter exhaust stack. The transmission lines would directly interconnect from each of the generation units to the adjacent PG&E switchyard. It is estimated that, in total, the 230-kV electrical interconnection would extend approximately 900 feet and require six, 100-foot-tall tubular steel pole structures. The existing CCPP and Gateway Generating Station have several tall generation and transmission structures, including two 195-foot-tall Gateway Generating Station exhaust stacks. The tallest existing exhaust stack at the CCPP is approximately 400 feet tall.

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). Collisions typically result when the structures are invisible (e.g., bare power lines or guy wires at night), deceptive (e.g., glazing and reflective glare in windows), or confusing (e.g., light refraction or reflection from mist) (Jaroslow 1979). 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 (APLIC 1996). In addition, lights on tall structures are known to attract birds, increasing the collision risk (Manville 2000).

As described above, the MLGS site is adjacent to the San Joaquin River, which is part of the Sacramento-San Joaquin River Delta system. The Delta is within the Pacific Flyway and provides important habitat for migratory and resident birds. However, the proposed project site and immediate vicinity provide only marginally suitable habitat and are not known to support special-status birds. The proposed transmission lines do not pose a collision threat because they are short in length and located near the center of MLGS property surrounded by taller structures.

Birds could collide with the 165-foot-tall MLGS exhaust stacks due to their proximity to the river. The two proposed exhaust stacks, which would be the tallest component of the MLGS, would be approximately 165 feet tall and the existing CCPP exhaust stacks are approximately 400 feet tall. 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 (Karlsson 1977; Longcore et al 2008). Because the MLGS exhaust stacks would be significantly shorter than 350 feet tall and shorter than the existing 400-foot-tall CCPP exhaust stacks, the proposed MLGS exhaust stacks would pose a relatively low collision risk to migrating birds. Potential project impacts to resident or migratory bird populations would be less than significant.

Electrocution

Egrets, herons, raptors, and other large aerial perching birds, including those offered 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/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 MLGS transmission lines would be 230-kV; therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to minimize bird electrocutions. Also, due to the highly industrialized nature of the proposed transmission line routes, birds with wingspans large enough to be susceptible to electrocution are not likely to perch on the transmission conductors or support structures.

To avoid potential electrocution impacts, the applicant proposes to construct the transmission lines in accordance with Avian Powerline Interaction Committee guidelines specifically designed to reduce the risk of bird electrocution (URS 2008a; p. 7.2-18). Staff agrees with this applicant-proposed impact avoidance and minimization measure and has incorporated it into staff’s proposed Condition of Certification **BIO-6**. Specifically, the phase conductors shall be separated by a minimum of 60 inches and bird perch diverters and/or specifically designed avian protection materials should be used to cover electrical equipment where adequate separation is not feasible (APLIC 2006). With implementation of this condition, electrocution impacts to birds would not occur.

Operation Lighting

Several existing light sources surround the proposed MLGS site, including the CCPP and Gateway Generating Station as well as traffic on Wilbur Road. A slight increase in light is expected to occur during operation of the MLGS. Under certain circumstances, lights can disorient migratory birds flying at night or attract wildlife such as insects and insect-eaters. However, no sensitive species were found in the project area that would be impacted by operational lighting. Therefore, staff concludes there will be no significant impacts to sensitive species from the minimal amount of lighting associated with operation of the new facility; no mitigation is proposed.

Operation Noise

The MLGS site is zoned as Heavy Industrial pursuant to the Contra Costa County General Plan (CCCCDD 2005) and is surrounded by other energy facilities including the CCPP and Gateway Generating Station. In addition, the project site is immediately north of Wilbur Road, approximately 0.6 mile west of State Highway 160 and 0.3 mile north of the Burlington Northern Santa Fe Railroad. Therefore, it is likely that animals in this area have become habituated to an elevated level of ambient noise. Operation of the plant would produce slightly elevated noise levels, but no sensitive species that could be impacted by this nominal increase in noise are known to occur in the immediate vicinity. Staff concludes there will be no significant impacts to biological resources by increased operational noise; no mitigation is proposed.

Stormwater Runoff

Stormwater runoff from open areas on the MLGS project site would be discharged to the San Joaquin River via the existing CCPP stormwater outfall-001 in accordance with the National Pollutant Discharge Elimination System (NPDES) General Industrial Permit requirements. The applicant proposes to gravel, rather than pave, most of the MLGS

surfaces; therefore the amount of stormwater discharge is expected to be the same or less than under existing conditions (URS 2008a). Impacts to the San Joaquin River would not occur. For a complete analysis of water quality impacts, refer to the **Soil and Water Resources** section of this Staff Assessment.

Air Emissions – Nitrogen Deposition

Nitrogen deposition is the input of nitrogen oxide (NO_x) and ammonia (NH₃) derived pollutants from the atmosphere to the biosphere. Mechanisms by which nitrogen deposition can lead to impacts on sensitive species include direct toxicity, changes in species composition among native plants, and enhancement of invasive species (Fenn et al 2003; Weiss 2006a). The increased dominance and growth of invasive annual grasses is especially prevalent in low-biomass vegetation communities that are naturally nitrogen-limited, such as coastal sage scrub, serpentine grassland, desert scrub, and sand dunes (Weiss 2006a).

The Antioch Dunes National Wildlife Refuge (NWR), which is approximately 0.75-mile west of the MLGS site, was once part of an expansive aeolian (wind-blown) dune system along the shoreline of the San Joaquin River. Established in 1980, the Antioch Dunes NWR comprise 67 acres in two disjunct units (Sardis Unit and Stamms Unit) and supports the last known natural populations of the federally endangered Lange's metalmark butterfly, federally and state endangered Antioch Dunes evening primrose, and federally and state endangered Contra Costa wallflower (USFWS 2001b). Antioch Dunes evening primrose, Contra Costa wallflower, and naked-stemmed buckwheat, the larval host plant of Lange's metalmark butterfly, require open sandy substrate for survival. Annual survey data collected from 1984 to 2009 shows that the populations of these endangered species are generally in decline and largely sustained by artificial propagation and transplantation (USFWS 2009a; USFWS 2009b; Euing 2010).

Noxious weeds (e.g., yellow starthistle, winter vetch, and ripgut brome) are the greatest threat to the endangered species at the Antioch Dunes NWR (USFWS 2001b; USFWS 2009a; USFWS 2009b). Invasive, non-native vegetation affects Antioch Dunes evening primrose, Contra Costa wallflower, and naked-stemmed buckwheat by out-competing them for space, sunlight, moisture, and nutrients as well as increasing fuel loads (Pavlick and Manning 1993). A soil evaluation conducted for the Antioch Dunes NWR found that Antioch Dunes evening primrose, Contra Costa wallflower, and naked-stemmed buckwheat are more competitive growing in or better adapted to less-fertile soils or areas of low-percent vegetative cover (Jones and Stokes 2000). Despite significant efforts in 2006, 2007, 2008, and 2009 to manage invasive weeds, populations continue to thrive throughout the refuge (USFWS 2009a; USFWS 2009b).

Excessive nitrogen deposition is strongly correlated with the growth of non-native vegetation (Huenneke et al 1990; Inouye and Tilman 1995; Weiss 1999; Bowman and Steltzer 1998; Brooks 2003) and field studies have found that nitrogen fertilization in sites with elevated nitrogen deposition will enhance grass invasion (Rillig et al 1998; Brooks 2003). Several recent studies have attempted to quantify the critical load or rate at which nitrogen deposition begins to result in adverse effects to nitrogen-sensitive ecosystems. Studies in the United Kingdom suggest that the critical load ranges from 10 to 20 kilograms of nitrogen per hectare per year (kg/ha/yr) for mobile and fixed sand

dune ecosystems (Jones et. al. 2004; Plassmann, et. al. 2009). Fenn et. al. (2003) counter that estimated nitrogen deposition thresholds for ecological effects for other geographic regions are frequently not applicable to the western United States. Research conducted in the South San Francisco Bay area on grasslands in nutrient-poor serpentine soils indicates that intensified annual grass invasions can occur in areas with nitrogen deposition levels of 11 to 20 kg/ha/yr, with relatively limited invasions at levels of 4 to 5 kg/ha/yr (Weiss 2006b). In previous northern California power plant cases licensed by the Energy Commission (e.g., CEC 2007) as well as a California-wide study of nitrogen deposition (Weiss 2006a), 5 kg/ha/yr was used as a benchmark for analyzing nitrogen deposition impacts to plant communities (CEC 2007); this benchmark was also used as the significance threshold in the applicant's nitrogen deposition impact analysis (URS 2010, Data Response #99).

An Energy Commission Public Interest Energy Research study modeled total nitrogen deposition throughout California (Tonneson et. al. 2007); results showed that most of California experiences elevated rates of annual nitrogen deposition, especially near urban areas. In the area encompassing the Antioch Dunes NWR, the baseline nitrogen deposition rate is estimated to be approximately 6.39 kg/ha/yr (Tonneson et. al. 2007). Although this estimate was produced using 2002 data, it is believed to be the most comprehensive and accurate data set available. Advances in emission control technology and offsets for stationary sources have resulted in a decrease of NO_x emissions (BAAQMD 2010a). However, given the increase in vehicle transportation activity, emissions controls that cause NH₃, and use of synthetic fertilizers, NH₃ emissions in the region could be increasing over time, although there is no formal inventory or prediction of long-term trends (BAAQMD 2009; BAAQMD 2010b). Therefore, without updated modeling at a similar scale (4 km² grid), it is difficult to determine whether this baseline level of nitrogen deposition has changed substantially since 2002.¹

According to the applicant's response to data request #99 (URS 2010), modeled nitrogen deposition rates from MLGS at the Antioch Dunes NWR would be between 0.03 and 0.04 kg/ha/yr. In combination with background levels, the maximum direct nitrogen deposition rate at Antioch Dunes NWR would be approximately 6.43 kg/ha/yr. Threats to the endangered species at the Antioch dunes from noxious weeds are likely exacerbated by nitrogen fertilization; therefore, additional nitrogen deposition at this already stressed ecosystem would be a significant impact.

Staff's proposed mitigation approach requires the applicant to remit annual payment towards the operation and maintenance budget of the Antioch Dunes NWR. The annual operating budget is approximately \$385,000 and includes money for non-native plant removal/fire prevention, sand acquisition, grazing management, butterfly propagation, and rare plant propagation (Picco 2009). Contributing payment would partially fund the management activities required to address impacts to the Antioch Dunes NWR from the effects of noxious weed proliferation resulting from nitrogen deposition.

¹ In data response #60 (URS 2009d), the applicant estimated the baseline nitrogen deposition rate to be 1.63 kg/ha/yr. These data were collected from a monitoring station in Davis, California, approximately 40 miles north of the proposed project area. This baseline estimate included inorganic wet deposition from nitrate and ammonium. It did not estimate total nitrogen, which also includes dry deposition (a significant proportion of total nitrogen (see Weiss 1999, Tonneson 2007, and Fenn et. al. 2003) and all the nitrogen species (i.e., HNO₃, NH₃, NO, NO₂, N₂O₅, PAN, and aerosol ammonium nitrate [NH₄NO₃]).

It is understood that emissions from the proposed MLGS project would not be the only source of nitrogen deposition at Antioch Dunes NWR. There are existing industrial stationary sources as well as mobile sources (i.e., transportation) in the San Francisco Bay area that have collectively elevated local and regional nitrogen deposition. Accordingly, staff proposes that the applicant's payment toward the operating budget of Antioch Dunes NWR be proportional to the proposed project's contribution toward total nitrogen deposition at Antioch Dunes NWR. The following equation was developed by staff to calculate the amount of mitigation that would be proportional to the project's contribution to ongoing impacts. Refer also to Condition of Certification **BIO-9** (Antioch Dunes National Wildlife Refuge Funding).

$$(\text{MLGS N-dep at ADNWR} / \text{baseline N-dep at ADNWR}) \times \text{annual operating budget of ADNWR} = \text{mitigation \$ / year}$$

$$(0.04 \text{ kg/ha/yr} / 6.39 \text{ kg/ha/yr}) \times \$385,000 = \$2,310.00/\text{year}$$

It is staff's determination that annual payment toward the operating budget of Antioch Dunes NWR that is proportional to the MLGS project's contribution to cumulative total nitrogen deposition (as calculated using the above equation and described in **BIO-8**) would mitigate adverse impacts to Antioch Dunes NWR and the Antioch Dunes evening primrose, Contra Costa wallflower, and Lange's metalmark butterfly from noxious weed proliferation exacerbated by MLGS nitrogen deposition.

It should be noted that the Applicant retains sufficient certificates to offset the MLGS project's NO_x emissions (BAAQMD 2010b; refer also to the **Air Quality** section of this Staff Assessment for additional information). However, for the following reasons, these offsets would not sufficiently mitigate indirect impacts from nitrogen deposition at the Antioch Dunes NWR:

- Precursor organic compounds (POC) offsets may be used to offset emission increases of NO_x (BAAQMD 2010b, Regulation 2-2-302.2). POCs do not pertain to nitrogen deposition.
- Available offsets are temporally and spatially variable and therefore would not directly ameliorate the current nitrogen deposition at the Antioch Dunes NWR in particular.
- The NO_x offsets do not address NH₃, which is a substantial contributor to total nitrogen deposition.

CUMULATIVE IMPACTS

"Cumulative" impacts refer to a proposed project's incremental effect viewed over time together with other closely related past and present projects and projects in the reasonably foreseeable future whose impacts may compound or increase the incremental effect of the proposed project (Public Resources Code Section 21083; California Code of Regulations., Title 14, Sections 15064[h], 15065[c], 15130, and 15355).

The cumulative scenario for biological resources includes past, present and reasonably foreseeable future projects with emissions that contribute to nitrogen deposition at

Antioch Dunes NWR. These projects include the Willow Pass Generating Station (proposed), Oakley Generating Station (proposed), Contra Costa Power Plant (existing), Gateway Generating Station (existing), Pittsburg Power Plant (existing), as well as several other existing and proposed industrial stationary sources (e.g., manufacturing facilities).

The Antioch Dunes NWR is the first and only refuge in the United States established to protect endangered plants and insects (USFWS 2001b). The 67-acre NWR is an isolated patch of a formerly expansive and biologically diverse dune system. The federally endangered Lange's metalmark butterfly, federally and state endangered Antioch Dunes evening primrose, and federally and state endangered Contra Costa wallflower are only known from this location and their numbers are in decline. Given the low population numbers and isolated geographic area, the endangered species at the Antioch Dunes NWR are extremely vulnerable to environmental change and stochastic events. The largest threat to these species is noxious weed invasion and the resultant cascading effects (e.g., competition, wildfires). As described above, noxious weed invasion is facilitated by nitrogen deposition, which is a result of the emissions of many mobile and stationary sources within the region.

The proposed MLGS project when considered with the aforementioned past, present, and reasonably foreseeable future projects would contribute to nitrogen deposition at Antioch Dunes NWR, thereby exacerbating cumulative impacts to the federally endangered Lange's metalmark butterfly, federally and state endangered Antioch Dunes evening primrose, and federally and state endangered Contra Costa wallflower. However, adequate payment toward the operating budget of Antioch Dunes NWR to partially fund management activities (as described in **BIO-8**) would mitigate impacts resulting from MLGS nitrogen deposition at the NWR, thereby eliminating the proposed project's contribution to cumulatively considerable effects.

COMPLIANCE WITH LORS

The proposed project must comply with state and federal LORS that address state and federally listed species, as well as other sensitive species and their habitats. Applicable LORS are presented in **BIOLOGICAL RESOURCES Table 1**. Direct impacts to biological resources are largely avoided, and accordingly most applicable LORS complied with, because the proposed project is sited in a highly industrialized, disturbed location within the existing CCPP. LORS compliance issues for indirect effects of the proposed project are discussed below.

ENDANGERED SPECIES ACT (ESA; 16 USC SECTION 1531 ET SEQ.)

Potential take of federally-listed species (i.e., federally endangered Lange's metalmark butterfly, federally endangered Antioch Dunes evening primrose, and federally endangered Contra Costa wallflower) at the Antioch Dunes NWR, which is federal land, requires compliance with the federal Endangered Species Act (ESA). The definition of "take" under ESA section 3(19) includes "harm". Harm is further defined by USFWS to include "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering" (50 CFR section 17.3). It is staff's opinion that the proposed project's

relatively small incremental contribution to cumulative nitrogen deposition and the resultant habitat degradation at Antioch Dunes NWR would not result in harm, as described above. Therefore, it is staff's determination that the proposed project would comply with the federal ESA.

CALIFORNIA ENDANGERED SPECIES ACT (FISH AND GAME CODE SECTION 2050 ET SEQ.)

The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species (i.e., state-endangered Antioch Dunes evening primrose, and state-endangered Contra Costa wallflower). It is staff's opinion that the proposed project's relatively small incremental contribution to cumulative nitrogen deposition and the resultant habitat degradation at Antioch Dunes NWR would not result in take, as defined above. Therefore, it is staff's determination that the proposed project would comply with CESA.

NOTEWORTHY PUBLIC BENEFITS

The proposed MLGS would replace the existing CCPP, which consists of the remaining operating Units 6 and 7. The retirement would occur upon the successful commercial operation of the MLGS. Retirement of CCPP would eliminate its use of once-through cooling, which draws cooling water from the San Joaquin River and then discharges it back into the river after use. The resulting elimination of impingement and entrainment of aquatic organisms as well as the reduction in thermal pollution from discharge water into the San Joaquin River is a noteworthy environmental public benefit.

CONCLUSIONS

Impacts to biological resources would be largely avoided because the proposed power plant site, construction laydown areas, and routes of proposed linear facilities (i.e., transmission, water, and natural gas) are highly disturbed or developed and surrounded by heavy industrial uses including the Contra Costa Power Plant and the Gateway Generating Station. The potential for the project area to support sensitive biological resources is low; the immediate vicinity supports wildlife that are likely habituated to frequent disturbance. With implementation of applicant-proposed avoidance and minimization measures and staff's proposed conditions of certification, direct impacts to biological resources would be less than significant.

Indirect impacts to the Antioch Dunes National Wildlife Refuge (NWR) would result from nitrogen deposition caused by MLGS emissions. The Antioch Dunes NWR, comprises 67 acres of remnant sand dunes, which contain the last known populations of the federally endangered Lange's metalmark butterfly, federally and state endangered Antioch Dunes evening primrose, and federally and state endangered Contra Costa wallflower. The greatest threat to these listed species is noxious weed invasion and the resultant cascading effects (e.g., competition, wildfire). Noxious weed proliferation is exacerbated by nitrogen deposition. Emissions from the proposed project would deposit a maximum of approximately 0.04 kilograms per hectare per year (kg/ha/yr) of nitrogen

at the Antioch Dunes NWR. Additional nitrogen deposition at this already stressed ecosystem would be a significant impact.

It is staff's determination that annual payment toward the operating budget of Antioch Dunes NWR that is proportional to the MLGS project's contribution to cumulative total nitrogen deposition (as described in **BIO-8**) would mitigate adverse impacts to Antioch Dunes NWR and the Antioch Dunes evening primrose, Contra Costa wallflower, and Lange's metalmark butterfly from noxious weed proliferation exacerbated by MLGS nitrogen deposition to less than significant.

In summary, staff concludes that the proposed project would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining protection of biological resources and with implementation of staff's proposed conditions of certification would not cause a significant impact under the California Environmental Quality Act (CEQA).

PROPOSED 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.

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. At least one year of field experience with biological resources found in or near the project area.

In lieu of the above 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 90 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities 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) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s), but remains the contact for the project owner and CPM.
1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;
 2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), to be submitted by the project owner;
 3. 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;
 4. Clearly mark sensitive biological resource areas, if present and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
 5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e. parking lots) for animals in harm's way;
 6. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification;
 7. Respond directly to inquiries of the CPM regarding biological resource issues;
 8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report; and
 9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training and all permits.

Verification: The Designated Biologist shall submit in the Monthly 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 ceased as approved by the CPM.

Designated Biologist Authority

BIO-3 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, 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, 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 five 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-4 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, 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, if present;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures as necessary;
5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. 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: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM the proposed 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. At least 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 six months after the start of commercial operation.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

BIO-5 The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to CDFG and USFWS (for review and comment) if applicable 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 identified as necessary to avoid or mitigate impacts;
4. all biological resource mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the Regional Water Quality Control Board permits;
5. all biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. 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;
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 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 forty-five (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 five (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. Ten 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 five 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 thirty (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.

Impact Avoidance and Minimization Measures

BIO-6 The project owner shall implement the following measures during construction and operation to manage their project site and related facilities in a manner to avoid or minimize impacts to the local biological resources:

1. Limit Disturbance Area. Clearly demarcate construction exclusion zones around biologically sensitive areas, including but not limited to, the drainage areas west of Tank 6, the oak tree west of the berm between tanks 3 and 5, and any other sensitive biological resources identified during preconstruction surveys. Vehicles and personnel shall be prohibited from entering sensitive habitats.
2. Minimize Impacts of Transmission Lines. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of bird electrocutions and collisions.
3. Avoid Use of Toxic Substances. Road surfacing and sealants as well as soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

4. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards the project boundaries and San Joaquin River shoreline. Lighting shall be shielded, directional, and at the lowest intensity required for activity.
5. Avoid Wildlife Pitfalls. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access. Should wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual to a safe location. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.
6. Avoid Entrapment of Wildlife. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches above ground for one or more days/nights, shall be inspected for wildlife before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored, or placed on pipe racks.
7. Report Wildlife Injury and Mortality. Report all inadvertent deaths of special-status species to the appropriate project representative, including road kill. 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 CPM and the project owner shall follow instructions that are provided by CDFG or USFWS.
8. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons.

Verification: 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 thirty (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. Additional copies shall be provided to CDFG and USFWS.

Pre-Construction Nest Surveys and Impact Avoidance and Minimization Measures for Breeding Birds

BIO-7 Pre-construction nest surveys shall be conducted if construction activities will occur from March 1 through August 31. At all times of the year, noise generating activities (above 60 dBA) shall be avoided during dawn and dusk to avoid impacts to birds protected under the Migratory Bird Treaty Act. 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 150 feet of the boundaries of the plant site;
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) and monitoring plan shall be developed. 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 (e.g., excessive noise above 60 dBA, especially during pile driving), shall be prohibited within the buffer zone until such a determination is made.

Verification: At least 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 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. Additional copies shall be provided to CDFG and USFWS.

Antioch Dunes National Wildlife Refuge Funding

BIO-8 The project owner shall provide an annual payment to Friends of San Pablo Bay in the form of interest on a lump-sum endowment for management of the Antioch Dunes National Wildlife Refuge. The annual payment shall be at least equal to the proportion of the project's contribution to total baseline nitrogen deposition, as calculated by the following equation:

$$(\text{MLGS N-dep at ADNWR} / \text{baseline N-dep at ADNWR}) \times \text{annual operating budget of ADNWR} = \text{mitigation \$ / year}$$

The operating budget of the Antioch Dunes National Wildlife Refuge is estimated to be \$445,000 in year 1, and \$385,000 in subsequent years. The operating costs shall be adjusted for inflation in accordance with the

Employment Cost Index – West or its successor, as reported by the U.S. Department of Labor's Bureau of Labor Statistics. Payment shall be made annually for the duration of project operation.

Verification: No later than 30 days prior to beginning project operation, the project owner shall provide written verification to the CPM, USFWS, and CDFG that the lump-sum endowment was established on behalf of the Friends of San Pablo Bay in accordance with this condition of certification.

The project owner shall provide written verification to the CPM, USFWS, and CDFG that the annual interest generated is at least the amount calculated using the above equation, after being adjusted for inflation. This verification shall be provided annually for the operating life of the project.

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CULTURAL RESOURCES

Testimony of: Amanda Blosser and Michael McGuirt

SUMMARY OF CONCLUSIONS

California Energy Commission staff's cultural resources analysis has determined that the proposed Marsh Landing Generating Station (MLGS) project would have no impact on known significant archaeological resources, ethnographic resources, historic standing structures, historic districts, or cultural landscapes.

Staff recommends that the Commission adopt the following cultural resources Conditions of Certification, **CUL-1** through **CUL-8**. These measures are intended to facilitate the identification and assessment of previously unidentified archaeological resources encountered during construction and to mitigate any significant impacts from the project on any newly found resources assessed as significant. To accomplish this, the conditions provide for: hiring a Cultural Resources Specialist and archaeological monitors, for cultural resources awareness training for construction workers, archaeological and Native American monitoring of ground-disturbing activities, recovery of data from significant discovered archaeological deposits, for the writing of a technical archaeological report on all archaeological activities and findings, and curation of recovered artifacts and other data. When properly implemented and enforced, staff believes that these conditions of certification would reduce to less than significant any impacts to previously unidentified significant historical resources encountered during construction or operation. Additionally, with the adoption and implementation of these conditions, the proposed MLGS would be in conformity with all applicable laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the MLGS to cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. 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 are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources are those materials, archaeological and architectural, usually 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. Under federal and state requirements, historical cultural resources must be more than fifty years old to be considered of potential historic importance. A resource less than 50 years of age must be of exceptional historical importance to be considered significant.

For the MLGS 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 potential impacts from the proposed project using criteria from the California Environmental Quality Act (CEQA).

If cultural resources are identified, staff determines which are significant and whether there could be a MLGS project-related significant impact to those. If significant project impacts to significant cultural resources cannot be avoided, staff recommends mitigation measures to reduce impacts to significant cultural resources to below the level of significance.

Staff's primary concern is to ensure that all potentially significant historical resources are identified, that all potential impacts are identified, and that conditions are set forth that ensure that all significant impacts are mitigated to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. For this project, which has 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 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 NAHC-identified Most Likely Descendants (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.

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
Health and Safety Code, section 7050.5	Makes it a misdemeanor to disturb or remove human remains found outside a cemetery; also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
Contra Costa Planning Department	Provides for identification and preservation of important archaeological and historic resources within the county.

SETTING

REGIONAL SETTING

The proposed MLGS is located approximately 0.1 mile east of the City of Antioch in Contra Costa County. This area includes the urban and mountainous portions of Contra Costa County as well as the islands and waterways of the Delta. The project is located at the northern end of the Diablo Range of the northern Coast Ranges Physiographic Province of California. The Coast Ranges are characterized by a northwesterly trending series of mountains and valleys. The Diablo Range is dominated by Mount Diablo, which rises 3,849 feet above the surrounding rivers, valleys, and coastal range. The project site is located on relatively flat land, just above sea level, that lies on the southern edge of the delta system below the confluence of the Sacramento and San Joaquin rivers. The MLGS project site has industrial facilities to the southwest and west.

SITE, VICINITY, AND PROJECT DESCRIPTION

The proposed MLGS would consist of new natural gas-fired generation facilities and ancillary systems. The new MLGS units would be constructed wholly within the existing Contra Costa Power Plant (CCPP) site, located within unincorporated Contra Costa County. The MLGS would redevelop approximately 27 acres of the CCPP site that are currently occupied by five fuel storage tanks, temporary buildings, and other ancillary features. The proposed MLGS parking and laydown areas would also be located within the CCPP on 14 acres of previously graded, disturbed, or paved areas of the power plant site. The MLGS would interconnect to the Pacific Gas and Electric (PG&E) switchyard located adjacent to the MLGS site. (URS 2009b).

Prehistoric Setting

Although archaeological investigations began in the Sacramento-San Joaquin Delta as early as 1910 with avocational archaeologists, cultural chronologies were developed later in the 1930s through the milestone works of Lillard and Purves (1936) and Lillard, Heizer, and Fenega (1939), both of which identified a sequence of cultural changes in the Sacramento Valley and adjoining Delta (URS 2008a, p. 7.3-2).

Windmill Pattern (ca. 3000 B.C. to 500 B.C.)

The artifact assemblage characteristic of this period includes flaked stone, ground stone, baked clay, and shell items that indicate diverse subsistence resources, including materials acquired through trade from distant geographical areas. The burial patterns of Windmill cemeteries and graves consist almost all of ventrally extended interments with heads facing west. The main exception to this is in the case of aged females who are buried in flexed position. Social stratification is inferred from the burial practices, and males tend to have higher social status than females, as indicated by the richer artifacts and deeper graves. Social status may have been inherited because some female, child, and infant burials contain elaborate artifacts (Moratto 1984, pp. 201–207).

Berkeley Pattern (ca. 500 B.C. to A.D. 500)

The Berkeley Pattern represents a gradual and significant change in economic interest and material culture that appears to have originated in the San Francisco Bay area. The use of acorns as a subsistence food increased dramatically during this period when compared to the Windmill pattern. The reliance on acorns is evidenced in the increase of mortars and pestles recovered from Berkeley Pattern sites. Other changes in material culture include occurrence of bone tool kits, unusual knapping techniques, and certain types of shell beads and pendants (Moratto 1984, pp. 207–211).

Augustine Pattern (ca. A.D. 500 to A.D. 1800)

The Augustine Pattern reflects a continued dependence on acorns for subsistence and an increased reliance on hunting, fishing, and gathering. Many burials continued to be flexed; however, for high-status burials the mortuary practice changed to cremation. Extensive trade networks were developed to support growing populations (Moratto 1984, pp. 211–214).

Ethnographic Setting

The project area is ascribed to the Bay Miwok. The Bay Miwok were one of five Miwok groups (Coast, Lake, Bay, Plains, and Sierra) who spoke the Miwokian language. The Bay Miwok occupied the eastern portion of Contra Costa County extending from Walnut Creek eastward to the Sacramento-San Joaquin Delta. Ethnographic data on the Bay Miwok is scarce, in part due to the early removal of these people from their land by the Spanish missions (Levy 1978, p. 398).

A typical settlement within the Bay Miwok territory would be situated on a natural high spot along a major river or stream and could include a brush shelter, sweat house(s), acorn granaries, a dance house, and earth-covered dwellings. The principle sustenance activities of the Miwok were hunting, fishing, and the gathering of wild plants. Acorns from various species were eaten, as were nuts, wild fruits and berries, various seeds, roots, and bulbs (Levy 1978, p. 398).

The Bay Miwok were organized like other Californian Indians in political units called triblets. Each triblet was an independent and sovereign nation that embraced a defined and bounded territory. A triblet typically had several permanently occupied settlements and more seasonally occupied camps that were utilized during the seasonal rounds of hunting, fishing, and gathering. The other unit of political significance was the lineage.

Lineages were associated with geographic localities and often with the permanent settlements within the triblet's territory (Levy 1978, p. 411).

Historic Setting

European exploration of the project area began in 1769 with several Spanish expeditions and led to the founding of Mission Santa Clara and Pueblo de San Jose de Guadalupe in 1777 and the Mission San Jose in 1797. The Bay Miwok were greatly affected by the Spanish incursions and establishment of the missions. They were the first of the Eastern Miwok tribes to be missionized and were taken to Mission San Jose, where they were baptized and induced to work. Miwok individuals appear on baptismal records of Mission San Jose as early as 1797. Many Bay Miwok fled the missions, becoming fugitives, hiding in the tule swamps of the Delta. As hostilities increased and the triblets learned techniques of warfare from the Spanish, they participated in a series of Indian wars that involved systematic raids on the missions and ranchos to obtain horses (URS 2008a, pp. 7.3-4–7.3-5).

Jurisdiction over Alta California was established by Mexico with her separation from the Spanish Empire in 1821. The missions were secularized in the 1830s and broken up and granted to Mexican citizens for use as cattle ranches called ranchos. Governor Jose Castro granted Rancho Los Meganos, named after the sand hills in the area, to Jose Noriega in 1835. The rancho consisted of 17,000 acres of land and included the land within the MLGS project area. In 1837, Noriega sold Los Meganos to John Marsh, one of the earliest American residents in California. John Marsh arrived in California in 1836 after studying at Harvard, being an Indian Agent and tutor in Minnesota, and being a shopkeeper in Missouri. Marsh practiced medicine, farmed, and raised cattle. He also had some success as a miner and profited from establishing the first wharf along the San Joaquin River to ship supplies to Antioch where they continued on to San Francisco (JRP 2008, p. 4). A smokehouse and blacksmith shop were also located at the wharf. During the Gold Rush, John Marsh built a long pier to accommodate larger vessels and sold supplies to miners headed to Sacramento and the Sierra Nevada. By 1850, Marsh was one of the wealthiest citizens in California (URS 2008a, pp. 7.3-4–7.3-5).

In 1849, two brothers, William W. and Joseph Smith founded the town of Smith's Landing which was later renamed Antioch. The city's location on the river favored commercial, shipping, and industrial development in Antioch. Like Marsh, businessmen in Antioch first catered to miners traveling to the gold mines as well as to local ranchers and farmers (URS 2008a, p. 7.3-5). Several wharfs were established along the river to facilitate shipping of locally made goods. The discovery of coal in the Mount Diablo area also spurred growth in Antioch during the late 1800s but coal mining declined in the area when higher quality coal was discovered in Oregon and Washington in the 1880s, and eventually mining ceased in the early twentieth century. Paper milling replaced the coal industry in Antioch, with the first paper mill established in downtown Antioch in 1889. California Paper and Board Mill remained operational in Antioch until the 1990s. Industrial expansion in Antioch continued to move eastward slowly through the nineteenth and twentieth centuries (JRP 2008, p. 6).

Within the project area, most of the land was owned by Henry F. Beede by 1900, and it remained in his ownership or that of his estate until PG&E purchased the land for the development of a new electrical generating facility in the late 1940s. Beede was an Antioch resident and owner of a lumber company along the waterfront. Land south of what is now Wilbur Avenue was also used for apricot, olive, and almond orchards and remained in agricultural use until after World War II (JRP 2008, p. 8). The land adjacent to the river was sandy and unfit for cultivation.

After World War II, industry in Antioch and in the project area developed quickly. Antioch had cheap land, easy access to transportation such as waterfront, rail, and highway, and a strong industrial tradition. Instead of building in Antioch, businesses located outside the city limits to avoid city taxes and fees. As the area became more industrial it was informally called “Industry Row.” Industries continued to thrive in the project area until salt water intrusion, environmental regulations, and changes in the market and consumer demands began to diminish the profits of these industries (JRP 2008, p. 8).

Development of the project vicinity began in 1949 when PG&E constructed a steam generating power plant. The site was ideal because it allowed easy access to water for cooling, access to residential and industrial customers, and access to transportation. In 1951, the Contra Costa Power Plant came on line, and two additional generating units were online by 1953 (JRP 2008, pp. 8–9).

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 CRHR-eligible 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. The first step is to establish an appropriate area of analysis for the inventory. 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 not-yet-identified 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 determinations of historical significance for any cultural resources that are identified.

This subsection describes the research procedures used by the applicant and Energy Commission staff for each phase and provides the results of the research, including literature and records searches (California Historical Resources Information System (CHRIS) and local records), Native American consultation, and field investigations. Staff provides a description of each identified cultural resource, its historical significance, and the basis for its significance evaluation. Assessments of the project’s impacts on significant cultural resources, potential impacts on previously unidentified, buried archaeological resources, and proposed mitigation measures for all significant impacts are presented in a separate subsection below.

Staff's Area of Analysis

The inventorying 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 a CRHR-eligible cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to historical resources, called the "area of analysis" for the project, is usually defined as the area within and surrounding the project site and associated linear facility corridors. The area varies in extent depending on whether the cultural resource is archaeological, ethnographic, or built-environment:

- For archaeological resources, the area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and the project linear facilities routes, plus 50 feet to either side of the routes.
- For ethnographic resources, the area of analysis is expanded to take into account traditional use areas and traditional cultural properties which may be far-ranging, including views that contribute to the significance of the property. These resources are often identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these groups may define the area of analysis.
- For built-environment resources, the area of analysis is confined to one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a half-mile buffer from the project site and above-ground linear facilities to encompass resources whose setting could be adversely affected by industrial development. For this project, the area is established at that minimum.
- For a historic district or a cultural landscape, staff defines the area of analysis based on the particulars of each siting case.

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,² 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.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (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.

Literature and Records Search

URS requested a record search at the Northwest Information Center of the California Historical Resources Information System (CHRIS) at Sonoma State University on February 13, 2008, to identify any previous cultural resources studies and recorded cultural resources within a 1.0-mile radius around the project area and within 0.5 mile to either side of the linear facilities. Within the record search area, there were 19 previous studies and 7 known cultural resources within 1.0 mile of the project vicinity and within 0.25 mile of the water pipeline route. The record search indicated the project vicinity was surveyed with negative results in support of the environmental impact report (EIR) for PG&E's sale of this and other power plants in 1998. The EIR noted there was low to moderate potential for both prehistoric and historical buried archaeological resources (URS 2008a, p. 7.3-7).

All seven previously identified resources fell within the area of analysis for this project, and they are listed in **Table 2**, below.

² 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.

CULTURAL RESOURCES Table 2
Previously Identified Cultural Resources within the Area of Analysis

Resource Designation	Resource Age	Type of Resource	CRHR Eligible
P-07-2614, Cline Property 1	Prehistoric and historic	Historic refuse scatter and prehistoric artifacts	No
P-07-2700, 487 Sandy Lane	Historic	Built Environment-residence	No
P-07-2701, 1059 Main Street	Historic	Built Environment-residence	No
P-07-2702, 1033 Main Street	Historic	Built Environment-residence	No
P-07-2703, 5400 Neroly Road	Historic	Built Environment-residence	No
P-07-000878 Site of Marsh Landing	Historic, ca. 1838	Historical archaeological	Unknown
P-07-000853 Contra Costa Power Plant	Historic	Built Environment-industrial facility	No

The applicant's consultant identified a shipwreck located off shore on the northwestern corner from the proposed MLGS. Although no off-shore components are planned for the proposed MLGS station, the waters fell within the record search area. URS consulted the California State Lands Commission, which maintains a database of shipwrecks, but no information about the shipwreck was available.

Local Records Search

For the built-environment survey, JRP Historical Consulting (JRP) reviewed listings for the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), California Historical Landmarks, and California Points of Interest, as well as conducting research at the Contra Costa County Historical Society; California State Library, Sacramento; and Shields Library, University of California, David. JRP also reviewed data collected from the Water Resources Center Archives and the Earth Sciences Library, at the University of California, Berkeley (JRP 2008, pp. 2–3).

Archival Research

To ensure that all potential project impacts were identified, staff sought more information on the location of Marsh Landing, the 1838 site of John Marsh's former wharf, or ship landing, relative to the location of the proposed MLGS. In Data Request #12, staff requested that the applicant undertake to locate the Marsh Landing historic site through archival research. In the absence of available archival information, staff further requested a subsurface inventory involving some on-site testing.

The applicant used data from the Dames and Moore geotechnical investigation, conducted for the original CCPP (1949), and also compared maps and aerial photographs of various dates (1862, 1906, 1908, 1918, 1939, 1949) to establish the location of the Marsh Landing historic site location relative to the historic-period shoreline, and the location of the proposed MLGS relative to the shoreline of today. Additionally, the applicant analyzed 1949 Dames and Moore topographic information to determine how extensive was the grading in the tank farm area within the CCPP site (URS 2008b, pp. 12-2–12-4).

The Dames and Moore report's boring log data showed that the location of the proposed MLGS showed no evidence of fill, indicating that the land had not been subject to reclamation activities prior to the construction of the CCPP. The map comparisons showed that the shoreline has remained relatively unchanged over time, and that, while the Marsh Landing historic site could be located within the boundaries of the CCPP, the proposed MLGS location is located inland from the mapped location of the Marsh Landing historic site and so is unlikely to impact any remaining archaeological deposits associated with that site. The Dames and Moore topographic map showed that 20–31 feet of material was removed in the area where the tank farm was constructed, making it unlikely that any archaeological deposits of whatever origin could still be present (URS 2008b, pp. 12-2–12-4). Staff concluded that this analysis, based on archival data, sufficiently filled staff's information needs, and so staff did not pursue the request for on-site subsurface testing.

Geoarchaeological Research

Geoarchaeology is a subfield of archaeology that uses the concepts and methods of the earth sciences to conduct archaeological research. The broader goal of geoarchaeology is to firmly establish the most basic elements of archaeological interpretation, which are the physical contexts of archaeological sites and the human material residues that are a part of them. Geoarchaeology provides information on the structure, the origin, and the development of archaeological deposits. Geoarchaeological research typically draw on a suite of concepts and methods from geomorphology (the study of landform development and history), stratigraphy (the study of the character and age of sequences of geologic deposits), pedology (the study of soils and soil development), and sedimentology (the study of the composition, character, and age of geologic sediments). Geoarchaeological research is essential to the analysis of the potential impacts of a proposed project on buried archaeological deposits, where a proposed project involves deep (greater than one meter) ground disturbance, because it provides a factual assessment of the likelihood that such deposits may be present in a project area and establishes the likely character of any such deposits.

As the construction of the MLGS will involve deep ground disturbance on the project site, staff would typically request the applicant to provide data on the potential presence of buried archaeological resources in the proposed project's construction areas. However, considering the additional information provided in the response to Data Request # 12, staff determined that a geoarchaeological survey was not warranted because of the substantial land modifications.

Native American Coordination

On April 24, 2008, URS contacted the Native American Heritage Commission (NAHC) to request a search of the Sacred Lands File and a list of local Native American contacts that might have knowledge of cultural resources in the project area. The NAHC indicated that no Sacred Lands were located within the area of analysis for the project and provided a list of three tribes and individuals to contact for further consultation. URS sent letters, provided a map, and requested the Native Americans to contact them if they had any concerns regarding cultural resources. At the time of this assessment no responses had been received.

Staff also requested a list of Native Americans in the proposed project area from the NAHC. Letters from staff were sent to the Native American groups and individuals on July 30, 2008, asking about Native American concerns in the proposed project area. No responses have been received to date.

Field Investigations

Archaeological Survey

A pedestrian survey of the entire project area and proposed waterline was conducted by Senior URS Archaeologist Mark Hale on October 9, 2007, and March 6, 2008. The survey was conducted by walking 15–20-foot parallel transects. All exposed soils were inspected for archaeological materials, although the surface visibility was poor within the developed power plant property. Along the course of the waterline, surface visibility was also poor because the linear facility would be placed in the current roadbed. No new prehistoric or historical archaeological resources were located during the pedestrian survey.

Built-Environment Survey

JRP Historical Consulting conducted the built-environment survey on November 29, 2007, and March 19, 2008, within the project area, and conducted a reconnaissance survey of the linear features of the project during the March, 2008 field visit. JRP located one resource that was 45 years or older within the area of analysis: the CCPP, which JRP field-checked as part of this project. The CCPP had been evaluated in 2000 for its eligibility for inclusion in the CRHR as part of the CCPP AFC. At that time, the cultural resources consultant, Frank L. Quivick, recommended that the CCPP was eligible under Criterion A for its association with the postwar expansion of the economy. In its current evaluation, JRP disagreed, stating that the association was not clear. Instead, JRP recommended that the CCPP did not appear to be significant within the context of electrical generation and steam power plants (JRP 2008, pp. 15, 18).

Six additional built-environment resources were identified in the area of analysis for the BLS (see **Table 2**, above). They were previously surveyed as part of a cultural resources assessment report in support of the widening of State Route 4 from State Route 160 to Big Break, City of Oakley. None of these resources was determined to be significant because they did not meet the CRHR criteria. These resources all are indicative of the general growth and development in Contra Costa County following World War II and do not appear to be significant under Criterion 1. They are not significant under Criterion 2 for their association with historical significant people. Nor do

these resources appear to be significant as at type, period, or style of residential architecture (URS 2008d, App. L3, App. A).

Summary of All CRHR-Eligible Resources

Of the seven previously known cultural resources identified in the literature search, only the Marsh Landing site appears to have the potential to be eligible for the CRHR and therefore considered a historical resource. Staff, however, agrees with the applicant that remains of this site are unlikely to exist where the MLGS construction would involve project-related excavations.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF IMPACTS TO HISTORICAL RESOURCES

Under CEQA, “a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment” (Pub. Resources Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is, the CRHR eligibility, of all historical resources identified in the Cultural Resources Inventory as CRHR eligible. The degree of significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource’s historical significance;
- How the resource’s historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource’s integrity that figure importantly in the manifestation of the resource’s historical significance; and
- How much the impact will change those integrity appraisals.

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved

accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility and vandalism or greater weather exposure becomes possible.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at proposed lay down areas has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

To identify construction-related impacts to cultural resources that would need to be mitigated, staff first identified all CRHR-eligible cultural resources (above), since only project impacts to CRHR-eligible cultural resources require mitigation and so must be evaluated to determine if they are substantial and adverse.

Identification and Assessment of Direct Impacts on Archaeological Resources and Recommended Mitigation

Neither the applicant nor staff identified any prehistoric or historic-period archaeological sites, known from previous surveys in the area. Contacted Native Americans also disclosed no archaeological sites in the area. Consequently, construction impacts from the proposed MLGS project would not affect known archaeological resources, and no mitigation would be required for known archaeological resources.

Construction generally entails the subsurface disturbance of the ground, which can affect unidentified buried archaeological resources which could be significant under CRHR Criterion 4 (“likely to yield information important in history or prehistory”). The risk of potential direct, physical impacts from the proposed MLGS construction on unidentified archaeological resources is commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. The proposed MLGS construction activities which involve ground disturbance primarily entail excavation for foundations of proposed equipment and grading the site after demolition of the tanks. The greatest excavation depths into native soils anticipated for the MLGS are up to 13 feet for the foundations for the plant equipment (URS 2008b, pp. 1-1–1-2).

The applicant recognizes there is a possibility that intact prehistoric and historic-period archaeological deposits could be present in undisturbed native soils on the proposed MLGS project site (URS 2008c, p. 14), and staff agrees with this assessment. Because of the possibility that prehistoric and historic-period archaeological deposits could be encountered during construction, CEQA advises a lead agency to provide for such a contingency, and the project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)). Consequently, staff recommends that procedures for identifying, evaluating, and

possibly mitigating impacts to newly discovered archaeological resources be put in place through conditions of certification to reduce those impacts to a less-than-significant level.

To that end as well, the applicant has suggested a number of measures intended to mitigate potential impacts to archaeological resources that could be discovered during the construction of the proposed MLGS project, in particular, deposits associated with the Marsh Landing historic site (URS 2008b, p. 3). The applicant's suggested mitigation measures include the following:

- Avoidance. If a significant cultural resource is found during construction, the applicant will if feasible, modify the construction plans to avoid the resource.
- Physical Demarcation and Protection. If significant cultural resources are found within the project area and if it can be avoided by modifying construction plans, the resource will be temporarily fenced or otherwise demarcated on the ground.
- Crew Education. Training will be given to construction personnel by the monitoring archaeologists on procedures for the handling of discovered archaeological resources, including the need to stop work until a qualified archaeologist has assessed the significance of the find and implemented appropriate mitigation measures and the prohibition of unauthorized collection of cultural resources.
- Archaeological Monitoring. The applicant shall arrange for a qualified professional archaeological monitor to be present during project-related excavation and trenching.
- Evaluation and Documentation. In the event that a resource can not be avoided during construction, the applicant will undertake further archaeological work to assess the importance/significance of the resource.
- Mitigation for Resource. In the event that a resource can not be avoided, the project archaeologist will consult with the CEC and the State Historic Preservation Office in regards to determining the resource significance and to determine appropriate mitigation measures for the loss of a significant resource.

Although staff concurs with many of the applicant's suggested mitigation measures, staff has added additional recommendations or expanded upon the applicant's suggestions to ensure that all impacts to cultural resources are mitigated to below the level of significance. The applicant's suggested mitigation measures and staff's additional recommendations are incorporated into the proposed Conditions of Certification **CUL-1** through **CUL-8**, below, intended to provide for the contingency of discovering archaeological resources during MLGS construction and related activities. Staff's proposed **CUL-1** requires a Cultural Resources Specialist (CRS) to be retained and available during the MLGS's construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. **CUL-2** requires the project owner to

provide the CRS with all relevant cultural resources information and maps. **CUL-3** requires the CRS to write and submit to the Energy Commission Compliance Project Manager (CPM) a Cultural Resources Monitoring and Mitigation Plan (CRMMP). **CUL-4** requires the CRS to write and submit to the CPM a final report on all MLGS cultural resources monitoring and mitigation activities. **CUL-5** requires the project owner to train workers to recognize cultural resources and instruct them to halt construction if cultural resources are discovered. **CUL-6** prescribes the archaeological monitoring, by an archaeologist and, possibly, by a Native American, intended to identify buried prehistoric archaeological deposits. **CUL-7** requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible. **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.

Staff's proposed mitigation measures for identifying, evaluating, and possibly mitigating impacts to previously unknown archaeological resources discovered during construction ensure that impacts to significant archaeological discoveries would be mitigated to a less-than-significant level.

Identification and Assessment of Direct Impacts on Ethnographic Resources and Recommended Mitigation

No ethnographic resources, either previously recorded or newly disclosed in the communications with Native Americans conducted by the applicant for the proposed project or by staff, were identified in the vicinity of the project. The proposed project would, therefore, have no significant impact on ethnographic resources, and no mitigation for impacts to this class of cultural resources would be required.

Identification and Assessment of Direct Impacts on Historic Standing Structures and Recommended Mitigation

No built-environment resources that qualify as historical resources for the purpose of CEQA analysis are now known or likely to be found in the project area of analysis. The proposed project would, therefore, have no significant impact on built-environment resources, and no mitigation for impacts to this class of cultural resources would be required.

Identification and Assessment of Indirect Impacts and Recommended Mitigation

Neither the applicant nor staff identified any indirect impacts to any identified cultural resources in the impact areas of the proposed MLGS project, and so no mitigation measures for indirect impacts would be required for any class of cultural resources.

Operation Impacts and Mitigation

During operation of the proposed MLGS project, 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. Such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original excavation. The measures proposed above and below to mitigate impacts to previously unknown archaeological resources found during the construction of the proposed project would also serve to

mitigate impacts that occur due to repairs that are made during the 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 MLGS project vicinity could occur if any other existing or proposed projects, in conjunction with the proposed MLGS, had or would have impacts on cultural resources that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to the future construction of the MLGS and other proposed projects in the vicinity could have a cumulatively considerable effect on subsurface archaeological deposits, both prehistoric and historic. The alteration of the setting which could be caused by the construction and operation of the proposed MLGS and other proposed projects in the vicinity could be cumulatively considerable, but may/may not be a significant impact to cultural resources.

In addition to the MLGS, the applicant has identified seven other proposed or approved projects in the general vicinity. Four of these projects involve the expansion or development of commercial developments (URS 2008a, p. 7.4-9). Two involve residential development. The seventh involves changes to a land use permit. In addition to MLGS, the applicant has also submitted an AFC with the Energy Commission for Willow Pass Generating Station located in Pittsburg, and another AFC was filed for the Oakley Generating Station in Oakley.

Because there are no known CRHR-eligible resources in the area of analysis, staff has only proposed conditions of certification for the MLGS project providing for identification, evaluation, and avoidance or mitigation of impacts to previously unknown CRHR-eligible archaeological resources discovered during the construction of the project.

Proponents of any other future projects in the MLGS area could mitigate impacts to unanticipated subsurface archaeological sites to less-than-significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as CRHR-eligible. Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code, section 5097.98. Since the impacts from the proposed MLGS project would be mitigated to a less-than-significant level by the project's compliance with staff's proposed Conditions of Certification **CUL-1** through **CUL-8**, and since similar protocols can be applied to other projects in the area, staff does not expect any incremental effects on cultural resources of the proposed MLGS project to be cumulatively considerable when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If Staff's proposed conditions of certification (below) are properly implemented, the proposed MLGS project would result in a less-than-significant impact on any new significant archaeological resources discovered during construction. The proposed MLGS project would therefore be in compliance with applicable state laws, ordinances, regulations, and standards listed in **Table 1**.

Contra County's General Plan has language promoting the general county-wide preservation of cultural resources. Staff's proposed conditions of certification will require specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources in order to ensure CEQA compliance. Consequently, if the project owner implements these conditions, its actions would be consistent with the cultural-resources-related goals of Contra Costa County.

CONCLUSIONS AND RECOMMENDATIONS

Staff's cultural resources analysis has determined that the proposed MLGS project would have no impact on known significant archaeological resources, ethnographic resources, historic standing structures, historic districts, or cultural landscapes.

Staff recommends that the Commission adopt the following cultural resources Conditions of Certification, **CUL-1** through **CUL-8**. These measures are intended to facilitate the identification and assessment of unanticipated discoveries of historical resources encountered during construction and to mitigate any significant impacts from the project on these resources if they should be found to be significant. To facilitate the identification and mitigations, the conditions provide for the hiring of a Cultural Resources Specialist and archaeological monitors, for cultural resources awareness training for construction workers, for the archaeological and Native American monitoring of ground-disturbing activities, for the recovery of data from significant discovered archaeological deposits, for the writing of a technical archaeological report on all archaeological activities and findings, and for the curation of recovered artifacts and other data. When properly implemented and enforced, staff believes that these conditions of certification would reduce to less than significant any impacts to unanticipated discoveries of historical resources encountered during construction or operation. Additionally, with the adoption and implementation of these conditions, the proposed MGLS project would be in conformity with all applicable laws, ordinances, regulations, and standards.

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 a Cultural Resources Specialist (CRS), and one or more alternate CRSs, if alternates are needed. The CRS shall manage all monitoring, 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 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 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 non-compliance on this or other 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 or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field 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 knowledgeably 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. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least 5 days prior to the CRMs beginning on-site duties.
4. 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.
5. 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 submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

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. If there are changes to any project-related footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance for those changes.
3. If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.
4. On a weekly basis 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 identifying changes, the project owner shall provide written notice of any changes to scheduling of construction phase.

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 mitigation plan shall be prepared for any CRHR-eligible (as determined by the CPM) resource, impacts to which cannot be avoided. 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 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 that are to be avoided during project-related ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance 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 Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, 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 project owner an electronic copy of the draft model CRMMP for the CRS.
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.
3. 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. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, findings, samplings, and analyses. All survey reports, DPR 523 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 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.

2. Within 90 days after completion of ground disturbance (including landscaping), 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.
3. Within 10 days after CPM approval, 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.
4. 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.

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, laydown areas, and along the linear facilities routes. 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.

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, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.
2. On a monthly basis, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers at the project site and on the linear facilities who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all ground disturbance at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all ground-disturbing activities on the project site, at the laydown areas, along the linear facility routes, and at roads or other ancillary areas, for as long as the activities are ongoing. Full-time archaeological monitoring shall require at least one monitor per excavation area where machines are actively disturbing native soils. If an excavation area is too large for one monitor to effectively observe the ground disturbance, one or more additional monitors shall be retained to observe the area.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, 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.

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

On forms provided 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. 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 cultural resources-related activities at the project site, 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 resources 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.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts are 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.

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. 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.

2. 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 acceptable to the CPM. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily reporting shall be provided to the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting.
3. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.
4. 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 and any comments or information, provided in response by the Native Americans.

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.

In the event that cultural resources over 50 years of age are found, or, if younger, determined exceptionally significant by the CPM, or impacts to such resources 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 **CUL-6** shall continue during all ground-disturbing activities elsewhere on the project site. 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 mitigation of any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.
2. If the discovery is prehistoric or ethnographic, 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, minimally, 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, 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 site 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, **CUL-6** and **CUL-7** 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 will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological surveys, 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 activities on the non-commercial borrow site, the CRS shall

survey the site 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

MARSH LANDING GENERATING STATION

A.D.	After the Birth of Christ
AFC	Application for Certification
ARMR	Archaeological Resource Management Report
B.C.	Before the Birth of Christ
BLS	Bridgehead Lift Station
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
DDSD	Delta Diablo Sanitation District
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
LORS	laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MLD	Most Likely Descendent
MLGS	Marsh Landing Generating Station, the proposed project
NAHC	Native American Heritage Commission

NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PSA	Preliminary Staff Assessment
SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
WEAP	Worker Environmental Awareness Program

REFERENCES

The *tn: 00000* in a reference below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker location and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

Jones and Stokes 2005.—Jones and Stokes, Inc. Historical Resources Evaluation Report Main Street (SR4) Widening to Big Break, City of Oakley, 2005.

JRP 2007—JRP Historical Consulting. "Historic Resources Inventory and Evaluation Report: Mirant Marsh Landing Generation Station," May, 2008. Appendix L-2 in Vol. II, Mirant Marsh Landing Generation Station Application for Certification. Submitted to CEC/Docket Unit on 05/30/08.

Levy 1978—Richard Levy. "Eastern Miwok," in *Handbook of North American Indians*, Vol. 8. Robert F. Heizer, ed. Washington, D. C.: Smithsonian Institution, 1978.

Moratto 1984—Michael J. Moratto. *California Archaeology*, Orlando, Fla.: Academic Press, 1984.

URS 2008a—URS/Anne Connell (tn: 46509). Marsh Landing Generating Station, AFC. Submitted to CEC/Docket Unit on 5/30/2008.

URS 2008b—URS/J. Sacks (tn: 49426). MLGS Response to Data Request, Set 1 (1-54). Submitted to CEC/Docket Unit on 12/12/2008.

URS 2008c—URS Corporation. "Archaeological Reconnaissance, Marsh Landing Generation Station, Contra Costa County, California." Appendix L-1 in Vol. II, Mirant Marsh Landing Generation Station Application for Certification. Submitted to CEC/Docket Unit on 05/30/08.

URS 2008d—URS Corporation. "Cultural Resources Record Search." Appendix L-3 in Vol. II, Mirant Marsh Landing Generation Station Application for Certification. Submitted to CEC/Docket Unit on 05/30/08.

URS 2009b – URS/Anne Connell (tn: 53293). Marsh Landing Generating Station Amendment to the AFC. 09/22/2009

HAZARDOUS MATERIALS MANAGEMENT

Testimony of: Alvin Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Marsh Landing Generating Station (MLGS), 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., Mirant Marsh Landing, 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 Contra Costa County Health Services Department, Hazardous Materials Program (CCCHSD-HMP) and Energy Commission staff. In addition, staff's proposed conditions of certification require that the CCCHSD-HMP review the risk management plan and that staff approve the plan prior to delivery of any hazardous materials to the MLGS 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 MLGS 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% ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at the MLGS 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 (NO_x) emissions through selective catalytic reduction and is proposed to be stored in one-20,000 gal 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 MLGS 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 MLGS would connect to an existing Pacific Gas and Electric (PG&E) natural gas line via a new 2,100-foot long, 12-inch pipeline that would run directly west from a connection point at the northeastern corner of the Gateway Generating to the MLGS site (URS 2008a, Section 5.2). The MLGS 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	
Contra Costa County Zoning Ordinance 98-48	Requires a Safety Plan and a RMP.
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 Contra Costa County Health Services Department, Hazardous Materials Program (CCCHSD-HMP). With regard to seismic safety issues, the site is located in Seismic Design Category D. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of the 2006 International Building Code for Seismic Category D (URS 2008a, Section 7.12.1.1).

SETTING

The project would be located on a 27-acre parcel in the northwest corner of the existing Contra Costa Power Plant (CCPP) property, with another 14 acres within the CCPP property to be used for construction laydown and parking. The CCPP property has been

used for power generation, and associated industrial activities, since 1951 (URS 2008c, Data Response 47). The main project site is bounded to the north by the San Joaquin River, to the west by the largely vacant Gaylord Corporation East Mill industrial property, and to the south and east by CCPP facilities and an existing Pacific Gas and Electric (PG&E) electrical switchyard. East of the existing CCPP facility is the Gateway Power Plant.

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 (7.1) of the Application for Certification (AFC) (URS 2008a). 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 (URS 2008a, Table 7.12-5).

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The topography of the site is essentially flat with an elevation range of about 10 to 16 feet above mean sea level. The San Joaquin River borders the Contra Costa Power Plant site to the north and industrial uses surround the site from all other directions. Terrain in the region is also generally flat with low hills rising to an elevation of about 200 feet above sea level approximately 1.5 miles south of the project site (URS 2008a, Section 7.12.1.1 and Figure 7.1-5).

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 three-mile radius) are listed and shown in Table 7.12-1 and Figure 7.6-1 (URS 2008a). The nearest sensitive receptor is a park located

about 2,900 feet east of the plant. The nearest residence is approximately 1,700 feet east of the site in the marina, where two other businesses are also located (URS 2008a, Section 7.12.1.1 and Figure 7.6-1).

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 (URS 2008a, Section 7.12). 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 14-1** of the Responses to Data Requests Set 1 (URS 2008c) 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 demolition and construction phases 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.

Demolition of existing structures will generate hazardous waste including asbestos-containing materials, which are discussed fully in the **Waste Management** section of this Preliminary Staff Assessment. Handling of hazardous materials during demolition and construction would follow administrative and engineering controls designed to minimize environmental impacts. All construction employees would be trained in the proper procedures for handling hazardous materials and specific mitigation measures would be implemented during fueling and maintenance of construction equipment (URS 2008a, Sections 7.12.2.1 and 7.12.4.1).

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 MLGS) 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 PSA 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% in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14%, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (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 2,100-foot long, 12-inch pipeline that would run directly west from an existing gas line at the northeastern corner of the Gateway Generating Station to a new metering station at the northern boundary of the MLGS site. The entire pipeline route is located within the boundaries of the Contra Costa Power Plant (CCPP) (URS 2008a, Section 5.2). 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.

The natural gas pipeline will be owned, constructed, and maintained by Mirant Marsh Landing LLC (URS 2008c, Data Response #15). 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. Additionally, the gas pipeline that would be constructed for this project would be located entirely within the CCPP site, which greatly reduces the risks of impacts to the public from a rupture or failure.

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 MLGS. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. MLGS would use 19% aqueous ammonia solution stored in one stationary above-ground storage tank, with a maximum capacity of 20,000 gallons (URS 2009b).

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 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 (considered by staff to be a level of significance).

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 7.12.2.2 of the AFC (URS 2008a) describes the modeling parameters 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%), the OCA was performed for a worst-case release scenario involving the failure and complete discharge of one of the two storage tanks, and for an alternative (more plausible) scenario involving a spill during tanker truck unloading. For the worst case scenario, the contents of the storage tank (20,000 gallons) would be collected by the secondary containment structure and drained through a 42-inch-diameter opening into

an underground vault. For the alternative scenario, the contents of the truck (8,000 gallons) would be collected by the containment area surrounding the truck unloading pad and drained into the same underground vault through a 24-inch-diameter opening (URS 2008a, Section 7.12.2.2).

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 between the years of 1971 and 2000 (88.0°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. The mean temperature recorded in the area between 1971 and 2000 (60.2°F), a wind speed of 3.0 meters per second, and atmospheric stability class D were used for the alternative scenario. Potential off-site ammonia concentrations were estimated using the SCREEN3 numerical dispersion model. The surface area of evaporating ammonia was assumed to be the combined area of the 42-inch and 24-inch drains for both scenarios. Results from the OCA are shown in Figures 7.12-2 and 7.12-3 and summarized in two unnumbered tables within section 7.12.2.2 of the AFC (URS 2008a, Pages 7.12-11 and 7.12-12).

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	56	169	214	375
Alternative	34	101	127	221

The results of the applicant's modeling show that concentrations exceeding CEC's level of significance of 75 ppm would extend slightly beyond the facility fenceline to the north and west of the MLGS site for both the worst-case and alternative scenarios. However, the area immediately north of the MLGS site is within the CCPP boundary and the area immediately west of the MLGS site consist of vacant industrial space that does not contain any public receptors (URS 2008a, Figures 7.12-2 and 7.12-3). Staff has reviewed the applicant's modeling and accepts the results. Additionally, staff conducted a hazardous materials and site security site visit at the existing power plant site on September 30, 2009. 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 MLGS 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 MLGS 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 areas surrounding each of the aqueous ammonia storage tanks that would drain through a 42-inch-diameter opening into an underground containment sump capable of holding the entire contents of the tank plus the rainfall associated with a 24-hour, 25-year storm;
- construction of a sloped concrete pad beneath each of the ammonia truck unloading areas 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 (URS 2008a, Section 7.12.2.2). 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 CCHSD-HMP).

In the event of a large spill, a full hazardous materials response would be provided by the Contra Costa County Health Services Department Hazmat Team. The County's Hazmat team is capable of handling any hazardous materials-related incident at the proposed facility and would respond within one hour (CCCFPD 2009). Staff finds that the County's Hazmat team is capable of responding to a hazardous materials emergency call from the MLGS 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 State Route (SR)-4 to SR-160, turn west at Wilbur Avenue, enter the CCPP site at the main gate, and continue to the MLGS site on an internal access road (URS 2008a, Section 7.12.2.2). There are three schools, one park, one childcare facility, and one residence along SR-4 and SR-160 in the vicinity of the project site; however, hazardous materials delivery along these freeways does not pose

a significant risk to local sensitive receptors. An additional residence is located on Wilbur Avenue along the transportation route (URS 2008a, Figure 7.6-1).

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 the main highway (SR-160). 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. See AFC section 7.10 for additional information on regulations governing the transport of hazardous materials.

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 MLGS would require a maximum of 120 deliveries per year (URS 2008a, Section 7.12.2.2). Each delivery will travel approximately 0.5 miles along Wilbur Avenue from SR-160 to the CCPP access road.

This would result in a maximum of 60 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 via Wilbur Avenue. Results show a risk of 0.054 in 1,000,000 for one trip from SR-160 and a total annual risk of 6.4 in 1,000,000 for 120 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.

In order to further ensure that the risk of an accident involving the transport of aqueous ammonia to the power plant is insignificant, staff proposed Condition of Certification **HAZ-6** would require the use of only the specified and approved route to the site.

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 possible 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 2006 International Building Code for Seismic Design Category D (URS 2008a, Section 7.12.1.1). 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 Chili (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 Chili, 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% or greater and this proposed facility plans to utilize a 19% 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 MLGS 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. Staff also conducted a hazardous materials and site security site visit at the existing power plant site on September 30, 2009. Staff reviewed the existing site security measures and found them to be more than adequate for the proposed MLGS project which would be located within the security perimeter of the existing CCPP. A few modifications of the east fence line between the existing CCPP and the Gateway power plant will be made in the near future along with the installation of additional CCTVs and thus staff does not propose that the project owner conduct its own vulnerability assessment. Furthermore, since the MLGS site and laydown construction area will be wholly within the existing security perimeter of the CCPP site, only a modified Construction Security Plan need be developed and that the existing Operations Security Plan need only be revised to include some additional measures.

These additional security measures include breach detectors, site personnel background checks, and hazardous materials vendor requirements. Site access for vendors shall be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only properly licensed and trained drivers. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for hazardous materials vendors to prepare and implement security plans (as per 49 CFR 172.802) and to ensure that all hazardous materials drivers are in compliance through personnel background security checks (as per 49 CFR Part 1572, Subparts A and B). The compliance project manager (CPM) may authorize modifications to these measures or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

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.

There are two projects in the immediate vicinity of the proposed MLGS that could potentially contribute to cumulative impacts. These are the Gateway Generating Station (GGS), located approximately 800 feet east of the MLGS site, and the operational portion of the CCPP, located about 500 feet northeast of the MLGS site (URS 2008c, Figure 14-1). Both facilities store aqueous ammonia as well as other chemicals typical of electric generating facilities (see Table 7.12-2 of the AFC for a complete list of chemicals stored at the CCPP). Since the applicant's modeling of an accidental release shows that ammonia concentrations exceeding 75 ppm would be found at 375 feet from the ammonia storage tank and thus not extend far enough off-site to reach either of these facilities, cumulative impacts from ammonia releases from these three facilities are not expected to occur.

However, in order to ensure that the risk of a cumulative impact is not significant, staff conducted its own independent analysis of both the potential for impacts from the MLGS aqueous ammonia tank alone and cumulatively with the tank at the Gateway facility. There is one 20,000-gallon aqueous ammonia storage tank proposed for this project; it will be located at the western side of the MLGS site.

Staff's quantitative offsite consequence analysis included a scenario where the tank completely ruptures and the entire contents spills into the secondary containment area. The following assumptions were used in staff's analysis:

- Building parameters and locations of the aqueous ammonia tank were obtained from the AFC. Building downwash effects of on-site buildings were included in the analysis.
- Atmospheric dispersion modeling was conducted using the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a.
- Screening meteorological data was used; rural.
- Used a receptor grid of -750 to 750 m east and -750 to 750 m north, at 25 m increments.
- The release height was assumed to be 4 feet (this is the minimum height allowed in the HARP model).
- The tank has a 42-inch diameter drain to its underground containment tank. The drains were modeled as area sources.
- Emission rate was calculated according to guidance presented in the US EPA's "Risk Management Program Guidance for Offsite Consequence Analysis," March 2009. The emission rate for ammonia resulting from tank rupture was determined to be 1.6 g/m²/sec, which is equivalent to 11.3 lb/hour ammonia (**Table 1**).
- Distances from the ammonia storage tank were determined to the maximum off-site concentration and to 75 ppm under each of the three scenarios evaluated.

The Gateway Generating Station is located east of the Marsh Landing project site. According to the Final Staff Analysis (FSA) dated March 2001 for the Gateway project

(formerly the Contra Costa Power Plant Project), there are three 20,000-gallon aqueous ammonia tanks at the Gateway facility. The FSA determined that rupture of one of the tanks would result in a concentration of 5.9 ppm ammonia at 800 feet away. In the unlikely event of simultaneous rupture of the two MLGS ammonia tanks and rupture of one of the Gateway tanks, cumulative ammonia concentration could occur at the eastern boundary of the Gateway site, carried by the predominant winds from the west. In order to assess this possibility, ammonia concentration at the eastern boundary of the Gateway facility was determined under each of the three scenarios for MLGS.

The applicant for the proposed MLGS predicted an ammonia concentration of 75 ppm at a distance of 375 feet from the MLGS ammonia tank. The applicant used the SCREEN3 model with worst-case assumptions (temperature 97 F, wind speed 1.5 m/sec, ammonia vapor pressure 359 mm Hg, derived emission rate 3.0 g/m²/sec).

Results of staff's analysis are presented in **Table 2**. Under Scenario 1, rupture of the western ammonia tank, the maximum off-site ammonia concentration is 134 ppm at approximately 169 feet from the tank, at the MLGS western fenceline. 75 ppm is modeled to occur at a distance of 235 feet from the tank. At the eastern boundary of the Gateway facility, the ammonia concentration is modeled to be approximately 2.1 ppm.

HAZARDOUS MATERIALS MANAGEMENT Table 3 **Derivation of Emission Rate.**

ALGORITHM

$$QR = \frac{(0.0035)(u^{0.78})(MW^{(2/3)})(A)(VP)}{(T)}$$

INPUT

Wind speed (u)	1.5	m/sec
Stability class	F	
Terrain	Rural	
Molecular weight (MW)	17	g/g-mole
Vapor pressure (VP)	190	mm Hg
Temperature	97	°F
Temperature (T1)	36	°C

VARIABLES

Diameter of drain	42	in
Area of drain in feet	9.62	ft ²
Area of drain in meters	0.89	m ²

EMISSIONS

QR	0.19	lb/min
QR	11.3	lb/hr
QR	1.4	g/sec
QR	1.6	g/m ² /sec

Aqueous ammonia vapor pressure obtained from EPA 1999; represents 20% aqueous ammonia, wind speed of 1.5 m/sec
EPA 2009. "Risk Management Program Guidance for Offsite Consequence Analysis." Office of Solid Waste and
Emergency Response. March. www.epa.gov/ceppo/

HAZARDOUS MATERIALS MANAGEMENT Table 4
Concentrations Determined at Discrete Distances Using HARP.

Rupture of the MLDS Aq. Ammonia Tank

Distance (feet)	Distance (meters)	Airborne Conc.	
		(µg/m ³)	(ppm)
169	52	9.32E+04	134
235	72	5.23E+04	75
2,554	779	1.47E+03	2.1

Max conc, at MLGS western fenceline inside MLGS property at approx. eastern boundary of Gateway facility

As can be seen from **HAZARDOUS MATERIALS MANAGEMENT Table 4**, staff's level of concern - 75 ppm - would be exceeded only at the western and northern fence lines which border an industrial open space of the Gaylord Corporation East Mill and the existing CCPP site, respectively. The only persons, therefore, who would be placed at risk during an accidental release of aqueous ammonia from the MLGS tanks would be workers at the Gaylord facility or a CCPP worker. However, as mentioned above, staff feels that this modeling is truly a "worse case" and that the release of aqueous ammonia from either of the two proposed storage tanks is extremely unlikely, even in an earthquake (see discussion above). It is important to note that no off-site public would be placed at a significant risk from a release of aqueous ammonia from either storage tank.

In the even more unlikely event of simultaneous rupture of the MLGS ammonia tank and rupture of one of the Gateway tanks, cumulative ammonia concentration could occur at the eastern boundary of the Gateway site, carried by predominant winds from the west. This cumulative concentration would be 2.1 ppm from MLGS plus 5.9 ppm from Gateway, for eight ppm at the eastern boundary of the Gateway site. This airborne concentration would barely have a noticeable odor as the odor threshold for most people is five ppm.

These accidental - or intentional - release scenarios are highly unlikely because the applicant will develop and implement a hazardous material storage and handling program for MLGS 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 and with the additional mitigation measures proposed by staff, 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 MLGS 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None received.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the MLGS 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 CCCEHS-HMP 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** and **HAZ-6**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-7** and **HAZ-8**.

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 Contra Costa County Health Services Department – Hazardous Materials Program (CCCHSD-HMP) and the CPM for review. After receiving comments from the CCCHSD-HMP 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 CCCHSD-HMP and the Contra Costa County Fire Protection District (CCCFPD) for information and to the CPM for approval.

Verification: At least thirty (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 CCCHSD-HMP and the CCCFPD 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 thirty (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% 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 sixty (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 thirty (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 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM (SR-4 to SR-160 to Wilbur Avenue to the project site). The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least sixty (60) days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval.

HAZ-7 Prior to commencing demolition, 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 thirty (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-8 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 100% of the perimeter fence of the entire Contra Costa Power Plant.

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 thirty (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.

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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

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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 MLGS

HAZARDOUS MATERIALS Appendix B
Hazardous Materials Proposed for Use at the MLGS*

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ^a
Aqueous Ammonia (NH ₄ OH – 29.4% weight)	1336-21-6	CO ₂ neutralization within steam power cycle	Physical: corrosive	400 gallons	1000 pounds
Acetylene	74-86-2	Welding gas	Health: toxic Physical: flammable	1,000 cubic feet	
Acrylic Acid-based Polymer	9003-04-7	Tricalcium phosphate and calcite dispersant	Health: irritant Physical: corrosive	180 gallons	
Antiscalant (Nalco Permatreat® PC-191)	Proprietary Mixture	RO system	Health: irritant Physical: corrosive	180 gallons	
Aqueous Ammonia 19% Solution	7664-41-7	NO _x emissions control	Health: irritation to permanent damage from inhalation, ingestion, and skin contact Physical: reactive, vapor is combustible	20,000 gallons	1000 pounds
Argon	7440-37-1	Instrument air	Health: toxic	500 cubic feet	
Carbon Dioxide	124-38-9	Instrument air	Health: toxic, asphyxiant	2,000 pounds	
Carbon Monoxide	630-08-0	Instrument air	Health: toxic	255 cubic feet	
Citric Acid (2% wt)	77-92-9 5949-29-1	Cleaning of RO membranes	Health: irritant Physical:	30 gallons	
Dibromo-nitrolo-propionamide (DBNPA)	10222-01-2	Primary non-oxidizing biocide for RO system	Physical: corrosive	100 gallons	
Dryer Desiccant (Silica Gel, SiO ₂ 99% wt.)	112926-00-8	Combustion turbine cleaning		1,000 pounds	
Helium and Nitrogen Mix	7440-59-7 7727-37-9	Instrument air	Health: toxic	To be determined	
Hydraulic Fluid	Mixture	Construction vehicles and equipment	Health: toxic, irritant Physical: flammable	250 gallons	
Hydraulic Oil (HB-1150 HY Guard)	8002-05-9	Rotating equipment	Health: toxic, irritant Physical: flammable	1,000 gallons	42 gallons
Hydrochloric Acid (38%)	7647-01-0	Microfiltration membrane cleaning	Health: toxic Physical: corrosive	400 gallons	5,000 pounds
Isothiazolone	None	Secondary non-oxidizing biocide		100 gallons	
Lube oil	8002-05-9		Toxic; flammable; irritant	18,000 gals	

Mineral Oil	8012-95-1	Transformers	Health: hazardous if ingested Physical: may be flammable/combustible	80,000 gallons	42 gallons
Motor Oil (CITGO SuperGard® SAE 30)	Proprietary Mixture	Construction vehicles and equipment	Physical: flammable	250 gallons	
Natural Gas	None	Fuel for power plant	Physical: flammable	As Needed	
Neutralizing Amine (Nalco® 365: Cyclohexylamine 30% wt; Morpholine 10% wt)	108-91-8 110-91-8	HRSG	Health: toxic Physical: flammable, corrosive	800 gallons	
Nitric Oxide	10102-43-9	Instrument air	Health: toxic	120 cubic feet	10 pounds
Nitrogen	7727-37-9	Turbine blanket	Health: toxic	6,000 gallons	
Nitrogen	7727-37-9	Instrument air	Health: toxic, asphyxiant	17,130 cubic feet	
Oxygen	7782-44-7	Instrument air, welding	Health: toxic Physical: flammable	2,000 cubic feet	
Oxygen Scavenger (Nalco ELIMIN-OX®)	497-18-7	HRSG	Health: irritant	800 gallons	
Paint (Ethylene Glycol)	107-21-1 (13463-67-7)	Touchup of painted surfaces	Health: toxic Physical: flammable	300 gallons	5,000 pounds
Polysilicate	None	Corrosion inhibitor for service water system		400 gallons	
Propane	74-98-6	Torch gas	Physical: flammable	500 pounds	
Propylene-glycol	57-55-6	Auxiliary cooling closed cooling water system	Health: irritant	60,000 gallons initial fill	
RO Membrane Cleaners (neat)	Proprietary Mixture	Detergent for RO system	Health: toxic, irritant Physical: corrosive	5 gallons	
Sodium Bisulfite (38%)	7631-90-5	Dechlorination (RO system)	Health: toxic	4,000 gallons	5,000 pounds
Sodium Hydroxide (50% wt)	1310-73-2	Conversion of CO ₂ in second-pass of RO to HCO ₃	Physical: corrosive	500 gallons	
Sodium Hydroxide (50% wt)	1310-73-2	Cleaning of RO membranes	Physical: corrosive	500 gallons	1,000 pounds
Sodium Hypochlorite (12.5% weight, trade)	7681-52-7	Cleaning of RO membranes	Physical: corrosive	~0.3 gallons Included in source water chemical storage	100 pounds
Sodium Hypochlorite (12.5% weight, trade)	7681-52-7	Biocide/biofilm control for service water system and raw	Physical: corrosive	240 gallons	100 pounds

		water tank			
Sodium Nitrate-Borax Formulation	Borax 133-43-4 (Anhydrous)	Closed cooling water corrosion inhibitor	Health: irritant	30 gallons	
Sulfur Hexafluoride/ USEPA Protocol Gases	2551-62-4	Switchyard breakers	Health: asphyxiant Physical: flammable	600 pounds	NA
Transmission Fluid	Mixture	Construction vehicles and equipment	Health: toxic, irritant Physical: flammable	250 gallons	
Tri-sodium Phosphate	10101-89-0	HRSG	Physical: corrosive	200 gallons	5,000 pounds
Turbine and Generator Lube Oil	8002-05-9	Rotating equipment	Health: toxic, irritant Physical: flammable	50,000 gallons	
Unleaded Gasoline	8006-61-9	Construction vehicles	Health: toxic, irritant, Target Organ (CNS) Physical: flammable	500 gallons	
Various Detergents	Various	Combustion turbine cleaning		1,000 pounds	

*Sources: Table 14-1 of Data Responses Set 1 (URS 2008c) and Revised Table 14-1 of the Amendment to the AFC (URS 2009b)
a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

LAND USE

Testimony of Negar Vahidi

SUMMARY OF CONCLUSIONS

Energy Commission staff concludes that the proposed Marsh Landing Generating Station (MLGS or “proposed project”), would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to State and local land use planning and would not generate a significant impact under the California Environmental Quality Act (CEQA) guidelines with respect to CEQA Appendix G issues, “Land Use and Planning” and “Agriculture Resources.” In addition, the MLGS would not be incompatible with existing on-site or nearby uses, as it is consistent with the general industrial character of these existing permitted uses, and the pattern of development of the project area.

INTRODUCTION

The land use analysis of the Marsh Landing Generating Station Application for Certification (AFC) focuses on the project’s consistency with land use plans, ordinances, regulations, and policies, and the project’s compatibility with existing and planned land uses. In general, a power plant and its related facilities could be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of noise, dust, public health, traffic, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. A power plant also may create a significant land use impact if it converts prime or unique farmland or farmland of statewide importance to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LAND USE Table 1 provides a general description of land use LORS applicable to the proposed project. The project’s consistency with these LORS is discussed in **LAND USE Table 4**. Currently, Contra Costa County is the only local agency with adopted land use LORS applicable to the proposed project. The proposed project is located within the city of Antioch’s Sphere-of-Influence (SOI) in an area of the county called the Eastern Waterfront Employment Area. Currently, the city is pursuing the annexation of 500 acres within the Eastern Waterfront Employment Area, which includes the MLGS site. Therefore, applicable land use LORS for both Contra Costa County and the city of Antioch are presented in **LAND USE Table 1**.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

<u>Applicable LORS</u>	<u>Description</u>
Federal	None
State	
<u>Subdivision Map</u>	This section of the California Public Resources Code provides

<u>Applicable LORS</u>	<u>Description</u>
<u>Act (Public Resources Code Section 66410-66499.58)</u>	procedures and requirements regulating land division (subdivisions) and parcel legality. Regulation and control of the design and improvement of subdivisions have been vested in the legislative bodies of local agencies.
Local	
<u>Contra Costa County General Plan 2005 – 2020 (Contra Costa Co. 2005)</u>	Contra Costa County's General Plan expresses the broad goals and policies, and specific implementation measures, which guide decisions on future growth, development, and the conservation of resources in the county. The General Plan contains a variety of policies in nine elements: Land Use, Growth Management, Transportation and Circulation, Housing, Public Facilities/Services, Conservation, Open Space, Safety, and Noise. Contra Costa County's General Plan (adopted in 2005) governs growth and development within the county through 2020.
<u>Contra Costa County Zoning Ordinance (Contra Costa Co. 2008)</u>	The Contra Costa County zoning ordinance (Title 8 of the Contra Costa County Code) establishes zoning districts and contains regulations governing the use of land and improvement of real property within zoning districts. The Contra Costa Zoning Ordinance supports the implementation of the General Plan, and specifies what uses are permitted, conditionally permitted, or prohibited within each zone.
<u>City of Antioch General Plan¹ (COA 2003)</u>	The City of Antioch's General Plan contains policies pertaining to growth management, land use, community image and design, economic development, circulation, public services and facilities, housing, resource management and environmental hazards. Many of the policies are aimed at balancing housing and employment growth and enhancing the visual character and image of the community, anticipating significant future growth. The MLGS site is in the City of Antioch's Sphere of Influence in areas designated for future employment growth.
<u>City of Antioch Zoning Ordinance (COA 2008)</u>	The city's zoning ordinance is part of the municipal code and implements the policies of the general plan. Title 9 of the city's municipal code is related to planning and zoning. The city of Antioch has not pre-zoned the MLGS.

SETTING

PROPOSED PROJECT

For a detailed description of the proposed project components and associated facilities, see the **Project Description** section. The environmental setting for the proposed project as it relates to land use is described below.

¹ The MLGS site currently is not within the jurisdiction of the City of Antioch. Annexation of the site and surrounding area to the City of Antioch is expected (URS 2008b) sometime in 2010.

Power Plant Site

The proposed MLGS site is within the boundaries of the existing Contra Costa Power Plant (CCPP) property. The CCPP is located at 3201 Wilbur Avenue in unincorporated Contra Costa County, California, approximately 1/10 mile from the current city of Antioch jurisdictional boundary; however, the city intends to annex the project site and adjacent land (URS 2008b) sometime in 2010 (COA 2009).

The MLGS would be situated on a parcel of approximately 27 acres that would be created by a subdivision of the existing single parcel [APN 051-031-014] that contains the CCPP site. When completed, the MLGS would occupy approximately 27 acres on the western portion of the CCPP property, generally within the footprint of the area occupied by five fuel oil tanks and an area to the east of the tanks. These five fuel oil tanks are no longer used to support CCPP plant operations and are slated for demolition. The MLGS site parcel would be purchased by Mirant Marsh Landing, LLC (Mirant Marsh Landing) from Mirant Delta, LLC (Mirant Delta).

The MLGS property is bordered on the east and south by the CCPP and the PG&E switchyard, on the west by a vacant industrial property, and on the north by the San Joaquin River. The Burlington Northern Santa Fe (BNSF) railroad right-of-way (ROW) runs in an east-west direction just south of the MLGS site and south of Wilbur Avenue.

The currently operating generating units at the CCPP (Units 6 and 7) have been in operation since 1964. Existing onsite land uses at the CCPP site include the five fuel oil tanks (Units 1 through 5) that are no longer used to support CCPP plant operations, and their various associated facilities (e.g., exhaust stacks, storage tanks, warehouse and office buildings, etc.).

Permanent access to both the CCPP and MLGS would be from Wilbur Avenue, using the CCPP's existing two entrances.

Approximately 14 acres within the CCPP property (but outside of the MLGS property) would be used for construction laydown, offices, and parking. No offsite construction worker parking or construction equipment/material laydown would be required for the construction of the MLGS. Primary access to the project site during construction would be from State Route (SR) 4 and SR 160 via Wilbur Avenue. Existing entrances and access roads within the CCPP would be used.

Other Project-Related Features and Facilities

The MLGS-related linear facilities would include potable and makeup water lines, a wastewater discharge line, and a natural gas line. These linear facilities and other features/facilities that would be developed as part of the proposed project are listed below.

- There would be approximately four 165-foot-tall stacks for exhaust discharge;
- A water treatment system building and associated water storage tanks would be developed;
- A control building would be built for housing the MLGS plant distributed control systems and electrical equipment, and that would be a warehouse for storage of equipment;

- Natural gas would be provided to the MLGS via a new 12-inch-diameter gas line to the existing PG&E's natural gas transmission line, located approximately 2,100 feet east of the MLGS metering station located within the CCPP site;
- Electric transmission interconnection would be via a single-circuit 230-kilovolt (kV) transmission line from the new MLGS generators to PG&E's adjacent switchyard located within the CCPP site;
- An underground fire loop would be fed from the existing on-site CCPP fire system;
- A well system with two wells (10X10-foot pad for each well) providing the proposed project's process water supply (brackish groundwater) would be located in the southern portion of the CCPP site, north of Wilbur Avenue and near the western entrance road to the CCPP (URS 2009b);
- A new 6-inch-diameter, 2,200-foot-long pipeline would be constructed within the existing CCPP access road right-of-way from the two wells to the MLGS Raw Water Storage Tank (URS 2009b);
- A 6-inch-diameter, 3,000-foot-long wastewater pipeline would connect the MLGS Wastewater Storage Tank to the city of Antioch's main sewer line just east of the CCPP main access road (URS 2009b). Approximately 500 feet of the pipeline would be constructed and installed within the existing rights-of-way along Wilbur Avenue; and
- The proposed project would connect to an existing potable water pipeline that runs north-south through the CCPP property (URS 2008a).

Agricultural Land

The Farm Land Mapping and Monitoring Program (FMMP) of the California Department of Conservation (DOC) provides statistics on conversion of farmland to non-agricultural uses for Contra Costa County where the MLGS is located. According to the FMMP "Important Farmlands" maps dated 2006, the proposed project site and all associated facilities are located on land designated as "Urban and Built-up Land"² (URS 2008b).

There are lands designated as Prime, Unique, and of Local Importance within the one-mile buffer of the MLGS site (see AFC Figure 7.4-6). These lands are located predominantly south of Wilbur Avenue. Portions of the proposed wastewater pipeline along Wilbur Avenue would traverse adjacent to the north of two parcels of important farmlands; a 16-acre parcel designated as Unique Farmland and a 174-acre parcel designated as Farmland of Local Importance (see AFC Figure 7.4-6). However, this pipeline would be constructed within an already disturbed existing right-of-way along Wilbur Avenue (URS 2009b).

The proposed project and related facilities are not subject to an Agricultural Land Conservation (Williamson Act) contract. In addition, the proposed project and related facilities are located on land that is considered nonagricultural land by the DOC.

² Urban and Built-up Land is defined by the DOC as: "land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes."

SURROUNDING AREA

The MLGS site is surrounded by the San Joaquin River to the north and industrial uses to the south, east and west. PG&E's Gateway Generating Station (GGS) is located immediately east of the CCPP. The nearest residential neighborhood is approximately 2,000 feet southwest of the site boundary.

The land in the general vicinity of the project site contains a mix of industrial and commercial uses, undeveloped land, open space, and agricultural, recreational and residential uses. Several vacant or undeveloped parcels are in the project vicinity.

The Burlington Northern Santa Fe (BNSF) railroad runs in an east-west direction just south of the MLGS site. State Route (SR) 4 and SR 160 are located to the south and east, respectively.

Areas south and west of the MLGS project site (closer to the city of Antioch center) have new and growing residential developments. In addition, several residences in the vicinity are co-located with commercial and industrial areas. Along Neroly Road, south of 18th Street, several residences are mixed with small businesses (e.g., auto repair). To the east of PG&E's GGS are three residences that are considered caretakers residences associated with the marinas of the Sportsmen Yacht Club. Figure 7.4-3 in the AFC illustrates the existing land uses in the area surrounding the MLGS site.

In addition to the land uses described above, several recreational, religious, educational, and natural resource protection areas are within one mile of the MLGS site as follows:

- Oak View Memorial Cemetery (2500 E. 18th Street);
- Holy Cross Cemetery (2200 E. 18th Street);
- Cornerstone Christian Center (1745 E. 18th Street);
- Live Oak Community Christian Church (5471 Live Oak Ave);
- BridgeWay Church and Christian Center School (3415 Oakley Road);
- Antioch Youth Sports Complex (1037 Apollo Court);
- Antioch Regional Shoreline Park (Bridgehead Road and Highway 160);
- Almondridge Park (Almondridge Drive and Beechnut Street); and
- Antioch Dunes National Wildlife Refuge (Wilbur Avenue).

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

The general plan land use and zoning designations of the proposed power plant site are illustrated on AFC Figures 7.4-5 (Designated Future Land Uses) and 7.4-4 (Zoning Designations), respectively. In addition, these figures illustrate the land use and zoning designations of lands within the one-mile buffer of the proposed power plant site. The land use and zoning designations of the areas surrounding the proposed project do not directly apply to the proposed project, but are presented to help illustrate the affected local agencies' existing and planned pattern of land use development in the project area.

The MLGS project site is currently in unincorporated Contra Costa County and the county's General Plan designates the majority of the site as Heavy Industrial (HI) and a narrow strip of land along the river as Open Space (OS). The Heavy Industrial classification is generally consistent with existing land uses at the MLGS site and allows for activities requiring large areas of land with convenient truck and rail access. These uses are typically not compatible with residential uses because their operations may be characterized by noise or other conditions requiring spatial separation. Uses may include metalworking, chemical or petroleum product processing and refining, heavy equipment operation and similar activities (Contra Costa Co. 2005). The county Open Space designation includes lands such as wetlands that are significant ecological resources or geologic hazards that are not otherwise designated in the General Plan as public space or similar. According to the General Plan, the most appropriate uses in Open Space areas involve resource management. Currently, this designation applies to a portion of the existing CCPP site that includes developed areas (e.g., the administration building) and would also apply to a small northwest portion of the proposed MLGS site where several of the existing CCPP fuel storage tanks are located.

The entire MLGS site is currently zoned as Heavy Industrial (HI) by Contra Costa County. According to the Contra Costa Zoning Ordinance the Heavy Industrial district is intended to support "heavy industrial manufacturing uses of all kinds, including, but not limited to, the manufacturing or processing of petroleum, lumber, steel, chemicals, explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products shall be permitted in the H-I district" (Contra Costa Co. 2008). There are no lot area, height, or side yard regulations or limitations in the Heavy Industrial zoning district (Contra Costa Co. 2008).

The City of Antioch's General Plan also addresses the MLGS project site. The site is designated as General Industrial and is included in the Eastern Waterfront Employment Focus Area (see AFC Figure 7.4-2). According to the General Plan, areas designated as General Industrial are intended for a range of industrial businesses, including uses, which, for reasons of potential environmental effects are best segregated from other, more sensitive, land uses, such as residential neighborhoods (COA 2003). Primary processing industries involving the mechanical or chemical transformation of raw materials or the blending of materials such as lubricating oils, plastics, and resins; and treatment and fabrication operations would generally be appropriate only within this designation. Industrial uses that may require massive structures outside of buildings, such as cranes or conveyer systems, or open air storage of large quantities of raw or semi-refined materials are also limited to this land use designation.

The city of Antioch has not pre-zoned the MLGS site (URS 2008a). The city of Antioch has indicated in discussions with the applicant that the zoning of the site would be consistent with the MLGS development plans. In addition, the City of Antioch is pursuing the Heavy Industrial (M-2) zoning designation for the MLGS site through pre-zoning as part of the annexation process (COA 2009). As indicated by the city of Antioch and documented in the Local Agency Formation Commission's (LAFCO) Delta Diablo Sanitation District (DDSD) Sphere-of-Influence Expansion Staff Report dated August 13, 2008, the zoning of the site would be M-2, Heavy Industrial (URS 2008b). The standards for Heavy Industrial include the M-2 Heavy Industrial District. This district allows heavy industrial uses which may generate adverse impacts on health or safety. This zone applies primarily to existing heavy industrial uses. The district is consistent

with the General and Rail-Served Industrial General Plan Designations. Uses include production of and extraction of metals or chemical products from raw materials, steel works and finishing mills, chemical or fertilizer plants, petroleum and gas refiners, paper mills, lumber mills, asphalt, concrete and hot mix batch plants, power generation plants, glassworks, textile mills, concrete products manufacturing and similar uses (COA 2008).

The off-site portions of the wastewater pipeline traverses existing rights-of-way within county lands designated and zoned for heavy industrial uses (see AFC Figures 7.4-4 and 7.4-5).

AFC LAND USE Tables 7.4-2 and 7.4-3 describe the general plan and zoning designations within a one-mile radius of the proposed MLGS site. AFC Land Use FIGURES 7.4-4 and 7.4-5 illustrate these designations.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and has acquired information from other sources, including local jurisdiction planning documents, to determine consistency of the proposed project with applicable land use LORS and the proposed project's potential to have significant adverse land use-related impacts.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the proposed project results in:

- Conversion of Farmland
 - Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
 - Conflict with existing zoning for agricultural use or a Williamson Act contract.
 - Other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physical disruption or division of an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, redevelopment plan, or zoning ordinance.
- 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.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, 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. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts and recommended mitigation and conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

According to the FMMP, the proposed project, including its associated linear facilities, are all located on lands designated as “Urban and Built-Up Land.” In addition, none of the lands affected by the proposed project are zoned for agricultural uses. Given the FMMP designations for lands affected by the proposed project, the MLGS would not convert any Farmland (i.e., with FMMP designations of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) to non-agricultural use. Neither the construction nor operational activities of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use. In addition, the project site is not located in an area that is under a Williamson Act contract. Therefore, the proposed project would not result in the conversion of Farmland to non-agricultural use, or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion.

Physical Disruption or Division of an Existing Community

The proposed MLGS and the majority of its related features/facilities would be located within the boundaries of an existing power plant that has been in its current location since the early 1950s. The proposed power plant and all associated facilities would be located on lands designated and zoned for industrial uses. The power plant would be located entirely on private property, on existing parcels that contain uses and facilities related to the activities at the existing CCPP. Access to the proposed project (including the construction laydown/worker parking area) would be through existing rights-of-way, including Wilbur Avenue, and roadways internal to the CCPP. The offsite portions of the proposed wastewater pipeline would be constructed within an already disturbed existing right-of-way along Wilbur Avenue for approximately 500 feet. Construction of this pipeline would require trenching within or along Wilbur Avenue, and could potentially require alternating partial closure of the traveled roadway during trenching work (URS 2008a). Therefore, no existing roadways or pathways would be completely blocked or removed from service due to the proposed MLGS. According to the applicant, if any roadway closures are required during construction, the closures would be scheduled in accordance with county and city requirements. For a discussion of impacts to traffic access, please refer to the **Traffic and Transportation** section.

The proposed project would not disrupt or divide an established community, nor would it conflict with the established industrial and power generation-related uses located immediately adjacent to it at the CCPP. The proposed project primarily involves the development of energy infrastructure in an area designated for industrial development. Therefore, no significant impacts associated with disruption or division of an established community would occur as a result of the proposed project.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

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). This includes all applicable federal, state, and local laws, ordinances, regulations, and standards. From a CEQA perspective, the analysis places particular emphasis on any environmental effect that may be avoided or mitigated by conformity with the applicable LORS.

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 section 25523[d][1]). The Energy Commission must either find that a project conforms to all applicable LORS 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 section 25525).

The development of the MLGS project is consistent with the overall goals and policies of the Contra Costa General Plan. The project would site new industrial growth within an existing industrial area that is planned for future industrial growth. The MLGS would conform to Contra Costa County's Growth Management Program by siting development within the Urban Limit Line, avoiding conversion of agricultural and open space and by locating in close proximity to existing infrastructure. The majority of the MLGS site is designated for Heavy Industry uses in the county's General Plan. Energy production facilities are consistent with this designation. A small portion of the MLGS site along the San Joaquin River is designated as Open Space in the county General Plan. However, this land was developed with fuel oil storage tanks in 1952, prior to the county's designation as Open Space. While the development of industrial facilities technically is not consistent with an open space designation, the entire site is zoned for Heavy Industrial development and consists of existing heavy industrial facilities (i.e., the CCPP and associated facilities). The industrial structures associated with the proposed MLGS would simply replace those existing industrial structures. The county General Plan Open Space policies also appear to be inconsistent with other policies in both the Contra Costa County and City of Antioch General Plans that support and encourage heavy industrial development in this area. The MLGS would be redeveloping existing areas developed with heavy industrial uses consistent with the goals of the county General Plan. In determining consistency with the General Plan, the county considers all of the applicable goals and policies of the plan and determines whether the project is consistent with the intent and vision set forth in the plan (Roch 2008).

The City of Antioch's General Plan also contains goals, policies and implementation measures to guide future growth. The city's General Plan policies are aimed at balancing housing and employment growth and enhancing the visual character and image of the community, anticipating significant future growth. The MLGS site is in the City of Antioch's Sphere-of-Influence in areas designated for future employment growth. The General Plan designates the MLGS site for General industry. Development of

energy production facilities is consistent with this designation and is consistent with the goals and policies of the General Plan. The city of Antioch has expressed support for the project and has indicated that the future zoning of the site (subsequent to annexation) would be M-2 (Heavy Industrial) consistent with what is proposed (URS 2008a; URS 2008b; COA 2009).

LAND USE Table 4 provides the consistency of the proposed MLGS with the specific applicable land use LORS adopted by State and local agencies, as identified in **LAND USE Table 1**. Staff has determined that the proposed project would comply with applicable land use LORS.

LAND USE Table 4
Project Compliance with Applicable Federal, State, and Local Land Use LORS

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Federal	None		
State			
Subdivision Map Act (Pub. Resources Code Section 66410-66499.58)	The Subdivision Map Act provides procedures and requirements regulating land divisions and the determination of parcel legality. Regulation and control of the design and improvement of subdivisions by the Map Act have been vested in the legislative bodies of local government. Section 66412.1 of the Subdivision Map Act exempts a project from state subdivision requirements provided that the project demonstrates compliance with local ordinances regulating design and improvements.	YES	According to the applicant (URS 2010), the MLGS site, excluding linear facilities but including the construction laydown areas, is proposed to be located on a portion of what is now a single existing legal parcel [APN 051-031-014] in Contra Costa County. That single parcel is currently owned by Mirant Delta, LLC (Mirant Delta) and is also the site of the existing Contra Costa Power Plant (CCPP). Mirant Delta has initiated the county subdivision process to divide the single existing parcel into two new parcels, one of which will comprise the site of the MLGS. Creating a new separate parcel would facilitate conveyance of the MLGS site from Mirant Delta to Mirant Marsh Landing, LLC. (Mirant Marsh Landing or the applicant). At the time of the AFC filing, Mirant Delta planned to wait for the city of Antioch to annex the existing CCPP site and to pursue subdivision through the city subdivision process. The city of Antioch is proceeding with annexation of the project site (URS 2008b; COA 2009) and expects to complete the process sometime in 2010. However, because the city annexation remains in progress and is not yet complete, Mirant Delta has initiated the subdivision process with the county to facilitate conveyance of the MLGS site to Mirant Marsh Landing. The county requires applicants seeking a subdivision that affects four or fewer parcels to file a tentative minor subdivision map and, upon approval of the tentative minor subdivision map by the county's Zoning Administrator, a parcel map. Within 30 days following receipt of an application for a minor subdivision, the County Department of Conservation and Development, Community Development Division (Department) must determine whether the application is complete. Applications for minor subdivisions are reviewed by a minor subdivision

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			committee, which prepares a report and recommendations on the application for submittal to the Zoning Administrator. The Zoning Administrator must hear the application within 50 working days after the original filing with the Department and render a decision within 15 calendar days after the hearing, unless the parties agree to extend those time limits. Once the tentative map is approved, the applicant applies for a parcel map which is reviewed by the county Public Works Department. If the map is satisfactory, it is presented to the county Board of Supervisors for approval within 10 days. The map can then be recorded, which effectuates the subdivision. Mirant Delta filed its application for a minor subdivision with the County in November 2009 and provided additional information to the county in early March 2010. Based on the County process outlined above, it is currently anticipated that the subdivision would be approved in early to mid summer 2010. If, however, the subdivision cannot be completed by the time that Mirant Marsh Landing needs to acquire the project site for financing purposes, then a lease arrangement may be put in place to ensure that Mirant Marsh Landing has adequate site control to commence construction of the proposed MLGS. Therefore, the MLGS would either be located on a new 27-acre parcel that is created through the subdivision, or on a 27-acre portion of the existing legal parcel that would be leased to Mirant Marsh Landing. Given this information, the proposed project would be in compliance with the Subdivision Map Act.
Local			
<u>Contra Costa County General Plan 2005 – 2020:</u> <u>Chapter 3 - Land Use Element</u> <u>(Contra Costa Co. 2005)</u>	<u>Countywide – Growth Management, 65/35 Land Plan, and Urban Limit Line</u> Policy 3-8: Infilling of already developed areas shall be encouraged. Proposals that would prematurely extend development into areas lacking requisite services, facilities and	YES	Contra Costa County's General Plan (adopted in 2005) governs growth and development within the county through 2020. Voter initiatives in Contra Costa County established two growth management programs that work together to guide development in the cities and unincorporated areas of the county: the Urban Limit Line and 65/35 Land Preservation Standard. The Urban Limit Line designates areas for future urban development and the 65/35 Land

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	infrastructure shall be opposed. In accommodating new development, preference shall generally be given to vacant or under-used sites within urbanized areas, which have necessary utilities installed with available remaining capacity, before undeveloped suburban lands are utilized. <u>Community Identity and Urban Design</u> Policy 3-20: Where new electrical transmission lines are proposed, they should be developed parallel to existing transmission lines to the extent feasible. Mitigation of the environmental impact of building these facilities should be in close proximity to the area of impact.	YES	Preservation Standard states that 65 percent of the county must remain nonurban. The MLGS would be developed on an existing power plant site within the Urban Limit Line. The area has been industrially developed for more than 50 years; therefore, new industrial development is compatible with the nature of the surrounding area. In addition, the MLGS would be located in an area (i.e., the existing CCPP) that would accommodate infrastructure connections. The proposed project is consistent with Policy 3-8. New transmission lines associated with the proposed project would be built on the MLGS site and would connect directly to the adjacent PG&E switchyard after crossing a narrow section of the CCPP site. In addition, the proposed transmission line would be developed in an area with existing heavy industrial and energy-related infrastructure. Therefore, MLGS is consistent with the intent of Policy 3-20.
	<u>Business and Employment Uses:</u> Policy 3-42: Industrial development shall be concentrated in select locations adjacent to existing major transportation corridors and facilities. Policy 3-43: Industrial employment centers shall be designed to be unobtrusive and harmonious with adjacent areas and development.		As discussed above, the MLGS would be developed on an existing power plant site within the Urban Limit Line. The area has been industrially developed for more than 50 years; therefore, new industrial development is compatible with the nature of the surrounding area. The site is near infrastructure (i.e., water and electric and gas transmission lines), and major transportation corridors (State Route [SR] 4 and SR 160) as well as the Burlington Northern Santa Fe [BNSF] railroad. The proposed project is consistent with Policies 3-42 and 3-43, because it is located adjacent to major transportation corridors and is harmonious with the existing surrounding industry adjacent to the proposed MLGS.
<u>Contra Costa Code, Title 8 (Zoning) - Chapter 84-62: H-I, Heavy Industrial District</u>	<u>Article 84-62.4. Uses:</u> <i>84-62.402 Uses--Permitted.</i> Heavy industrial manufacturing uses of all kinds, including, but not limited to, the manufacturing or processing of	YES	The MLGS is a power plant proposed to be sited on the site of an existing power plant (i.e., the CCPP). The MLGS would develop an existing industrial site in proximity to other industrial development, much of which has been in the area since the early 1950s.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
(Contra Costa Co. 2008)	petroleum, lumber, steel, chemicals, explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products shall be permitted in the H-I district. (Ord. 1459: prior code § 8164(b): Ord. 1046: Ord. 382). <i>84-62.404 Uses--Requiring land use permit.</i> Uses requiring land use permit in the H-I district shall be the same as the uses designated in Section 84-58.404 for the L-I district.³ (Ord. 67-39 § 5, 1967: Ord. 1459: prior code § 8164(a): Ords. 1046, 382). <i>Article 84-62.6. Lot, Height, Yard 84-62.602 Lot, height, yard--Regulations.</i> There are no lot area, height, or side yard regulations or limitations in the H-I district. (Ord. 1459: prior code § 8164(c): Ord. 1046: Ord. 382).		The proposed MLGS would be consistent with the heavy industrial land use types allowed in the county H-I (Heavy Industrial) District. Note that the MLGS site is in the City of Antioch's Sphere-of-Influence (SOI) and is slated to be annexed to the city in the sometime in 2010. Although the city of Antioch has not pre-zoned the MLGS site, they have indicated that the zoning of the site would be M-2 (Heavy Industrial). This zoning designation also would be consistent with the county's H-I zoning for the site.
<u>City of Antioch General Plan⁴ (COA 2003):</u>	<u>4.3.2 Community Structure Policies.</u> <i>Policy b:</i> Give priority to new development utilizing existing and financially committed infrastructure systems over development needing financing and construction of new infrastructure systems. <i>Policy d:</i> Concentrate large-scale industrial uses along the waterfront east of Rodgers Point and within areas designated for industrial use along	YES	Consistent with Policy b, the MLGS would redevelop a portion of an existing industrial site within an industrial area. This redevelopment takes advantage of existing and nearby infrastructure (i.e., water and electric and gas transmission lines, major transportation corridors, rail facilities). In addition, consistent with Policy d, the MLGS would expand the existing heavy industrial development along Wilbur Road, providing additional employment. Therefore, the proposed project is consistent with the city's applicable Community Structure Policies.

³ *84-58.404 Uses--Requiring land use permit [...in Light Industrial District].* All of the uses in the following districts are permitted after the granting of land use permits: Single family residential districts, multiple family residential districts, retail business districts, neighborhood business districts, general commercial districts, agricultural districts and forestry recreation districts. (Ord. 67-39 § 4, 1967: prior code § 8163(a): Ord. 1046: Ord. 1006: Ord. 382).

⁴ The MLGS site currently is not within the jurisdiction of the City of Antioch. Annexation of the site and surrounding area to the City of Antioch is expected (URS 2008b) sometime in 2010.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	existing rail lines. Limit employment-generating uses adjacent to residential areas and within mixed-use planned communities to business parks and office uses. <u>4.4.4.2 Employment-Generating Land Use Policies.</u> <i>Policy d:</i> Ensure appropriate separation and buffering of manufacturing and industrial uses from residential land uses.	YES	No residential developments are adjacent to the MLGS site. The nearest residential neighborhood is approximately 2,000 feet to the southwest of the project site boundary. As discussed above under the section entitled Setting, additional residences are to the east of the project site and are nonconforming “caretaker” residences sited in industrial zones. The proposed MLGS site is separated from nearby residences by existing intervening heavy industrial uses associated with the CCPP, and the PG&E GGS and switchyard. Therefore, project development would be consistent with Policy d.
	<u>4.4.6.3 Eastern Waterfront Employment Area.</u> <i>Policy I:</i> As a condition of new development or redevelopment of properties along the San Joaquin River between Rodgers Point and the existing marina at the SR 160 freeway, require dedication and improvement of a riverfront trail and linear park.	Not Applicable	The project site falls between Rodgers Point and SR 160. The existing CCPP site has facilities along the shoreline of the San Joaquin River, including cooling water intake structures, outfall channels and water treatment facilities. The MLGS site would abut the stormwater outfall channel of the existing CCPP along the San Joaquin River. Due to the existing infrastructure along the shoreline and the proximity to existing and proposed power plant facilities, dedication of a riverfront trail or linear park would pose a public safety and security risk. Therefore, dedication of a riverfront trail and linear park would not be a compatible use with the existing and proposed heavy industrial uses, and the planned pattern of development for industrial use in the area. It should be noted that the proposed project site is currently within the jurisdiction of Contra Costa County, and that the city of Antioch's LORS do not yet legally apply to the project site. So, although the MLGS site is within the city's SOI, as part of annexation of the site, the city would have to

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
<u>City of Antioch Municipal Code, Title 9: Planning and Zoning⁵ (COA 2008)</u> <u>Chapter 5 – Zoning:</u> <u>Article 38, Land Use Regulations</u> <u>Article 3 § 9-5.30</u>	<u>(K) M-2 (Heavy Industrial District).</u> This district allows heavy industrial uses which may generate adverse impacts on health or safety. This zone applies primarily to existing heavy industrial uses. The district is consistent with the General and Rail-Served Industrial General Plan Designations. Uses include production of and extraction of metals or chemical products from raw materials, steel works and finishing mills, chemical or fertilizer plants, petroleum and gas refiners, paper mills, lumber mills, asphalt, concrete and hot mix batch plants, power generation plants, glassworks, textile mills, concrete products manufacturing and similar uses.	YES	consider the applicability of this policy to an area already developed with heavy industrial uses along the San Joaquin River. Given that the city has indicated that their zoning of the site would be M-2 (Heavy Industrial) (COA 2009) once the MLGS site is annexed, it is likely that Policy I would not apply to the MLGS site and that the city considers a power plant to be appropriately located at the proposed site. The proposed MLGS site is currently not within the jurisdiction of the city of Antioch. However, the site does lie within the city's SOI, and the city has indicated that the area would be annexed to the city sometime in 2010. Although the MLGS site has not been pre-zoned, the city has indicated that the zoning of the site (once annexed) would be M-2 (Heavy Industrial) (COA 2009). By siting the MLGS and the majority of its associated infrastructure in an area with existing heavy industrial uses, the development of the proposed project at the CCPP site would be consistent with the intent of the M-2 Heavy Industrial District. The M-2 zoning designation also is consistent with the existing Contra Costa County Heavy Industrial zoning for the MLGS site. Therefore, the heavy industrial zoning designations by both jurisdictions indicate that the proposed project is appropriately sited, and consistent with the pattern of development for the area.

⁵ The City of Antioch zoning designations currently do not legally apply to the MLGS, because the proposed project site is within the jurisdiction of Contra Costa County until annexation of the site to the City of Antioch (expected sometime in 2010). The City of Antioch has not pre-zoned the MLGS site (URS 2008b).

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. Administrative or conditional use permitting requirements (see discussion in **LAND USE Table 4**) and project reviews under CEQA are in place to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses. As noted in the discussions above under the section entitled **Physical Disruption or Division of an Established Community** and in **LAND USE Table 4**, development of the proposed project and its associated features/facilities are compatible with existing surrounding land uses, because the proposed project site and construction laydown area are located entirely within an existing power plant site (i.e., the CCPP), which has been in operation since the early 1950s. Land uses at the existing CCPP site are industrial in nature and are dominated by utility and energy infrastructure uses as described above under the section entitled **SETTING**. In addition, the proposed 27-acre MLGS site is located near major transportation corridors (i.e., SR 4, SR 160, and the BNSF railroad). The proposed MLGS represents redevelopment with updated power plant infrastructure at the existing CCPP. The proposed MLGS is consistent with applicable LORS, such as existing (i.e., Contra Costa County) and expected (i.e., City of Antioch) General Plan Land Use and Zoning designations for the proposed project site and the immediately surrounding exiting land uses (i.e., uses within the CCPP). Therefore, the proposed project would not result in any physical land use incompatibilities with existing surrounding land uses.

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close 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, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close 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 (CCR 2006; CCR 2008). Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

The area immediately surrounding the proposed project includes uses associated with the existing Contra Costa Power Plant and is primarily dominated by heavy industrial uses and public utilities. There are sensitive receptors (such as recreational facilities, schools, churches, etc) within a one-mile buffer of the proposed MLGS. However, none of these sensitive receptors are in close proximity of the proposed project site. The caretakers residence at the Sportsmen Yacht Club is approximately 1,500 feet to the east of the MLGS site, and the nearest residential neighborhood is approximately 2,000 feet southwest of the site boundary, south of Wilbur Avenue. However, the MLGS would

be sited approximately 1,000 feet north of Wilbur Avenue, with the proposed project site separated from the public road by an intervening industrial parcel (associated with the CCPP) that would serve as a buffer between publicly accessible areas and the MLGS project.

Given the existing permitted uses surrounding the proposed project, and the fact that the proposed project and its associated features/facilities are consistent with local LORS (which are developed by local jurisdictions to mitigate impacts of planned development), the proposed project is not considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors.

The **Air Quality, Hazardous Materials Management, Noise, Public Health, Traffic and Transportation**, and **Visual Resources** sections provide detailed analyses of the project-related nuisance impacts such as any adverse construction-generated noise, dust, and traffic; and operation-related public health, visual, and traffic impacts. These other sections of the Staff Assessment discuss any potential adverse nuisance impacts on sensitive receptors as applicable to the respective resource area being analyzed.

CUMULATIVE IMPACTS AND MITIGATION

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 2006, §15065[A][3]).

Areas south and west of the MLGS site (closer to the city of Antioch center) have new and growing residential developments. In the city of Oakley, north of Main Street and east of Bridgehead Road, an area currently in agricultural use is planned for future commercial development. The River Oaks Crossing Specific Plan EIR has been drafted but not officially adopted. In addition, in the city of Antioch, an area just east of Phillips Lane has been cleared and is planned for future residential development. These future uses are also shown on AFC Figure 7.4-3.

In addition, as noted in detail in Table 7.4-4 of AFC Section 7.4 (Land Use), there are several planned and approved projects in the area surrounding the MLGS site. Although their applications have been approved, construction has not started on most of these proposed projects. Cumulative projects listed that have been approved by the planning agency responsible for their jurisdiction have, by nature of their approval, complied with the land use plans, policies and regulations applicable to the project. Projects listed that have not been approved have the potential to conflict with applicable plans, policies, and regulations. However, in order for these projects to be approved, they would need to conduct an analysis of conformance with these plans, policies, and regulations.

The area in the immediate vicinity of the proposed MLGS site is essentially dominated by similar industrial and utility development. The proposed MLGS would represent a similar land use type to adjacent uses. The proposed project would not require a General Plan amendment, zoning amendment, or other changes or concessions that

would alter the development standards, availability of permits, or use of the project site or surrounding properties.

The proposed project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the growing population in the project area by connecting to the existing electric system and other utility infrastructure. The land use effects of the proposed project in combination with past, present, and reasonably foreseeable projects in the area would not be cumulatively considerable. Therefore, cumulative land use impacts of the proposed MLGS would be less than significant.

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would not result in conversion of any Farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts.
- The proposed project would not disrupt or divide the physical arrangement of an established community.
- The proposed project is consistent with the applicable existing Contra Costa County Land Use LORS and city of Antioch Land Use LORS anticipated to apply to the proposed project upon the MLGS site's annexation to the city. Please see **LAND USE Table 4**.
- The proposed project would not be incompatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses.
- The proposed project's cumulative land use impacts would be less than significant.

PROPOSED CONDITION OF CERTIFICATION

The land use impacts of the proposed project are less than significant, and therefore do not require any specific land use conditions to help mitigate project impacts. Therefore, no conditions of certification are proposed.

REFERENCES

- CCR 2006. California Code of Regulations, Title 14, Chapter 3 (CEQA Guidelines), §§15000-15387, as amended July 11, 2006.
- CCR 2008. California Code of Regulations, Health & Safety Code, §§42301.6-42301.9. Site accessed at: <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=42001-43000&file=42300-42316>. February 7, 2008.
- COA 2003. City of Antioch General Plan. November 23, 2003.
- COA 2008. City of Antioch, Municipal Code, Title 9: Planning and Zoning. Current through Ord. 2016-C-S, passed 6-10-08.

COA, 2009. Letter from COA Community Development to CEC. November 30.

Contra Costa Co. 2005. Contra Costa County General Plan 2005 – 2020. Chapter 3, Land Use Element, Subsection 3.7 (Land Use Designations) and 3.8 (Land Use Goals, Policies, and Implementation Measures), Policies. January 2005.

Contra Costa Co. 2008. Contra Costa County Code, Title 8 (Zoning). Current through Ordinance 2008-29, passed November 4, 2008

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NOISE AND VIBRATION

Testimony of: Erin Bright

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Marsh Landing Generating Station (Marsh Landing) can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on people within the affected area, either direct, indirect, or cumulative.

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 receptors 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 groundborne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of Marsh Landing 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) and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **Noise Appendix A**, which immediately follows this technical discussion.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State (Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local Contra Costa County General Plan, Noise Element Contra Costa County Code (Title 7 – Building Regulations §716-8.1008 Nuisances) City of Antioch General Plan, Noise Element City of Antioch Noise Ordinances	Establishes acceptable noise levels and limits hours of construction. Requires that noise be controlled to prevent public nuisances. Establishes acceptable noise levels and limits hours of construction. Establishes acceptable noise levels and limits hours of construction.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). 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.

There are no federal laws governing off-site (community) noise.

The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of 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 groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,¹

¹ VdB is the common measure of vibration energy.

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 land use compatibility guidelines are listed in **Noise: Table 2**.

Noise Table 2
Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (db)							
	50	55	60	65	70	75	80	
Residential - Low Density Single Family, Duplex, Mobile Home								
Residential - Multi-Family								
Transient Lodging – Motel, Hotel								
Schools, Libraries, Churches, Hospitals, Nursing Homes								
Auditorium, Concert Hall, Amphitheaters								
Sports Arena, Outdoor Spectator Sports								
Playgrounds, Neighborhood Parks								
Golf Courses, Riding Stables, Water Recreation, Cemeteries								
Office Buildings, Business Commercial and Professional								
Industrial, Manufacturing, Utilities, Agriculture								
	Normally Acceptable Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.							
	Conditionally Acceptable New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.							
	Normally Unacceptable New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.							
	Clearly Unacceptable New construction or development generally should not be undertaken.							

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 the federal OSHA standards (see the **Worker Safety and Fire Protection** section of this document, and **NOISE Appendix A, Table A4**).

LOCAL

Contra Costa County General Plan Noise Element

Contra Costa County has adopted the State of California land use compatibility guidelines (shown above in **Noise Table 2**) in their general plan (Contra Costa County 2005). The noise levels considered generally acceptable and conditionally acceptable for single-family residences are 60 dB CNEL and 70 dB CNEL, respectively. Several policies in the Contra Costa County General Plan Noise Element are applicable to construction and operation of the project (Contra Costa County 2005). These policies are as follows:

- Policy 11-1 – Requires new projects to meet acceptable exterior noise level standards for various land use categories (see **Noise Table 2**).
- Policy 11-6 – “If an area is currently below the maximum ‘normally acceptable’ noise level, an increase in noise up to the maximum should not be allowed necessarily.”
- Policy 11-8 – Requires construction activities to be concentrated during normal daytime work hours.

Contra Costa County Code

Contra Costa County requires that operations be controlled to prevent nuisances, such as noise and vibration, to nearby public and private ownerships. There are no specific limits in these ordinances that might govern noise levels at Marsh Landing.

City of Antioch General Plan Noise Element

The City of Antioch has also adopted the State of California land use compatibility guidelines (shown above in **Noise Table 2**) in its general plan noise element (Policy 1, City of Antioch 1988). The noise levels considered generally acceptable and conditionally acceptable for single-family residences are 60 dB L_{dn} /CNEL and 70 dB L_{dn} /CNEL, respectively. Several policies in the City of Antioch General Plan Noise Element are applicable to construction and operation of the project (City of Antioch 1988). These policies are as follows:

- Policy 7 - The impact of point sources of noise should be minimized. In many cases, this can be accomplished by limiting the hours of operation of such sources to the daytime (7:00 a.m. to 6:00 p.m.) when the community will tolerate higher noise levels.

- Policy 11 – The background ambient noise level for outdoor living areas, defined as back yards for single-family homes and patios for multi-family units, shall not exceed 60 CNEL.

City of Antioch Noise Ordinances

Two sections in the City of Antioch Code of Ordinances are applicable to noise produced by construction and operation of the project (City of Antioch 2000). Ordinance sections 5-17.04 and 5-17.05 regulate heavy construction equipment noise and construction activity noise. These regulations limit heavy construction equipment operation and construction activity to the following hours:

1. On weekdays between 7:00 a.m. and 6:00 p.m.
2. On weekdays within 300 feet of occupied residences between 8:00 a.m. and 5:00 p.m.
3. On weekends and holidays between 9:00 a.m. and 5:00 p.m.

The City of Antioch Code of Ordinances also contains a zoning provision relating to noise attenuation requirements. Ordinance section 9-5.1901 states the following:

- (A) Uses adjacent to outdoor living areas (e.g., back yards for single-family homes and patios for multi-family units) and parks shall not cause an increase in background ambient noise which will exceed 60 CNEL.
- (B) The Zoning Administrator may require an acoustic study for any proposed projects which could have or create a noise exposure greater than 60 CNEL or than that which is otherwise deemed acceptable.
- (C) The Zoning Administrator may require the incorporation into a project of any noise attenuation measures deemed necessary to ensure that noise standards are not exceeded.
- (D) No use, activity, or process shall produce vibrations that are perceptible without instruments by a person at the property lines of a site.

SETTING

Marsh Landing would be constructed within the project boundary of the existing Contra Costa Power Plant located approximately one tenth of a mile from the City of Antioch in Contra Costa County. The Gateway Generating Station, a 530 MW combined cycle power plant located approximately 1,000 feet east of the Marsh Landing project boundaries, began operation in January 2009. The site and surrounding land are zoned for heavy industrial uses (URS 2008a, AFC §§ 2.2, 7.5.1.3).

The ambient noise regime in the project vicinity consists of the Gateway Generating Station (Gateway), highway traffic, train traffic, and air traffic. The nearest sensitive noise receptor is a residence approximately 1500 feet east of the project site; Gateway lies between Marsh Landing and this nearest receptor (URS 2008a, AFC § 7.5.1.3, Figure 7.5-1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may 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 groundborne vibration or groundborne 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 exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting combined noise level;²
2. the duration and frequency of the noise;
3. the number of people affected;
4. the land use designation of the affected receptor sites; and

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.

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;
- use of heavy equipment and noisy activities are limited to daytime hours; and
- 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, including the minority population.

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (URS 2008a, AFC § 7.5.1.3, 7.5.1.4; Tables 7.5-2 through 7.5-4). The survey was conducted on November 13 through 15, 2007, and monitored existing noise levels at the following locations, shown on **Noise and Vibration Figure 1**:

1. Measuring Location LT-1: Within the confines of the Sportsman Yacht Club located approximately 1,400 feet east of the eastern edge of the project site (2,100 feet from the approximate center of the plant). This location represents the nearest sensitive receptor, the one most likely to be impacted by project noise. Long-term (25-hour) monitoring showed ambient noise levels typical of an industrial environment.
2. Measuring Location LT-2: Near the northeastern corner of an existing residential neighborhood located approximately 1,970 feet from the southwest corner of the project boundary (2,900 feet from the approximate center of the plant). Long-term (25-hour) monitoring showed ambient noise levels similar to location LT-1.

The Gateway Generating Station came online in January 2009 and conducted a 25-hour Community Noise Survey at that time, which reflects the most recent and accurate ambient noise level at Measuring Location LT-1 and supersedes the measured ambient levels presented in the AFC (URS 2009b § 3.5).

Noise Table 3 summarizes the ambient noise measurements at the noise sensitive receptors (URS 2008a, AFC Tables 7.5-2 and 7.5-3; URS 2009b § 3.5, Revised Tables 7.5-5 and 7.5-7):

Noise Table 3
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime ¹	L_{eq} – Nighttime ²	L_{90} – Nighttime ³
LT-1: Nearest residence	63	62	60
LT-2: Southwest residence	61	60	45

Source: URS 2008A, AFC Tables 7.5-2 and 7.5-3; URS 2009b § 3.5, Revised Tables 7.5-5 and 7.5-7

¹ Staff calculations of average of 15 daytime hours

² Staff calculations of average of 9 nighttime hours

³ Applicant' calculations of average of 4 consecutive quietest hours of the nighttime,

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of Marsh Landing is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities (URS 2008a, AFC § 7.5.2.1).

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 applicant has predicted the noise impacts of project construction on the nearest sensitive receptors (URS 2008a, AFC § 7.5.2.1, Tables 7.5-5 and 7.5-6). A maximum construction noise level of 80 dBA L_{eq} is estimated to occur at a distance of 100 feet from the acoustic center of the construction activity (most often the power block) and attenuate to no more than 56 dBA L_{eq} at the nearest sensitive receptor, location LT-1 (URS 2008a, AFC § 7.5.2.1, Table 7.5-6; and staff calculations). A comparison of construction noise estimates to measured ambient conditions is summarized in **Noise Table 4**.

Noise Table 4
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level ¹ (dBA L _{eq})	Measured Existing Ambient ² (dBA L _{eq})	Cumulative (dBA L _{eq})	Change (dBA)
Location 1 — Nearest residence (east)	56	63 daytime	64 daytime	+1 daytime
		62 nighttime	63 nighttime	+1 nighttime
Location 2 — Residences to west	51	61 daytime	61 daytime	+0 daytime
		60 nighttime	60 nighttime	+0 nighttime

1 Source: URS 2008A, AFC § 7.5.2.1, Tables 7.5-5 and 7.5-6; and staff calculations

2 Source: URS 2008A, AFC Tables 7.5-2 and 7.5-3; URS 2009b § 3.5, Revised Tables 7.5-5 and 7.5-7; and staff calculations of average of daytime and nighttime hours.

The applicable local noise LORS do not limit construction noise levels, but they limit noisy construction to daytime hours. Noisy construction work would be allowed only during the daytime hours of 7:00 a.m. to 6:00 p.m. on weekdays and 9:00 a.m. to 5:00 p.m. on weekends and holidays. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Therefore, the noise impacts of Marsh Landing 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** above, last column, the highest increase in the ambient noise levels at the project's noise-sensitive receptors would be 1 dBA. An increase of 1 dBA is not detectable. Therefore, the noise effects of plant construction are considered to be less than significant at the above receptors.

To ensure the project construction would create less than significant adverse impacts at the most noise-sensitive receptors, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints regarding construction noise.

In light of the following proposed conditions of certification, the noise impacts of Marsh Landing construction activities would be less than significant.

Linear Facilities

New offsite linear facilities include a 2,100 foot long natural gas pipeline, two approximately 1-mile-long lines to the Bridgehead Lift station for raw water and waste

water movement, and a potable water pipeline running less than 100 feet from the project site (URS 2008a, AFC §§ 1.1, 2.1, 5.2, 6.2)

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, 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**.

Pile Driving

The applicant does not discuss whether pile driving would be necessary for construction of Marsh Landing, but staff analyzes the effects of pile driving noise in case it is found to be required. If pile driving is required for construction of the project, the noise from this operation could be expected to reach 104 dBA at a distance of 50 feet. Pile driving noise would thus be projected to reach a level of 72 dBA at Location LT-1, the nearest residential receptor (staff calculation). This would combine to produce an increase of 10 dBA over ambient noise levels (see **Noise Table 5**, below). While this would produce a noticeable impact, staff believes that limiting pile driving to daytime hours, in conjunction with its temporary nature, would result in impacts tolerable to residents. Staff proposes condition of certification **NOISE-6** to ensure that pile driving noise, should it occur, would be limited to daytime hours.

Noise Table 5
Pile Driving Noise Impacts

Receptor	Pile Driving Noise Level (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})	Cumulative Level (dBA)	Change (dBA)
Location 1	72	63	73	+10
Location 2	69	61	70	+9

1 Source: URS 2008A, AFC Table 7.5-5; URS 2009b Revised Table 7.5-7; and staff calculations

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving, should it be employed. Vibration attenuates rapidly. The approximate center of the plant would be 2,100 feet from the nearest noise-sensitive receptor. Thus, it is likely that no vibration would be perceptible at this distance. Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (URS 2008a, AFC §§ 7.5.2.1, 7.5.5.2). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Operation Impacts and Mitigation

The primary noise sources of Marsh Landing include combustion turbine generators, compressors, air-cooled heat exchangers (ACHE), selective catalytic reduction (SCR) exhaust stack, and transformers (URS 2008a, AFC § 7.5.2.3). Staff compares the projected noise with applicable 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.

The applicant included the following noise mitigation measures in performing computer modeling of noise impacts from project operation (URS 2008a, AFC § 7.5.2.3):

- Inlet air silencers;
- Turbine enclosures;
- Compressor enclosures;
- Exhaust silencers; and
- ACHE silencing

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (URS 2008a, AFC §§ 7.5.2.3, 7.5.2.4, 7.5.2.5; URS 2009b § 3.5, Revised Table 7.5-7). The applicant has predicted operational noise levels, summarized in **Noise Table 6** below.

Noise Table 6
Predicted Operational Noise Levels and Noise LORS

Receptor	Project Alone Operational Noise Level L_{eq} (dBA) ¹	City of Antioch General Plan and Noise Ordinances, CNEL (dBA)	Contra Costa County General Plan, CNEL (dBA) ²
LT-1	54	60	60
LT-2	50	60	60

Sources: ¹URS 2009b, Revised Table 7.5-7

²Noise Table 2, above

The applicant has incorporated noise reduction measures into the design of the project to ensure that there will not be a substantial increase in noise levels at the nearest receptor. The local planning policy guidelines for Contra Costa County and the City of Antioch require new projects to meet acceptable exterior noise level standards of 60 dB CNEL in residential areas.

As seen in **Noise Table 6**, the project's operational noise level at LT-1 and LT-2 would be 54 and 50 dBA L_{eq} (hourly average), respectively. The CNEL scale is the average 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. It accounts for the higher sensitivity to noise in the nighttime, when people are generally sleeping. For a constant noise source, such as a

power plant, the hourly average levels of 54 and 50 dBA are equivalent to 61 and 57 dBA CNEL, respectively. The project noise level at LT-1 would thus be 1 dBA higher than the noise level that is deemed generally acceptable by both the county and the city, but would be within the conditionally acceptable limits. Given that the existing ambient level at LT-1 would be higher than the project noise level this incremental increase would be acceptable. Therefore, the project's operational noise impacts at LT-1 and LT-2 comply with both the City of Antioch's and Contra Costa County's noise LORS. To ensure compliance, staff proposes Condition of Certification **NOISE-4**.

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.

For residential receptors, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common. 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 7**.

Noise Table 7
Predicted Operational Noise Levels

Receptor	Project Alone Operational Noise Level L_{eq} (dBA) ¹	Measured Existing Ambient, Average Nighttime L_{90} (dBA) ²	Project Plus Ambient L_{90} (dBA)	Change in Ambient Level
LT-1	54	60	61	+1
LT-2	50	45	51	+6

¹ Source: URS 2009b, Revised Table 7.5-7

Combining the ambient noise level of 60 dBA L_{90} (**Noise Table 6**, above) with the project noise level of 54 dBA at LT-1 would result in 61 dBA L_{90} , 1 dBA above the ambient. As described above (in **Method and Threshold for Determining Significance**), staff regards an increase of up to 5 dBA as a less-than-significant impact. Therefore, staff considers the above noise impact from the project at LT-1 to be less than significant.

Combining the ambient noise level of 45 dBA L_{90} with the project noise level of 50 dBA at LT-2 would result in 51 dBA L_{90} , 6 dBA above the ambient. This is a noticeable increase that lies within the range staff considers potentially significant. In order for the cumulative level to be no more than 5 dBA over nighttime ambient at LT-2, a level that staff considers less than significant, the project noise alone must not exceed 49 dBA at location LT-2. Thus, the applicant's predicted noise level of 50 dBA must be reduced to 49 dBA, at LT-2. Staff proposes Condition of Certification **NOISE-4** to ensure that the project does not exceed the noise levels specified above.

Tonal Noises

One possible source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (URS 2008a, AFC § 7.5.2.4). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**, below.

Linear Facilities

All gas piping would lie underground and would be silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line and would thus be inaudible to any receptors (URS 2008a, AFC § 7.5.2.6).

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 a combined cycle power plant consist of high-speed gas turbines, steam turbines, 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. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that ground-borne vibration from Marsh Landing 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. Marsh Landing's chief source of airborne vibration would be the gas turbines' exhaust. In a simple cycle power plant such as

Marsh Landing, however, the exhaust must pass through the SCR and the stack silencers before it reaches the atmosphere. The SCRs act as efficient mufflers. The combination of SCRs and stack silencers makes it highly unlikely that Marsh Landing would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (URS 2008a, AFC § 7.5.4.3). 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. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**, below.

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, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

The applicant has identified seven projects in the vicinity of Marsh Landing. Staff has also reviewed other large industrial projects within the vicinity that are reasonably foreseeable for cumulative consideration, including the Oakley Generating Station. However none of these projects are industrial or manufacturing and would not be expected to impact noise levels in the area (URS 2008a, AFC § 7.5.3). The noise impacts of the Gateway Generating Station have been accounted for in this analysis (see **SETTINGS** and **Operation Impacts and Mitigation**, above).

FACILITY CLOSURE

In the future, upon closure of Marsh Landing, all operational noise from the project would cease, and no further adverse noise impacts from operation of Marsh Landing would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that Marsh Landing, 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 adverse noise impacts on people

within the project area, including the minority population, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one mile of the site and one-half mile of the linear facilities, by mail or 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 and include that telephone number in the above notice. If the telephone is not staffed 24 hours per 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 in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, 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, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of Marsh Landing, 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 related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a 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 implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. 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 noise levels due to operation of the project alone will not exceed an hourly average of 54 dBA, measured at or near monitoring location LT-1 (approximately 1500 feet east of the project site boundary), and an hourly average of 49 dBA, measured at or near monitoring location LT-2 (approximately 0.4 miles southwest of the project site boundary).

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 85% or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring locations LT-1 and LT-2, or at a closer location acceptable to the CPM. This survey during the power plant's full-load operation shall also 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 values, 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 85% 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 shall 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.

NOISE-5 Following the project's first achieving a sustained output of 85% or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the 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 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 that will be employed 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 TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features, including pile driving, shall be restricted to the times delineated below:

Mondays through Fridays: 7:00 a.m. to 6:00 p.m.

Weekends and holidays: 9:00 a.m. to 5:00 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 ground disturbance, 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

Marsh Landing Generating Station (08-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

City of Antioch 2003. Noise Element of the City of Antioch General Plan, November, 2003.

City of Antioch 2008. City of Antioch, California Code of Ordinances.
<http://www.ci.antioch.ca.us/>. 2008.

Contra Costa County 2005. Noise Element of the Contra Costa County General Plan, January 2005.

Contra Costa 2009. Contra Costa County Ordinance Code. Title 7 – Building Regulations, §716-8.1008 Nuisances.

URS 2008a – URS/Anne Connell (tn: 46509). Marsh Landing Generating Station, AFC
5/30/2008

URS 2009b – URS/Anne Connell (tn: 53293). Marsh Landing Generating Station,
Amendment to the AFC. 09/22/2009

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, those higher levels 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 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 (U.S. Environmental Protection Agency, Effects of Noise on People, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **NOISE Table A2** illustrates 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.
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')	104		
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 1 dB cannot be perceived.
2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.
3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.
4. A 10-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 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **NOISE Table A3** indicates the rules for decibel addition used in community noise prediction.

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 6 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, as shown in **NOISE Table A4**.

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 CFR § 1910.95.

PUBLIC HEALTH

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 Marsh Landing Generating Station (MLGS) and does not expect that there would be any significant adverse cancer or short- or long-term adverse 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 emissions of pollutants for which there are specific ambient 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 Marsh Landing Generating Station (MLGS) 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 exposure 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)

<u>Applicable Law</u>	<u>Description</u>
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 mandated the California Air Resources Board (ARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also required 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 Source 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 health 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 Marsh Landing Generating Station 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 that toxicant. 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, Mirant Marsh Landing LLC, the proposed project site is a 27-acre parcel in the northwestern portion of the property of the existing Contra Costa Power Plant (CCPP) on 3201 Wilbur Avenue in unincorporated Contra Costa County, California (URS 2008a, pp. 1-1, through 1-6, 7.4-1 through 7.4-3 and 7.4-2 and 7.4-3). CCPP is owned and operated by Mirant Delta LLC, (Mirant Delta). The site is zoned for industrial uses with the nearest residence located approximately 2,500 feet southwest of the site boundary. The applicant, (URS 2008a, Figure 7.6-1) provided specific information showing the sensitive receptor locations within a three-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, nursing homes, medical centers, and hospitals.

According to census figures from 2000, there are some locations in the project area with minority populations of more than 50%, (Mirant Marsh landing 2008a, p. 7.8-9) pointing to the type of significant disproportionate pollutant exposure that could raise environmental justice concerns.

As discussed by the applicant, (URS 2008a, pp. 7.6-1 through 7.6-3), the available studies have shown the health status of the population around the project site to be similar to that of residents of the Greater Bay Area or California in general, meaning 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 related programs to minimize the potential for areas with higher toxic emission levels.

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 rising over the Pacific Ocean. This high-pressure system blocks out most mid-latitude storms except in the winter when most of the area's 13 inches of rainfall occur. 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 mid 60s (URS 2008a, 7.1-2).

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 and 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 air toxics-related risk of 143 in one million background risk estimate for 2003 could be compared with the total 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 (URS 2008a, pp. 7.1-7, 7.1-8, 8 and 7.6-4 through 7.6-7, and Appendix J), are those from human exposure to the windblown dust from site excavation and grading, demolition of retired Contra Costa Power Plant facilities and buildings, and emissions from construction-related 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 (URS 2008a, p 7.13-1, 7.13-2 and Appendix R) showed specific areas of possible chemical contamination from past industrial activities. The applicant has discussed the procedures for safely handling such contaminants as well as all the other wastes generated in the construction and operational phases (URS 2008a, pp 7.13-2 through 7.13-8). The measures for ensuring such safe handling are included in the **Waste Management** section as specific conditions for certification.

The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust as required by BAAQMD Regulation 6 (URS 2008a, p. 7.1-31, and Appendix J). Such dust-related impacts 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 emissions could be regarded as possibly adding to the carcinogenic risk of specific concern in this analysis. Appendix J (URS 2008a) presents the diesel emissions from the different types of equipment to be used in the construction phase. 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.

Operational Impacts

The main health risk from the proposed project's operations would be associated with emissions from its two gas-fired combustion turbine generators and a small fuel gas heater. **Public Health Table 1** 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.

Public Health Table 1
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, and Office of Environmental Health Hazard Assessment Air Toxics Hot Spots Program Risk Assessment Guidelines.

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 MLGS'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 (CAPCOA 1993). The results from this assessment (summarized in staff's **Public Health Table 2**) were provided to staff along with documentation of the

assumptions used (URS 2008c, pp.7. 6-3 through 7.6-19 and Appendix O). 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.

As shown in **Public Health Table 2**, the chronic hazard index for the maximally exposed individual is 0.003 while the maximum hazard index for acute effects is 0.072. 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.

The cancer risk to the maximally exposed individual from normal project operation is shown as 0.074 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.

Public Health Table 2
Operation Hazard/Risks for the Marsh Landing Generating Station

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.072	1.0	No
Chronic Noncancer	0.003	1.0	No
Individual Cancer	0.074×10^{-6}	10.0×10^{-6}	No

Source: Staff's summary of information from Mirant Marsh Landing 2008a pp. 7.6-7 and 7.6-16.

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.

Since staff's analysis has established that no significant health impacts would result anywhere around the project area, the issue of environmental injustice from significant impacts would not arise during operations.

CUMULATIVE IMPACTS

The applicant assessed the cumulative impacts from the proposed MLGS, the existing CCPP Units 6 and 7, and Units 1 and 2 of the existing Gateway Generating Station (GGS) as a way of estimating the cumulative impacts of emissions from identifiable pollutant sources in the project's area of potentially significant impacts (URS 2008a, pp. 7.6-8 and 7.6-9). The toxic emissions data that were used were from the years 2005 through 2007. Such cumulative impacts were presented in terms of potential cancer risks and indices of acute and chronic health effects. The maximum cancer risk in this regard was calculated as 0.114 in one million with indices of 0.086 and 0.006 for acute and chronic impacts, respectively. As with MLGS by itself, these health risk values are significantly below their respective levels of significance as established by staff and the BAAQMD. The pollutants from MLGS and the existing area sources could 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 additions is to ensure that they are maintained within insignificant levels when emitted from any new source.

As previously noted, the maximum impact locations for the proposed MLGS and similar sources would be the spot where pollutant concentrations would theoretically be highest. Even at this location, staff does not expect any significant MLGS-related changes in the lifetime risk to any person, given the calculated incremental cancer risk of only 0.074 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 0.003) 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 MLGS 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 July 11, 2008 letter to the Project Manager, Mr. John Martinez (who owns the two-acre parcel adjacent to the proposed project) complained about the prospects of locating the project as proposed and specifically pointed to the potential hazards from the emissions from the facility as the reason for his opposition.

Staff's Response: As with the commenter, staff is concerned about the impacts of emissions from any source and has assessed the potential health risks from exposure to the toxic pollutants of specific concern in this analysis. From this assessment, staff determined that this group of pollutants would be emitted from the proposed project at levels not posing a significant health hazard to anyone in the area and would therefore not recommend against the project on the basis of the risk from such emissions.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of the proposed natural gas-burning Marsh Landing Generating Station 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, 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 beyond those proposed by the applicant.

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

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California Air Resources Board (ARB) 1996. California Toxic Emissions Factors (CATEF) Database for Nat. Gas-Fired Combustion Turbine Cogeneration, 1996

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

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URS 2008a. Application for Certification for the Marsh Landing Generating Station, Volumes I and II. June 25, 2007

URS 2008c. Responses to Staff’s Data requests 1-54 for the Proposed Marsh landing Generating Station. December 12, 2008

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 Marsh Landing Generating Station (MLGS) would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, emergency medical services, 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 socioeconomic 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 MLGS 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

The following table contains all applicable socioeconomic laws, ordinances, regulations, and standards (LORS).

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

<u>Applicable Law</u>	<u>Description</u>
State 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	These sections include provisions for school district levies against development projects. As amended by Senate Bill (SB) 50 (stats. 1998, ch. 407, sec. 23), these sections state that, except for fees established under Education Code 17620, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost of school facilities.

SETTING

The project site is located at 3201 Wilbur Avenue in the unincorporated portion of Contra Costa County, adjacent to the cities of Antioch and Oakley, approximately 35 miles east of San Francisco. The proposed project would redevelop approximately 27 acres within the existing Contra Costa Power Plant (CCPP), which currently houses fuel

storage tanks, temporary buildings and other ancillary facilities (URS 2008a, pg. 2-1). The proposed project is approximately 0.5 mile west of State Route (SR) 160 and the Antioch Bridge, and south of the San Joaquin River. Immediately adjacent to the CCP, PG&E owns a switchyard and the Gateway Generating Station (URS 2009b). The land immediately surrounding the MLGS project site is used for industrial purposes. The land in the vicinity of the project site contains a mix of industrial and commercial uses, undeveloped land, open space, agricultural, recreational and residential uses (URS 2009b). The proposed project site would be owned and operated by Mirant Marsh Landing, LLC.

Contra Costa County is adjacent to Alameda, San Joaquin, Sacramento and Solano Counties. Contra Costa County has 19 incorporated cities; Antioch, Brentwood, Clayton, Concord, Danville, El Cerrito, Hercules, Lafayette, Martinez, Moraga, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon and Walnut Creek. Several residences in the project vicinity are co-located with commercial and industrial areas. The closest residence (in a residential area) is located approximately 2,000 feet southwest from the proposed project (URS 2008b, pg. 7.4-2).

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.

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.

The minority population within the six-mile radius of the proposed site is 131,930 persons, and the total minority population is 56,872 persons or 43.10% of the total population (see **Socioeconomics Figure 1**). Staff in several technical areas identified in the **Executive Summary** of this document, have considered environmental justice in their environmental impact analyses.

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 MLGS consists of 12,710 people or 8.2524% of the total population.

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.

**SocioeconomicsTable 2
CEQA Environmental Checklist Form**

	Potential ly Significa nt Impact	Less Than Significant With Mitigation	Less Than Significan t 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:				
D. 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				
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
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/INDUCED IMPACTS

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 MSA is a relatively freestanding metropolitan area (MA) typically surrounded by non-metropolitan counties. **Socioeconomics Table 3** shows the historical and projected populations of the study area.

Socioeconomics Table 3
Historical and Projected Populations

Area	2000 Population	2010 Population	2020 Population
Alameda County	1,443,741	1,550,133	1,663,481
Contra Costa County	948,816	1,075,931	1,237,544
Source: URS 2008b, Table 7.8-3 (MLGS, AFC)			

Socioeconomics Tables 4 and 5 show that the total labor by skill for the Oakland-Fremont-Hayward Metropolitan Division (MD) (Alameda and Contra Costa Counties.) would be more than adequate to provide construction labor for the proposed project.

Socioeconomics Table 4
Total Labor by Skill in MSA Annual
Average for 2016

Discipline	Oakland-Fremont-Hayward Metropolitan Division (MD)	Peak # of Workers for Project Construction by Craft
Boilermakers	280	65
Carpenters	17,230	14
Electricians	4,640	110
Ironworkers	490	40
Laborers	14,390	36
Pipe Fitters	4,200	175
Painters and Insulators	6,610	8
Cement Finisher	2,260	26
Millwrights	500	71
Operating Engineers	4,130	26
Teamsters	11,200 ¹	7
Total Craft	55,930	578
Contractor Staff	590 ²	52
Total Site Staff	56,520	630
¹ The Occupational Employment Projection does not have a title for Teamsters. The closest related title is "Truck Driver, Heavy and Tractor Trailer"		
² Construction and Related Workers, All Other		

The applicant estimates construction would take place over 27 months, requiring a workforce of 272 craft and professional personnel. Project operation would require 16 full-time employees at the Marsh Landing Generating Station power plant (URS 2009b, pg. 3-41). The workers are expected to commute to the project site from surrounding communities from Alameda, Contra Costa and surrounding counties.

Staff concludes that the construction and operation workforce would not induce substantial growth or concentration of population, and the MLGS would not encourage people to permanently move into the area. The MLGS would not have a direct or indirect impact on population growth.

Housing Supply

In 2006, Contra Costa County had 384,688 housing units and a vacancy rate of 3.2%. Contra Costa, Sacramento, San Joaquin, Alameda and Solano Counties had a vacancy rate of 3.6% with approximately 1,851,865 housing units. The City of Antioch has approximately nine hotels/motels with approximately 501 rooms with an average occupancy rate of 92.5%. The City of Oakley has one hotel with 80 rooms, with an average occupancy rate of 90 to 100%. Contra Costa county has approximately 39 hotels/motels with approximately 3,972 hotels rooms (URS 2008a, pg. 7.8-5). In addition to the available hotel/motel accommodations, recreational vehicle sites are located within the project site vicinity.

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. The majority of the construction workforce (approximately 90) would be from the Contra Costa, Sacramento, San Joaquin, Alameda, and Solano counties. The remaining ten percent of construction workers would temporarily relocate within commuting distance of the project site and return to their homes on the weekends (URS 2009b, pg. 3-41).

The project would have 16 new full-time employees would be hired within commuting distance of the project. Given the labor force in Contra Costa County and surrounding counties within commuting distance of the project, staff does not expect employees would relocate to the immediate project area. If all 16 new employees relocated to Contra Costa County, only 16 dwelling units would be needed. Staff concludes that the proposed project would not displace any people or necessitate construction of replacement housing elsewhere.

Staff concludes that the construction and operation workforce would not have a significant adverse impact on the housing supply within the immediate project area and the regional areas of Alameda and Contra Costa counties.

Displace Existing Housing and Substantial Numbers of People

The MLGS would be located on approximately 27 acres within the existing Marsh Landing Generating Station. The project site would be located on the western portion of the property, within the footprint of the area occupied by five fuel oil tanks and the area east of the tanks. The five fuel oil tanks not in use and were slated for demolition in 2008. Land surrounding the proposed project site is primarily industrial, with commercial, undeveloped, open space, agricultural, recreational and residential. South and west of the proposed project site boundary is new residential developments, east is a PG&E Gateway Generating Station with three residences that are considered caretaker residences for the associated marinas (URS 2008a, pg. 7.4-2).

The City of Antioch has initiated annexation of a 500-acre area called the Northeast Annexation, which includes the project site. A resolution was approved (with a Negative Declaration) on March 25, 2008 by the Antioch City Council for the Northeast Annexation. The project is pending approval with the Contra Costa County Local Agency Formation Commission (LAFCO) (ROC, Kate Sibley).

The MLGS proposed project site is zoned Heavy Industrial by Contra Costa County. The Contra Costa General Plan designates the majority of the site as Heavy Industrial and a narrow strip of land along the river as Open Space (OS). The proposed project would be located in an existing industrial area with outlying commercial, undeveloped, open space, agricultural, recreational and residential uses. Because the MLGS proposes to add 27 acres to an already existing power plant site, there would be no displacement of existing housing or substantial numbers of people.

Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the MLGS 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's proposed onsite Fire Protection and Prevention Plan, is analyzed in the **Worker Safety and Fire Protection** section of this Staff Assessment.

Emergency Medical Services

As stated in the AFC and verified by staff, the project site is within the Contra Costa County Fire Department (CCCFD) (<http://www.cccfpd.org>) jurisdiction. Paramedic services are contracted to American Medical Response (AMR) by the CCCFD. An AMR unit consists of one or two emergency medical technicians and one or two paramedics. AMR has up to approximately 30 units during the day and 17 to 20 units at night. The maximum response time to the project site is 11 minutes and 45 seconds (URS 2008a, pg. 7.8-7). The average response time to the project site would be approximately seven minutes (SAMP 2008a).

The closest hospital to the project site is Sutter Delta Medical Center in the City of Antioch with an estimated driving time of 5 minutes. This hospital has an emergency room and has 119 beds which run at near capacity. Additional hospitals located within the surrounding area include; the John Muir Medical Center-Concord, in the City of Concord approximately 19 miles west of the site; Contra Costa Regional Medical Center, in the City of Martinez approximately 24 miles west of the site; John Muir Medical Center-Walnut Creek, in the City of Walnut Creek approximately 27 miles southwest of the site (URS 2008a, pg. 7.8.7).

As discussed in **Project Description, Worker Safety and Fire Protection**, and **Hazardous Materials Management**, the MLGS 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 by Contra Costa County Fire Protection District and the surrounding hospitals would be adequate during construction and operation. The project would not require construction of new or physically altered emergency medical facilities.

Law Enforcement

The MLGS proposed project site is located within the jurisdiction of the Contra Costa County Sheriff's Department (CCCSD) (<http://www.co.contra-costa.ca.us>). The Contra Costa County Sheriff's Department would provide police protection and public safety services (traffic and neighborhood police control, emergency calls, and crime prevention) to the area of the MLGS project. The closest CCCSD station to the proposed project site is the Delta Station, which has 5 sergeants and 20 officers. Typical response time to the project site varies from 1 to 45 minutes, depending upon the severity of incident (URS 2008a, sec. 7.8.1.4). In the event Delta Station officers or sergeants are unable to respond, City of Oakley officers can respond until Delta officers or sergeants arrive (Douglas, 2008). The City of Oakley is approximately two miles from the project site.

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 20 miles (<http://www.chp.ca.gov>) from the project site in Martinez, 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 MLGS during construction and operation. The project would not require new or physically altered law enforcement facilities.

Education

The project site is in the Antioch Unified School District (AUSD) and has 23 schools including one community college and 20,168 students in 2006-2007. The AUSD is at 97% capacity with enrollment growing slowly. Doser Libby Medical High School (DLMHS) opened in August 2008, and will eventually serve 600 students in grades 9 through 12. DLMHS began with a freshmen class and will add another grade level each subsequent year. (<http://dlmhs-antioch-ca.schoolloop.com/dlmhs>).

Sixteen workers would be required for operation of the MLGS project, and are expected to primarily relocate from the Contra Costa, Sacramento, San Joaquin, Alameda, and Solano counties labor force. If all 16 new operation workers relocate within Antioch Unified School District, an average family size of 2.72 persons per household (<http://quickfacts.census.gov/qfd/states/06/06013.html>) would result in the addition of approximately 11 children to the local schools.

As previously noted in **Socioeconomics Table 1**, other than the requirement authorized under Section 17620 of the Education Code, the Energy Commission cannot impose developer fees to mitigate the cost of school facilities. School impact fees to the AUSD are estimated at approximately \$6,120 (URS 2008a, pg. 7.8-15). Staff has proposed Condition of Certification **SOCIO-1** to ensure payment of this one-time school impact fee as a requirement for LORS compliance. Given the small number of students who potentially could relocate to schools within the AUSD, the construction or operation of the project would not create significant adverse socioeconomic impacts on educational resources as a result of the MLGS project.

Increase the Use of Existing Recreation Facilities

The Contra County Department Parks and Recreation maintains a variety of recreation buildings, community centers, trails and a historic park. The community parks amenities include playgrounds, picnic tables/barbeques, tennis courts, volleyball courts, sports court and basketball courts (<http://www.co.contra-costa.ca.us>).

Given the labor force and two hour commuting time within Alameda and Contra Costa counties, staff does not expect employees to relocate to the immediate project area. Staff concludes that there is a variety of parks within the regional project area and the project would not require construction of new parks nor substantially increase the use of

existing parks. Therefore, the construction and operation workforce would not have a significant adverse impact on parks and recreation.

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. An 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 emergency services.

There are currently two applications for power plants on the scale of the CCGS that are before the Energy Commission and proposed for Contra Costa County and that could compete with CCGS for skilled labor. These are the Oakley Generating Station project, approximately 0.85 mile from the MLGS site, and the Mirant Willow Pass Generating Station project, located in Pittsburg, approximately 7 miles west of the MLGS site. Depending upon project schedules, there could be a demand on construction craft workers typically needed for constructing power plants. However, the potential for a high worker demand that could pull workers from out of the area and lead to some stress on public facilities and utilities is counterbalanced by the current economic recession, which has affected the building trades industries particularly hard.

Although forecasters predict the economy to begin recovering later this year, employment growth generally lags other factors in an economic recovery. Also counterbalancing this potentially high demand for construction workers in the Pittsburg-Antioch-Oakley area is the fact that the project can draw on the entire San Francisco Bay area for construction workforce. As shown in **Socioeconomics Table 5**, the total construction labor force by MSA/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. Therefore, although several projects will require a labor supply for construction in roughly the same time period, there is a sufficient supply of skilled labor in Contra Costa County. 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 MLGS 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
Oakland-Fremont-Hayward Metropolitan Division (MD) (Alameda and Contra Costa Counties.)	80,120	84,380
Sacramento County MSA (Part of Sacramento-Arden Arcade-Roseville MSA)	74,290	81,940
San Joaquin County MSA	15,870	16,550
Solano County MSA	14,070	11,200
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 MLGS 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. The proposed project site would be owned and operated by Mirant Marsh Landing, LLC and 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 27 months.

All indirect and induced operation impacts would result from annual operations and maintenance expenditures. All construction and operation impacts would take place within Contra Costa County. The economic benefits of the proposed project, as required

by the Energy Commission regulations and resulting from the IMPLAN model are shown below in **Socioeconomics Table 6**.

Socioeconomics Table 6, MLGS Economic Benefits (2009 dollars)	
Fiscal Benefits	
Estimated annual property taxes	As much as \$9 million annually
State and local sales taxes: Construction	\$1.9 million
State and local sales taxes: Operation	\$33,000 annually
School Impact Fee	\$6,120 to the Antioch Unified School District
Non-Fiscal Benefits	
Total capital costs	\$550 million
Construction payroll	\$146 million
Annual Operations and Maintenance	
Construction materials and supplies	\$30 million
Operations and maintenance supplies	\$385,000 annually
Operations and maintenance budget	\$7.7 million annually
Direct, Indirect, and Induced Benefits	
<i>Estimated Direct, Indirect and Induced</i>	
Construction Jobs	1,000 jobs
Construction Income	\$146 million
Operation Jobs	34 jobs
Indirect Business Taxes (5-County)	\$6.4 million
Operation Income payroll	\$3.2 million
Construction Business Taxes	\$6.0 million
Operation Business Taxes	\$135,000
Operation Economic Output	\$10.2 million
Source: URS 2008a, URS 2009b	

PROPERTY TAX

The current property tax rate for the Contra Costa Power Plant project site is 1.12%. The current assessed value of the project site is \$47,326,279. The project site is estimated to currently yield approximately \$530,054 in local property tax revenues to the county annually. Project construction would add \$550,000 million to the current assessment value of \$47 million. Using the property tax of 1.12, the estimated increase in property tax revenue that would accrue to the Contra Costa County annually would be as much as \$6 million (URS 2009b, page 3-42).

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 MLGS include employment and income for the project area and region. Staff concludes that construction and operation of the MLGS 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 MLGS would not induce substantial growth or concentration of population; induce substantial increases in demand for housing or public services; or displace a large number of people.

PROPOSED CONDITION OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school development fee to the Antioch Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to start of project construction, the project owner shall provide the Compliance Project Manager (CPM) proof of payment of the statutory development fee.

REFERENCES

- Antioch Unified School District, Dozier-Libbey Medical High School
<http://dlmhs-antioch-ca.schoolloop.com/dlmhs>
- California Department of Finance. 2000. Demographic Research Unit, California State Census Data Center Census 2000 PL94-171, Table Two Population by Race/Ethnicity Incorporated Cities by County.
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- Contra Costa Parks and Recreation, <http://www.co.contra-costa.ca.us>
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- Council on Environmental Quality. 1997. Environmental Justice; Guidance Under the National Environmental Policy Act, 1997.
- Record of Conversation, Kate Sibley, Assistant to Lou Ann Texeira, Contra Costa LAFCO
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- URS 2008a – URS/Anne Connell (tn: 46509). Marsh Landing Generating Station, AFC 5/30/2008
- URS 2009b – URS/Anne Connell (tn: 53293). Marsh Landing Generating Station Amendment to the AFC. 09/22/2009

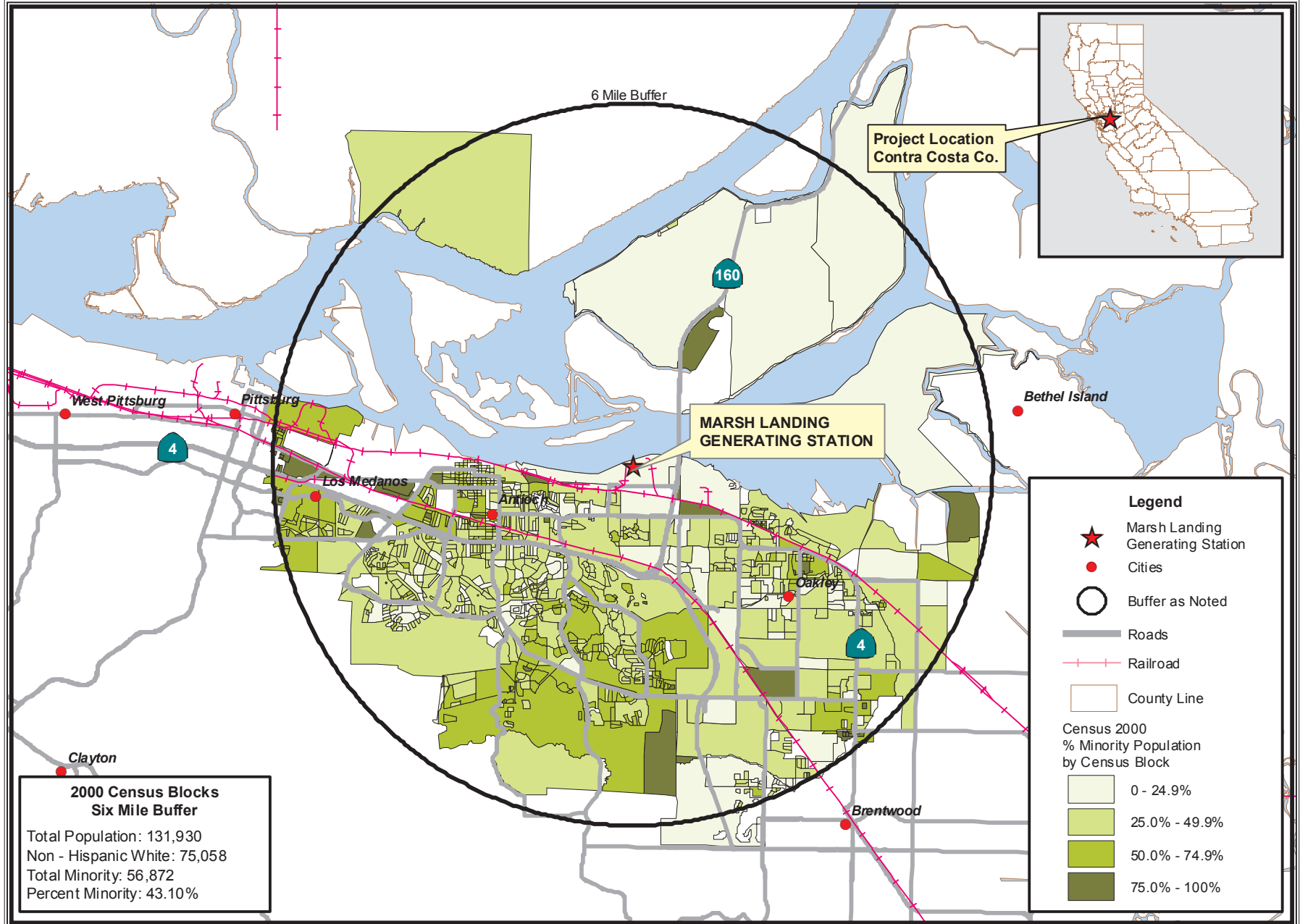
U.S. Census Bureau, Household and Families, 2000 for Contra Costa County,
<http://quickfacts.census.gov/qfd/states/06/06013.html>

SOCIOECONOMICS - FIGURE 1A

Marsh Landing Generating Station - Census 2000 Minority Population by Census Block - Six Mile Buffer

APRIL 2010

SOCIOECONOMICS



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, APRIL 2010

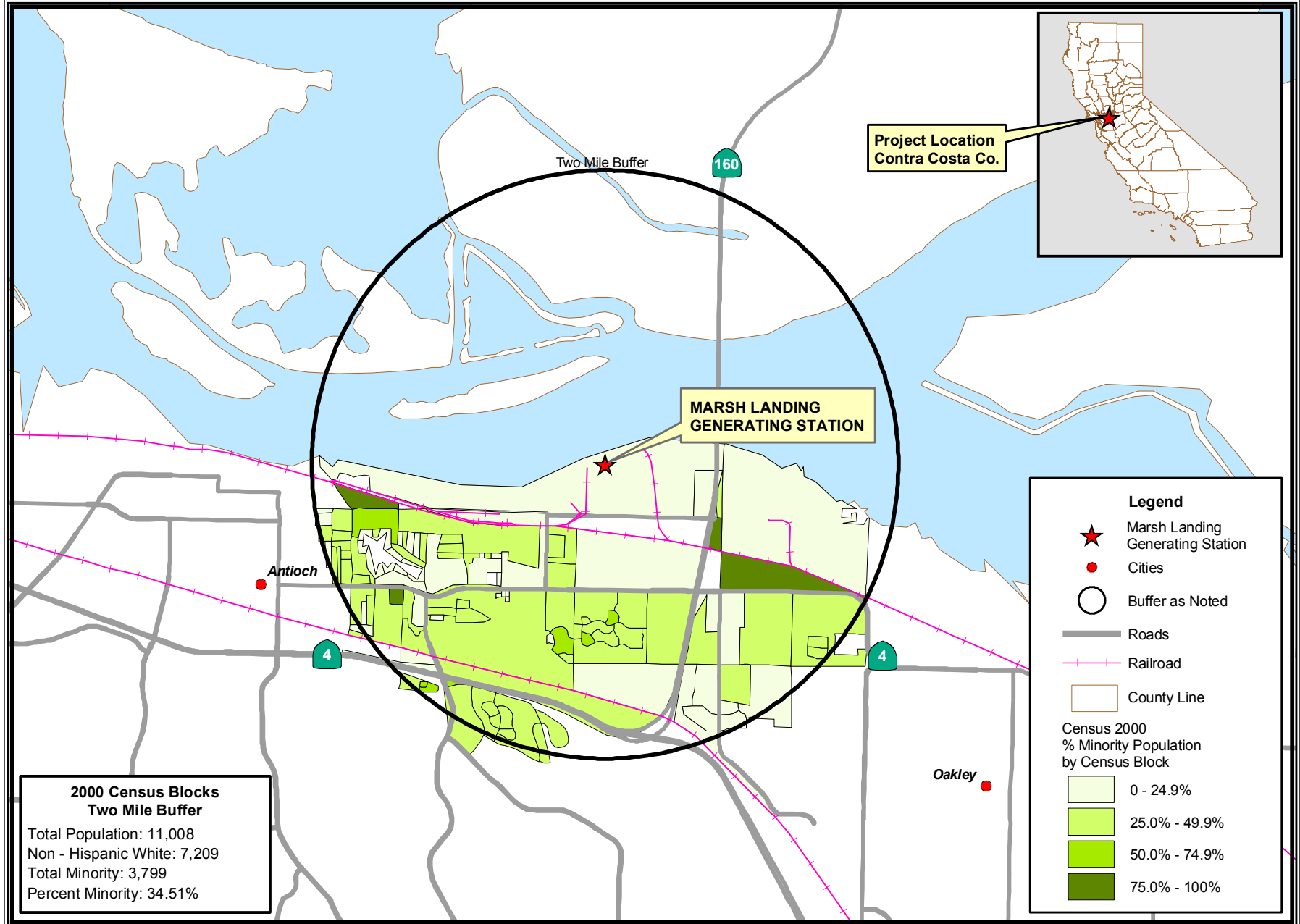
SOURCE: California Energy Commission Statewide Power Plant Maps 2006 - Census 2000 PL 94-171 Data - Matrix PL2

SOCIOECONOMICS - FIGURE 1

Marsh Landing Generating Station - Census 2000 Minority Population by Census Block - Two Mile Buffer

APRIL 2010

SOCIOECONOMICS

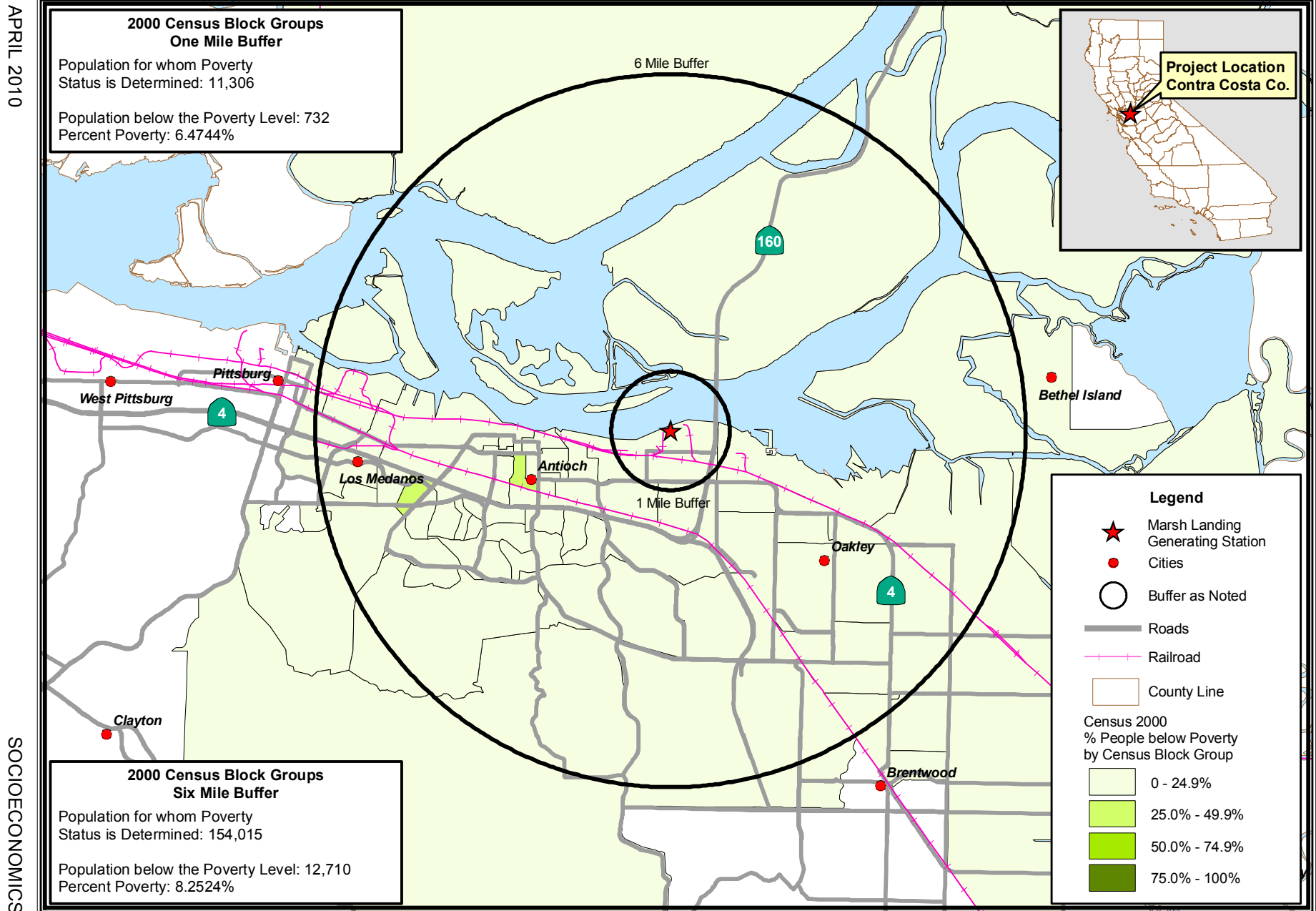


CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, APRIL 2010

SOURCE: California Energy Commission Statewide Power Plant Maps 2008 - Census 2000 PL 94-171 Data - Matrix PL2

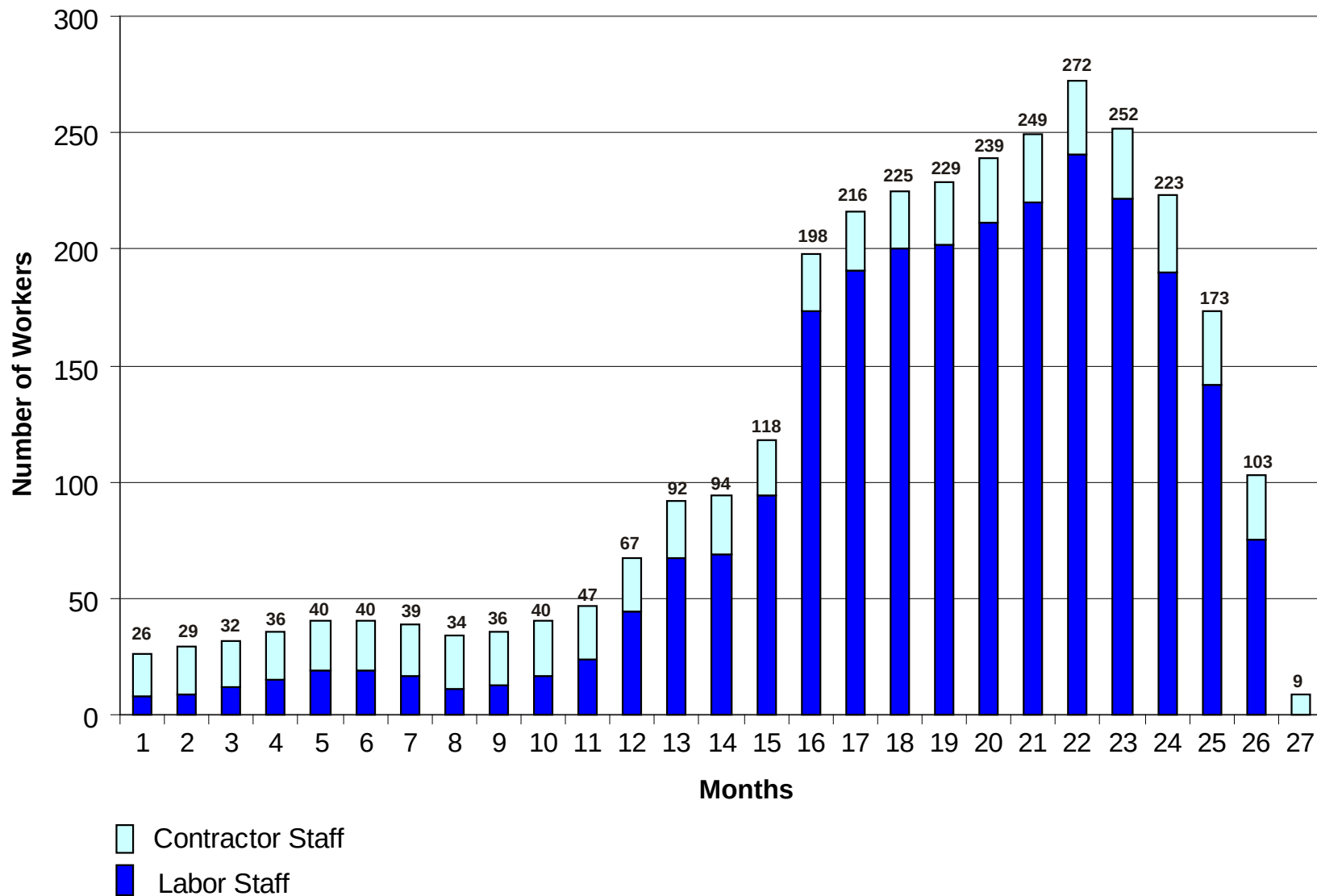
SOCIOECONOMICS - FIGURE 2

Marsh Landing Generating Station - Census 2000 Percentage of People below Poverty by Census Block Group - One and Six Mile Buffer



SOCIOECONOMICS - FIGURE 3

Marsh Landing Generating Station - Construction Staff By Month



SOIL AND WATER RESOURCES

Testimony of Vince Geronimo, PE, and Rachel Cancienne, EIT

SUMMARY OF CONCLUSIONS

Based on its assessment of the construction and operation of the proposed Marsh Landing Generating Station (MLGS) project to the extent that additional impacts are not identified after site remediation, California Energy Commission (Energy Commission) staff has found that:

- Stormwater runoff from all disturbed areas of the 27 acre site would not cause significant impacts with the implementation of sedimentation basins that remain active throughout construction;
- Potential adverse impacts caused by erosion and storm water flows during construction and operation would be mitigated with the development and implementation of effective Storm Water Pollution Prevention Plans that include the requirements of the Contra Costa Clean Water Program;
- The potential for the proposed project to contribute to flood flows or increase the elevation of the 100-year floodplain during construction or operation is minimal and would not cause or contribute to an adverse impact;
- The maximum projected sea level rise of 18 inches by 2050 would not pose a threat to the MLGS site or its operation;
- The use of brackish groundwater as the source for project water supply would not have significant impact on groundwater quantity or quality at the site or for adjacent areas; and
- The proposed use of a limited volume of brackish groundwater for inlet air evaporative cooling is consistent with Energy Commission water policy.

Staff was not able to fully assess all potential impacts to soil and water resources due to the unknown extent of contaminated soil and possibly contaminated groundwater. Staff therefore cannot reach any conclusion about existing site conditions and possible contamination. Site characterization is currently being conducted at the request of California Department of Toxic Substances Control (DTSC).

Staff concludes that the MLGS project would not result in any significant adverse impacts to soil or water resources and would comply with applicable laws, ordinances, regulations, and standards (LORS) if the measures proposed in the Application for Certification are implemented by MLGS and staff's proposed conditions of certification are adopted by the Commission.

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 MLGS. This analysis specifically focuses on the potential for MLGS 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 laws, ordinances, regulations and standards (LORS).

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.

The sufficiency of the proposed brackish water supply and on-site storage capacity to meet MLGS peak power production during a multi-day water outage is addressed in the **Power Plant Reliability** section of this SA. The soil remediation process and the method for contaminated soil removal are addressed in the **Waste Management** section; however, ongoing coordination with the Department of Toxic Substances Control needs to continue before on-site corrective action and cleanup requirements can be determined.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Soil and Water Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 USC, §§ 1251 et seq.).	Requires states to set standards to protect water quality, which include regulation of storm water discharges during construction and operation of power plant facilities.
Resource Conservation and Recovery Act of 1976 (40 CFR Part 260 et seq.)	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 LORS	
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.

California Water Code, section 13260	Requires filing with the appropriate Regional Water Quality Control Board (RWQCB) a report of waste discharge that could affect the water quality of the state.
California Water Code (CWC) Section 13552.6	CWC Section 13552.6 prohibits the use of domestic water for cooling towers if suitable recycled water is available.
Recycling Act of 1991 (Water Code § 13575 et seq.)	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.
California Water Code, section 13751	CWC Section 13751 mandates that within 60 days of construction, alteration, abandonment or destruction of a groundwater well a completion report be filed to the appropriate water agency.
Title 17, California Code of Regulations	Requires prevention measures for backflow and cross connections of potable and non-potable water lines.
Title 23, California Code of Regulations,	Requires the RWQCB to issue waste discharge requirements specifying conditions for protection of water quality.
State Policies and Guidance	
<i>Integrated Energy Policy Report</i> (Pub. Resources Code, Div. 15, § 25300 et seq.)	In the <i>2003 Integrated Energy Policy Report</i> , consistent with State Water Resources Control Board Resolution 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating it will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling 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 exceed 3,000 mg/l for it to not be considered suitable, or potentially suitable, for municipal or domestic water supply.
Local LORS	
Contra Costa County Zoning Ordinance Title 10, Chapter 1014	Requires compliance with the Contra County Clean Water Program and the development of a Stormwater Management Plan.
Contra Costa County Clean Water Program	Requires significant new or redevelopment projects in Contra Costa County to design and implement storm water treatment measures to reduce the discharge of storm water pollutants to the maximum extent practicable.

SETTING

Marsh Landing, LLC (Applicant) proposes to construct and operate the MLGS within the existing Mirant Delta, Contra Costa Power Plant (CCPP) site, which is currently located in unincorporated Contra Costa County (County) approximately 0.1 mile from the City of Antioch (City). The City of Antioch hopes to annex the property prior to the start of MLGS operation (URS 2008a). The topography of the proposed MLGS site is essentially flat situated at an elevation of approximately 10-feet above mean sea level (amsl) (URS 2008a).

PROJECT SITE AND VICINITY DESCRIPTION

The proposed MLGS would consist of four (Siemens 5000F) 190 MW simple cycle units. The Applicant proposes to develop approximately 27 acres of Mirant Delta's 114-acre CCPP site for the MLGS. The existing CCPP site is classified as a brownfield site and is bordered by the San Joaquin River to the north and industrial facilities to the south, east, and west. The Pacific Gas & Electric Company's (PG&E) Gateway Generating Station (GGS) is located immediately east of the CCPP (URS 2008a).

The 27-acre MLGS site is currently occupied by five fuel oil storage tanks and a small open area east of the tanks. All construction and operation activities would occur within the CCPP site except excavation and installation of the natural gas and wastewater pipelines. The project will use a small amount (approximately 50 AFY) of water for process water needs that include makeup water for the CTG inlet air evaporative coolers and service water systems. The proposed industrial process water would be brackish groundwater via the shallow aquifer beneath the proposed MLGS site.

The MLGS facility would also occupy 14 additional acres of the CCPP site for construction laydown, trailers, and employee parking. These areas are void of vegetation and are previously disturbed and graded (URS 2008a). A more complete description of the MLGS project, associated linear facilities, worker parking, and the equipment laydown areas is contained in the **Project Description** section of this SA.

SOIL

The base soil underlying the CCPP site is overlain by approximately 6-feet of silty sand fill. This fill overlays the original Delhi Sands, which covers the project site and surrounding area including the proposed gas supply pipeline and wastewater pipeline routes. This soil type is typically associated with floodplains, terraces, and alluvial fans and is well drained (URS 2008a).

GROUNDWATER

The proposed MLGS site is located within the Pittsburg Plain Groundwater basin along the south shore of the San Joaquin River. Aquifers in the Pittsburg Plain Groundwater basin are hydrologically connected to the San Joaquin and Sacramento rivers. At the site, the depth to groundwater ranges from 6 to 10 feet below ground surface (bgs) and fluctuates with tidal influences and the seasonal flows of the San Joaquin and Sacramento rivers. The direction of groundwater flow is north-northwest towards the San Joaquin River (URS 2008a and CEC 2001).

The quality of the groundwater in the Pittsburg Basin is generally poor due to chlorides, total dissolved solids (TDS), and agricultural runoff. These TDS levels tend to increase with depth and are due to upward migration of saline water contained in the deep marine sediment. Groundwater in the area of the site is primarily used for industrial purposes and is not a drinking water source because of the high level of total dissolved solids (URS 2008c).

SOIL & GROUNDWATER CONTAMINATION

Existing conditions at the MLGS project site include areas where prior site uses have resulted in releases of hazardous wastes thus resulting in soil and groundwater contamination. The identification and removal of contaminated soil is discussed in the **Waste Management** section of this SA. The site has not been adequately characterized according to DTSC and additional pre-certification testing is on-going.

The proposed MLGS site is currently occupied by five fuel oil storage tanks that will be removed as a part of the MLGS project construction. The tanks are old and contain approximately 2 million gallons of fuel oil. The structural integrity of the tanks and tank foundations is unknown and there is evidence of fuel oil releases near the tanks. The Phase I ESA (URS 2008a, Appendix R) identified three areas to the east of the fuel oil tanks, within the footprint of the MLGS site that may require additional testing and assessment. These areas currently have petroleum hydrocarbons or arsenic in the soil (URS 2008a and URS 2008c).

The existing PG&E switchyard, located south and east of the proposed MLGS site, may have soil contaminated with dielectric fluids from the switchyard equipment. The dielectric fluid may have leached into the groundwater, which is at a depth of 6 to 10 feet bgs. Because groundwater flow is towards the MLGS site, the groundwater beneath the MLGS site is potentially contaminated and may be encountered during construction and operation (URS 2008a).

MLGS construction activities would be prohibited until the project site is fully sampled, assessed and remediated. Dewatering measures for potentially contaminated groundwater is further discussed in the Impacts and Mitigation section of this assessment.

SURFACE HYDROLOGY

The proposed MLGS site is situated in an area of the western Delta near the confluence of the Sacramento and San Joaquin rivers. The Contra Costa Canal is located approximately 2 miles south of the site, and no surface water bodies are present on-site. Surface water runoff flows north to the San Joaquin River. Please see **Soil & Water Figure 1** and **Soil & Water Figure 3**.

The water quality of the river at the proposed MLGS site is variable due to its position between the estuarine transition zone that separates the upstream freshwater delta from the downstream saltwater bay. Near the site, the San Joaquin River changes from fresh water during periods of high river flow to brackish water during periods of lower flow. The volume of water that flows past the power plant between successive tidal phases is approximately 1.3 billion cubic feet (URS 2008c and CEC 2001).

The San Joaquin River is identified as being impaired for a variety of contaminants including pesticides, mercury, boron, selenium, and other pollutants. This impaired listing indicates that the ambient concentrations of these constituents are too high to support the beneficial uses identified for this water body (URS 2008c).

PROJECT WATER SUPPLY

The proposed MLGS facility would use an average of 50 AFY of brackish groundwater via a new well system along the southern boundary line of the CCPP property, north of Wilbur Avenue. The well system would consist of two, 120 foot-deep wells spaced 50 feet apart (see **Soil & Water Figure 2**). To provide redundancy, pumping would occur via only one well at a time. A new 6-inch diameter, 2,200 foot-long pipeline would be constructed within the CCPP right-of-way to transport the groundwater from the wells to the MLGS Raw Water Storage Tank. Expected brackish groundwater quality is summarized in **Soil and Water Table 2**.

Soil and Water Table 2
Influent Water Quality and Evaporative Cooler Specifications

Constituent		Influent Groundwater ¹		Specifications	
		Range	Value Used for Design ²	Evaporative Cooler Makeup Water	Evaporative Cooler Circulating Water
General					
Alkalinity, M (Total)	mg/L CaCO ₃	207 – 263	235	20 – 60	30 – 180
Alkali metals	mg/L Na + K	365 – 546	397		
Carbon dioxide	mg/L CO ₂	10.1 – 17.6	15.7		
Carbon, total organic	mg/L C	5 – 15	11		
Chlorine, total residual	mg/L Cl ₂	<0.04			
Color	Color Units	2.2 – 6.8	6.8		
Conductivity	µmhos	1,720 – 2,990	2560	50 – 750	75 – 2250
Hardness, total	mg/L CaCO ₃	240 – 351	351		
Oil and grease	mg/L	<5.0	<5.0	< 2.0	< 6.0
Oxygen	mg/L O ₂	2.02 – 2.17	2.10		
Oxygen demand, biochemical	mg/L O ₂	<4.0	<4.0		
Oxygen demand, chemical	mg/L O ₂	<10	<10		
pH		7.3 – 7.63	7.4	6.0 – 8.5	
Silica, Reactive	mg/L SiO ₂	42 – 62	48	< 25	< 75
Silica, Total	mg/L SiO ₂	17 – 46	45		
Solids, total dissolved ²	mg/L ions	1,130 – 1,670	1420	30 – 500	45 – 1500
Solids, total suspended	mg/L	<1 – 14.4	14.4	< 5	< 15
Turbidity	NTU	0.401 – 6.43	6.43		
Trace Constituents					
Aluminum, total	mg/L Al	<0.05 – 0.35	0.35		

Constituent		Influent Groundwater ¹		Specifications	
		Range	Value Used for Design ²	Evaporative Cooler Makeup Water	Evaporative Cooler Circulating Water
Barium, total	mg/L Ba	0.014 – 0.033	0.019		
Iron, total	mg/L Fe	<0.02 – 0.5	0.5	< 0.2	< 0.6
Heavy metals	mg/L Fe, Mn, Cu, V, Pb	0.21 – 0.67	0.67		
Manganese, total	mg/L Mn	0.13 – 0.23	0.17		
Strontium, total	mg/L Sr	0.79 – 1.3	1.05		
Cations					
Calcium	mg/L Ca	58 – 81	81	20-60	50-180
Magnesium	mg/L Mg	22 – 36	29		
Potassium	mg/L K	4.1 – 5.6	5.6		
Sodium	mg/L Na	360 – 540	390		
Anions					
Bicarbonate	mg/L CaCO ₃	210 – 257	235		
Carbonate	mg/L CaCO ₃	0.19 – 0.50			
Chloride	mg/L Cl	250 – 540	375	< 50	< 150
Fluoride	mg/L F	<0.1 – 0.37	0.26		
Nitrate	mg/L NO ₃	<0.1 – 1.3	0.4		
Phosphate ³	mg/L PO ₄	<0.1	0.52		
Sulfate	mg/L SO ₄	340 – 470	370		
Corrosion and Scaling Indices					
Larson-Skold			5.6		
Langelier			0.03		0.25 – 0.75
Ryznar			7.31		5.5 – 6.5
Puckorius			6.53		6.0 – 7.0
Notes:					
¹ From samples collected during aquifer test performed between March 30, 2009 and April 2, 2009. Analyzed by McCambell Analytical Laboratory (see Revised/New Appendix I).					
² The water analysis of sample WS-04 was used for design. Although the actual TDS measured was 1,420 mg/L, a “calculated” TDS of 1,623 mg/L was used for design.					
³ For design purposes, it is assumed that total phosphorous is converted to ortho-phosphate.					

Source: URS 2009b, Table 2.5-3

Since the groundwater proposed for process water use at MLGS has elevated total dissolved solids (TDS), chloride, and other constituents inconsistent with requirements for the evaporative coolers and simple cycle units, the groundwater must be treated to meet the specifications needed for inlet air evaporative cooling. The Applicant proposes a mobile treatment system consisting of both a filtration and an ion exchange (IX) trailer.

The filtration trailer would contain five equally-sized pressure vessels, operating in parallel, with media that would remove suspended solids so that resins in the IX trailer downstream would not foul. The treated effluent from the filtration trailer would flow directly to the IX trailer for removal of dissolved impurities via two strong acid cation resin beds (in parallel), followed by two strong base anion resin beds (in parallel), followed by a mixed bed.

Once a filtration or IX trailer is considered spent, it would be towed by a licensed hauler to a licensed service center for backwashing and either rinse-down or regeneration, respectively, and a fresh trailer would take its place at the plant. During peak operating times, the Applicant anticipates the filtration and IX trailers would need to be exchanged after approximately 1 day of operation as each trailer is capable of providing treatment for one Simple Cycle unit for approximately 24 hours of operation. The Applicant suggests that the treatment trailers would need to be replaced approximately 71 times per year, based on maximum dispatch during the year (URS 2009b). The proposed average and maximum daily water demand in gallons per minute (gpm) and average annual consumption in acre-feet per year (AFY) is shown below in **Soil and Water Table 3**.

Soil and Water Table 3
Daily and Annual Average Water Consumption and Wastewater Discharge Requirements

Water Service/ Use	Average Daily Use ¹ (gpm)	Maximum Daily Use ² (gpm)	Annual Use ³ (AFY)
Siemens Simple Cycle Units			
Evaporative cooler makeup	146.2	409.0	45.5
Service water	10.0	10.0	3.2
On-line combustion turbine wash	0.2	0.2	0.3
Off-line combustion turbine wash	0.4	0.4	0.6
Total Plant Makeup Water Usage Requirements	157.0	419.5	49.6
Potable water	0.1	0.1	0.2
Process wastewater	50.6	117.6	14.5
Sanitary wastewater	0.1	0.1	0.2
Notes: AFY = acre-feet per year; gpm = gallons per minute 1 See Revised Figure 2.5-8 for detailed water balance figure. 2 Avg daily water use is based on 4 Simple Cycle units operating at full generating capacity with evaporative cooling on. 3 Maximum daily use is based on peak summer conditions (95 degrees F) and 20% relative humidity for all Simple Cycle units operating at full generating capacity. 4 Average annual use based on an annual capacity factor of approximately 20%.			

Source: URS 2009b

Potable water would be supplied by the City of Antioch through an existing potable water pipeline that runs through the CCPP property to the City's water line located along Wilbur Avenue. The Applicant proposes to use potable water for construction purposes and estimates that approximately 9 AF would be required during the 33 month construction period with an additional 8 AF used for hydrostatic testing (2 AF) and steam blow-off (6 AF). During operation, the Applicant estimates that the MLGS facility would require approximately 2 AFY of potable water for personnel consumption, eyewash stations, showers, and sanitary needs (URS 2008a and URS 2008c).

Process and Sanitary Wastewater

The Applicant proposes two separate wastewater collection systems for the MLGS. The plant's process wastewater system would collect blowdown from the combustion turbine generators (CTG) and heat recovery steam generators (HRSG), reject water from the first pass reverse-osmosis system, chemical feed area drains, and general plant drains would be collected in the plant's wastewater storage tank. From the tank, the Applicant proposes to convey its process wastewater to the City of Antioch's sewer line along Wilbur Avenue via a new MLGS wastewater line.

The sanitary system would collect domestic wastewater from sinks, toilets, and other sanitary facilities for discharge to the plant's sanitary sewer collection system. The sanitary wastewater would discharge to the City of Antioch's sewer line via the same pipeline used for process wastewater (URS 2008a).

Storm Water

The proposed MLGS would be constructed on the existing CCPP site. The topography of the proposed MLGS site is relatively flat with an elevation of 10-feet amsl. The proposed MLGS project would have a finished grade of approximately 10 to 15-feet amsl, and non-contact storm water runoff from open areas on the plant would be discharged to the San Joaquin River via the existing CCPP storm water Outfall-001. Storm water runoff from areas that collect soluble chemicals, volatile liquids, and oil would be directed to a new oil water separator (OWS) system. The oil from the oil containment chambers of the OWS would be collected and shipped off site for recycling, and the water from the clear effluent chambers would be pumped to the wastewater storage tank for discharge to the City of Antioch sewer line along Wilbur Avenue. (URS 2009b).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The proposed MLGS project was evaluated to determine whether its construction or operation would contribute to erosion, sedimentation, flooding, and degradation of water quality and water supply. Compliance with the comprehensive regulatory procedures that have been adopted, absent unusual circumstances, will ensure that impacts will not occur. The regulatory procedures typically offer a suite of options for addressing the potential impacts and include performance standards so that impact avoidance or minimization is ensured.

The federal and state LORS and state and local policies presented in **Soil and Water Table 1** were used to determine the significance of potential impacts for this assessment. The following LORS and state and local policies are of particular relevance when determining the significance of potential impacts associated with the project.

- The Clean Water Act requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water.

- The Resource Conservation Recovery Act of 1976 seeks to prevent surface and groundwater contamination.
- California Water Code, section 13260 requires the establishment of waste discharge requirements that could affect the water quality of the state.
- Contra Costa County Clean Water Program requires significant development projects in the County to design and implement storm water treatment measures to reduce the discharge of storm water pollutants to the maximum extent practicable.
- Contra Costa County Zoning Ordinance Title 10, Chapter 1014 requires adherence to the Contra Costa Clean Water Program Stormwater Management Plan (SWMP) per Order No. 5-00-120.
- California Code of Regulations, Title 17 Requires the prevention for backflow and cross connections of potable and non-potable water lines.

For impacts that either exceed published standards or do not conform to established practices, mitigation will be proposed by staff to reduce or eliminate the impact.

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of direct and indirect impacts associated with the construction and operation of the proposed MLGS is presented below. Potential construction related impacts to soil, storm water, and water quality, including the Applicant's proposed mitigation measures and staff's determination of the adequacy, are discussed below. If necessary, staff will propose additional mitigation measures and refer to specific conditions of certification.

Construction Impacts and Mitigation

Construction of the proposed MLGS would include demolition of fuel oil tanks and storage buildings; soil excavation and remediation; grading and building construction; and the installation of utility connections. Water quality could be impacted through the discharge of sediment-laden runoff, the migration of existing on-site pollutants, and the release of hazardous materials during construction.

Water and Wind Erosion

The proposed project site is currently an industrial facility consisting of five aboveground fuel oil storage tanks; oil heating and pumping systems; pipelines; and hazardous and non-hazardous storage areas. Storm water runoff from the area within the berms surrounding the five fuel storage tanks currently collects and drains to an OWS prior to discharge to the San Joaquin River. Non-contact storm water from the areas outside the berms is discharged directly to the river via Outfall 001 or by overland flow (URS 2008a and URS 2008c).

The Applicant expects to disturb the entire 27-acre project site during construction of MLGS. Water, wastewater and gas transmission lines will be constructed underground using open trench methods (URS 2008a).

After demolition of all structures and the remediation and disposal of contaminated soil (discussed in the **Waste Management** section), the Applicant proposes to cut and fill the project site to an elevation of 9 to 15 feet amsl (URS 2008a). During the cut and fill process, the potential for soil erosion is the greatest. Soil disturbing activities during construction increase the potential for storm water runoff, which could possibly contain contaminated sediment or other pollutants, to discharge to the San Joaquin River.

A site-specific final Drainage, Erosion, and Sedimentation Control Plan (DESCP) shall be prepared to address all project elements to ensure protection of soil and water resources for the construction and operation phases of the project. The Applicant shall also prepare and implement a construction Storm Water Pollution Prevention Plans (SWPPP) in accordance with the General Permit for Construction Activities. The Applicant has provided a revised draft construction SWPPP and a draft DESCP (URS 2010b). These plans propose erosion control BMPs that include soil erosion and treatment control measures for trapping eroded sediments during construction. The Applicant also proposes to reduce soil erosion by watering the site, installing straw bales and silt fences, and limiting exposed areas (URS 2008a).

As a redevelopment project in unincorporated Contra Costa County that would discharge storm water to a surface water body, the project owner must comply with Order No. R2-2003-0022 and prepare a SWCP. The SWCP is required in addition to the construction SWPPP. The SWCP is to include project specific permanent stormwater management facilities and best management practices (BMPs) that will be incorporated into development projects to treat stormwater runoff and control runoff rates and volumes after the construction process is completed (CCCWP 2006). The SWCP is discussed in the operational impacts and mitigation section.

The Applicant believes that with the implementation of the mitigation measures proposed in the construction SWPPP the impacts to surface water quality during MLGS construction would be less than significant. Staff agrees that the proper selection and implementation of BMPs can reduce the impact of water and wind erosion to a level that is less than significant. Adherence to the procedures in an approved construction SWPPP and implementation of the DESCP would limit erosion and the migration of the contaminants in storm water runoff from entering the San Joaquin River during construction.

Staff has reviewed draft construction SWPPP and recommends Condition of Certification **SOIL & WATER-1** for the final preparation and implementation of the plan. Because the construction SWPPP requires the Applicant to test for contaminated soil and to monitor storm water runoff, adequate steps would be taken to protect soil and water resources during construction of the MLGS.

Staff also recommends that the draft DESCP be completed and implemented in accordance with Condition of Certification **SOIL & WATER-2**. The DESCP is a site specific 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. The DESCP ensures protection of soil and water resources for the construction and operation phases of the MLGS project.

Through compliance with Conditions of Certification **SOIL & WATER-1** and **SOIL & WATER-2** which require the project owner to obtain Compliance Project Manager (CPM) approval of the construction SWPPP and the DESCP, staff believes that soil loss and surface water pollution during construction of the MLGS would not create a significant impact. Approval and implementation of a site-specific construction SWPPP and the DESCP would mitigate potential erosion, sedimentation, or contamination impacts to water quality to less than significant levels.

Soil and Groundwater Contamination

The applicant provided analytical results based on soil sampling and analysis near the storm water drains within the construction yard. This analysis was prepared in response to staff Data Requests #94, 95, 96, 97, and 98 for the MLGS site waste issues (CEC 2010) to assess potential impacts from off-site run-on in the construction yard area. The applicant demonstrated in the revised Human Health Risk Assessment (HHRA) (URS 2010a) that there are no significant impacts in surface soil adjacent to storm drains.

To ensure that the project site is characterized and remediated as necessary and to reduce any impacts from prior or future hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes Conditions of Certification **WASTE-1, 2, 3, 4, and 8**. Because further site characterization is currently being conducted at the request of DTSC, staff must wait for these results and may recommend additional **WASTE** Conditions of Certification. These currently proposed and possible future conditions would require the project owner to ensure that the project site is investigated and remediated as necessary; demonstrate that project wastes are managed properly; and ensure that any future spills or releases of hazardous substances or wastes are properly reported, cleaned-up, and remediated as necessary.

Through compliance with **WASTE** Conditions of Certification and Conditions of Certification **SOIL & WATER-1** and **SOIL & WATER-2** the dispersion of pollutants by wind or water erosion would be mitigated reducing potential impacts to soil and groundwater resources, for existing contaminants, to less than significant. Any remediation that is required would meet established professional standards.

Surface and Groundwater Quality

The Applicant does not propose to use groundwater during construction of the MLGS project; although, construction activities could potentially affect groundwater quality through inadvertent spills or discharge that could then infiltrate and percolate into the groundwater. The Applicant proposes to construct foundations on piles in lieu of deep excavations, but trenching operations for the natural gas pipeline could encounter groundwater. Therefore, dewatering during construction may be required where trench excavations encounter groundwater.

Groundwater beneath the site is relatively shallow (approximately 6 to 10 feet bgs) and may be contaminated. To address the potential for encountering contaminated groundwater, the Applicant proposes to develop a dewatering plan prior to excavation. Within the plan, the Applicant proposes to include requirements for water sampling, analysis, and analytical review before disposal. The proposed plan would define discharge options based on volume, chemical analysis and permit discharge limits. The

Applicant proposes to consult and/or notify all appropriate regulatory agencies prior to discharging groundwater (URS 2008a).

Staff agrees that a dewatering plan is required to prevent contaminated groundwater from entering the San Joaquin River. Staff proposes that the Applicant comply with Condition of Certification **SOIL & WATER-3**, which requires the project owner to submit a complete Notice of Intent (NOI) for compliance with Central Valley RWQCB Order No. R5-2008-0081 for Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters.

Through submittal of the NOI for coverage under Order No. R5-2008-0081, the Central Valley RWQCB will determine the adequacy of this order to protect water quality and will impose more stringent discharge requirements if necessary. Compliance with Condition of Certification **SOIL & WATER-3** would prevent significant impacts to both groundwater and surface water resources from construction dewatering activities (CVRWQCB 2008).

Operation Impacts and Mitigation

Operation of the MLGS could lead to potential impacts to soil and surface or groundwater quality. Soils may be impacted through erosion or the release of hazardous materials used during operation of the project. Water quality could be impacted by the discharge of eroded sediments from the site, the discharge of hazardous materials released during operation, or the migration of existing hazardous materials present in the subsurface soils.

Soil

The operation and maintenance of the proposed MLGS would not involve soil-disturbing activities. During plant operation, the MLGS site would be covered with impervious material or gravel, and no on-site soil would be exposed. The water and gas pipelines would be underground and routine vehicle traffic would be limited to existing paved roads (URS 2008a).

The Applicant has proposed to implement an industrial SWPPP in conformance with the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activities (Order No 97-03-DWQ). The industrial SWPPP would include BMPs for refueling and maintenance of equipment, protection of hazardous materials from storm water exposure, and the preparation and implementation of spill contingency plans in specified areas. The Applicant expects that with proper implementation of these and other BMPs in the industrial SWPPP no significant impacts to soil resources or surface water quality are anticipated during the long-term operation of the MLGS (URS 2008a).

The RWQCBs for the San Francisco Bay and Delta regions (San Francisco Bay RWQCB and Central Valley RWQCB) have mandated that the County and its municipalities impose more stringent storm water treatment requirements on new and redeveloped construction projects. The Contra Costa Countywide NPDES Stormwater Permit Amendment (SFBRWQCB Order No. R2-2003-0022) requires the County and its municipalities prepare and implement Stormwater Control Plans (SWCP) that are

consistent with the Contra Costa Clean Water Program (CCCWP) as authorized by Order No. R2-2003-0022 (SFBRWQCB 2003).

Staff agrees that a properly prepared and implemented industrial SWPPP in conjunction with a SWCP are required prior to operation of the MLGS to avoid significant adverse effects that could be caused by transport of sediments or contaminants from the MLGS site and associated linear facilities by wind or water erosion. Staff has recommended Condition of Certification **SOIL & WATER-3** that requires the project owner to comply with the General NPDES Permit for Discharges of storm water associated with industrial activity. Staff proposes that the requirements for the SWCP adhere to the requirements of the DESCP recommended by staff in Condition of Certification **SOIL & WATER-2**. These plans may be integrated to meet the local requirements for the SWCP following construction. This combined document shall be approved by the CPM and implemented in accordance with Condition of Certification **SOIL & WATER-2** and **SOIL & WATER-3** to reduce soil related impacts to less than significant during operation of the facility.

Storm Water

After construction, the MLGS would be essentially flat with all surfaces paved or graveled. The MLGS drainage system will not significantly change the existing drainage patterns that flow north toward the San Joaquin River. The proposed MLGS project would not increase site impervious. The applicant's stormwater calculations show a reduction in the developed condition, peak discharge when compared to existing site conditions. Therefore, staff believes that the project would not increase flood hazards to adjacent properties.

Staff's review of the draft stormwater management plans (DESCP and SWCP) (URS 2010b) found that these plans, when implemented during the operational phase would mitigate impacts to storm water. The Applicant proposes to route storm water runoff that may be exposed to pollutants to the OWS prior to discharge to the wastewater collection facilities. Only non-contact storm water (storm water that does not flow through potential pollutants) would be discharged to the San Joaquin River.

Staff's prior recommendations for Conditions of Certification **SOIL & WATER-2** and **SOIL & WATER-3** would help to reduce potential impacts to water quality, if implemented. Condition of Certification **SOIL & WATER-4** requires the project owner to comply with all requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity, including the development and implementation of an operational SWPPP. Staff recommends that the stormwater management plans (DESCP and SWCP) be implemented in conjunction with the industrial SWPPP. These plans provide the framework for stormwater impact avoidance and provide the guidance for establishing a monitoring and reporting program. The plans are to be consistent with the local requirements. The Applicant proposes to include BMPs to protect water resources consistent with local CCCWP requirements and San Francisco Bay RWQCB Order No. R2-2003-0022 (URS 2008a).

In order to meet the requirements of the CCCWP staff has included the requirement for a SWCP as part of the DESCP in Condition of Certification **SOIL & WATER-2**. With

implementation of the industrial SWPPP, the SWCP, and the DESCP, the project would prevent significant impacts to surface water quality from storm water runoff.

Flooding Potential

The 100-year base flood elevation (BFE) is 7-feet amsl as determined by the Federal Emergency Management Agency (FEMA). The proposed MLGS is not currently in the 100-year floodplain and would have a final construction elevation between 9 to 15 feet amsl.

Tsunami and Seiche

Tsunamis are waves typically generated offshore or within large bodies of water during a subaqueous fault rupture or subaqueous landslide event. Seiches are waves generated within a large body of water caused by the horizontal movement of an earthquake. Because of the proximity of the project site to San Francisco Bay, there is a potential for the project site to be impacted by a tsunami or seiche from the occurrence of a major earthquake.

Tsunami

A tsunami is a series of seismic sea waves caused by sea-bottom deformations that are associated with earthquakes, landslides, or volcanic activity beneath the ocean floor. Local tsunamis can be caused by significant vertical displacement along offshore faults and subaqueous landslides. Earthquake faults in the San Francisco Bay area that could generate a tsunami include the San Andreas, San Gregorio, and Point Reyes faults (CCSF 2008).

The majority of earthquake faults transecting the San Francisco Bay area are strike-slip faults; therefore, a tsunami is not expected to be a major threat as a result of a regional earthquake. The primary tsunami threat along the central California coast is from distant earthquakes along subduction zones elsewhere in the Pacific basin. It is estimated that the 100-year tsunami wave height at the Golden Gate Bridge would be 8.2 feet but would dissipate to approximately 4-feet as it moved eastward into San Pablo Bay. The wave height would propagate outward as it flows east through the Suisun Bay where the remaining wave would dissipate as it flowed into the low lying areas of Suisun Marsh west of the MLGS site. The MLGS site would not be impacted by the 100-year tsunami due to its location well east of the Golden Gate Bridge and the many embayments the wave would flow through prior to reaching the site (CCSF 2008).

Seiche

Seiches occur in enclosed water bodies as a result of ground shaking primarily due to earthquakes. The enclosed water body nearest to the MLGS site is the Suisun Bay. A seiche originating in Suisun Bay would have to travel up stream to the proposed MLGS site and would flood the low-lying areas of Suisun Marsh causing the seiche to rapidly dissipate prior to reaching the proposed MLGS site.

Sea Level Rise

The San Joaquin River forms the northern boundary of the proposed MLGS site, which is located within the estuarine transition zone between the Suisun Bay and the San

Joaquin River. The finished grade elevation adjacent to the river would be 10-feet amsl, which would be approximately 3 feet above the BFE for the 100-year storm. Since there is the potential that sea level rise due to climate change could inundate portions of the site, staff has reviewed the sea level rise estimates for California (URS 2008a).

According to the a 2008 draft report (report) from the California Climate Change Center, the rise in sea level would range from 30 to 45 cm (12 to 18 inches) along the California coast by 2050. The report also projects an increased rate of extreme high sea level events that would occur during high tides accompanied by winter flood flows. Given the project's location in the estuarine transition zone, the proposed MLGS site would be subjected to these extreme events during its operational lifetime (CCCC 2008).

Based on a maximum projected sea level rise of approximately 18 inches by 2050, staff finds that the finished grade elevation of 10-feet amsl would prevent flooding of the proposed MLGS site due to the potential of sea level rise in combination with high tides and winter flood flows. Additionally, staff is confident the project owner would take proactive steps to protect the MLGS in the event flood flows or the sea level begin to rise above the BFE of 7 feet amsl as shown on the 1987 Flood Insurance Rate Map (URS 2008a).

Water Supply

The Applicant proposes to use brackish groundwater from the shallow sand and gravel aquifer beneath the proposed project site. The aquifer has a storage volume of approximately 46,000 AF and a specific yield of 0.045. Two proposed wells would pump approximately 50 AFY for process water use, which is about 1,500 AF, 0.03% of total aquifer storage, over the 30-year life of the proposed project (URS 2009b).

The principal sources of groundwater recharge in the area are infiltration of precipitation and runoff from the northeastern slope of the Diablo Range. Near the proposed MLGS site, the natural gradient is north-northeast toward the river. The Applicant suggests that the high transmissivity of the aquifer formation attenuates drawdowns; therefore, minimal drawdown, approximately 0.25 ft, would be expected from the proposed pumping at a distance of 0.5 mile from the proposed MLGS site (URS 2009b). However, the Applicant also notes that during peak months when the well is pumped continuously, drawdown in the aquifer causes surface water from the San Joaquin River to infiltrate the aquifer and migrate toward the proposed well. Conversely, during off-peak months when the well is pumped sporadically, the natural groundwater gradient toward the river returns and the infiltrated surface water moves back toward the river. The natural gradient toward the river is smaller than the opposing pumping-induced gradient; therefore, the net movement of infiltrated fresh surface water is toward the proposed MLGS well. The Applicant's groundwater transport model suggests that none of the infiltrated San Joaquin River-water would reach the proposed pumping well during the 30-year life of the project (URS 2009b).

While there are no known groundwater wells located within 0.5 mile of the proposed project water supply wells, in the event that wells exist, the expected drawdown would be considered minimal. Project-specific pumping would not be expected to have any measurable effect on municipal wells that are located more than 3 miles away. Staff

believes there will be no significant impacts to other users or environmental resources due to project groundwater pumping.

To ensure that drawdown remains limited as estimated, Staff recommends Condition of Certification **SOIL & WATER-6**, which requires the project owner to install metering devices prior to the use of groundwater or potable water for MLGS operation. Data from the metering devices would be used to prepare an annual water use summary that would be submitted to the CPM in the annual compliance report.

Alternative Water Supply

During periods of peak demand for electricity, the Applicant proposes to operate the MLGS at full capacity for up to 18 hours per day. Though the Applicant believes the two proposed redundant well systems would make failure of the main process water supply unlikely, the Applicant believes that the proposed on-site raw water, service water, and secondary evaporative cooler blend water storage tanks would provide enough back up supply for up to 1.7 consecutive days of plant operation during peak demand. **Soil & Water Table 4** summarizes the ability of the proposed MLGS plant to operate with an interruption in water supply service via on-site backup water sources.

Soil & Water Table 4
Available On-Site Backup Process Water

Operating Case	Days of Plant Operation with No Flow from Wells
Peak Flow (420 gpm)	1.7
Daily Average Flow (150 gpm when dry bulb temperature is ≥ 79 °F)	3.7
Normalized Flow (annual average)	19.1

Source: URS 2010b

Additionally, the City of Antioch has available potable water that could be used for process water should an alternative water supply be temporarily necessary. The water would be supplied through the proposed facility's potable water connection. The source of City-supplied water is surface water of the Sacramento-San Joaquin Delta. The City provides nearly 22,000 AF of water to its 100,000 customers each year. Since Mirant Delta has conditionally proposed to shut down CCPP when the proposed MLGS would commence operations, the use of the City's potable water as an alternative water source for MLGS would be offset by the elimination of CCPP water needs (URS 2010b).

The source of City of Antioch's water is the Sacramento-San Joaquin Delta. Staff believes potable water from the City would be a viable option for a temporary alternative process water supply source, however, staff believes the use should be limited in volume and duration because use of a municipal water supply for evaporative cooling is not consistent with Energy Commission water policy. Staff recommends the applicant be required to comply with Condition of Certification **SOIL & WATER-6**, which would require the applicant to limit use of these supplies to times when the outage is beyond the control of the applicant or limit it to the reasonable time needed for repair or replacement of equipment limiting their operation. Staff believes that with implementation of this condition there would be no significant impacts because delivery

would be made in accordance with the suppliers approved operation and supply agreements which have undergone the necessary environmental reviews. Also, as discussed above the delivery would be limited in volume and duration.

Groundwater Contamination

No underground chemical storage tanks are proposed at the project site. No release of contaminated storm water from the plant site is expected; therefore, no contaminated stormwater contact with groundwater would occur. As such, no significant impacts to groundwater resources would result from plant discharges if the site specific industrial SWPPP, DESCP, and the SWCP are implemented as required by Conditions of Certification **SOIL & WATER-2**, and **SOIL & WATER-4**.

However, existing conditions consist of contaminated groundwater plumes beneath the proposed MLGS site. Through subsurface testing of soil and groundwater, a 1997 Phase II ESA performed at the CCPP revealed elevated arsenic concentrations in three areas of the CCPP site. The highest of these elevated concentrations (ranging from 40 to 242 µg/L) was located in the northwest corner of the CCPP site, approximately 2300 feet away from a proposed pumping well location for the MLGS facility. Additionally, total petroleum hydrocarbon (TPH) concentrations between 50 and 14,000 µg/L were found at various locations across the CCPP site. The highest TPH concentrations were found near the river about 2,500 feet from the proposed MLGS pumping wells (URS 2009b).

Additionally, the current owner of the former Gaylord Container Corporation East Mill property, which is adjacent to the western boundary of the proposed MLGS site, has a Voluntary Cleanup Agreement with the California Department of Toxic Substances Control (DTSC) for plumes of Tetrachloroethylene (PCE) and metals (arsenic, chromium, and nickel) due to former Gaylord operations. The PCE plume is 2,400 feet from a proposed MLGS well and the nearest metals plume is approximately 1,300 feet from a proposed well (Revised Appendix I, AFC Amendment).

The Applicant submitted a contaminant transport model to determine the effect of pumping via the proposed MLGS wells on the known contaminants. The Applicant has stated that the results show that after 30 years of pumping (the expected life of the project), about 11% of the source water in the well would have passed through or originated in one of the contaminated areas. Whittman Hydro Planning Associates, Inc. (WHPA), Mirant's groundwater subcontractor, asserts that the reductions in concentration that would occur in the aquifer would stabilize the contaminants and inhibit migration. WHPA found attenuation reported at nearby sites which also made them believe that contaminants on the former Gaylord property would likely not reach the proposed pumping wells within the life of the project (Revised Appendix I, AFC Amendment).

Process and Sanitary Wastewater

The Applicant proposes to discharge both process and sanitary wastewater to a DDSD wastewater treatment facility in accordance with an Industrial Wastewater Discharge Permit. The MLGS wastewater would be discharged via a new 3,000-ft long, 6-inch-diameter wastewater pipeline to the City of Antioch sewer line along Wilbur Avenue

which would connect to the City's main sewer line just east of the CCPP main access road (see Revised Figure 2.1-1, URS 2009b). Approximately 500 feet of the new wastewater pipeline will be along Wilbur Avenue. The pipe will be installed in a trench within existing road rights-of-way (URS 2009b).

Process wastewater from the MLGS facility would be stored in the Wastewater Storage Tank, diluted as needed by relatively low TDS evaporative cooler blowdown, and then discharged to the City's main sewer line.

In order to ensure that the proposed MLGS discharges its wastewater to a licensed wastewater treatment facility, staff recommends the applicant be required to provide a copy of a long-term wastewater discharge agreement in accordance with Condition of Certification **SOIL & WATER-5**. Compliance with **SOIL & WATER-5** would ensure that no significant impacts to soil or water resources occur by the conveyance of MLGS's wastewater discharges to DDSD's wastewater treatment facility.

CUMULATIVE IMPACTS AND MITIGATION

The MLGS would neither cause nor contribute to cumulative impacts to soil and water resources. Sound engineering practices and BMPs would be used in both the project's design and operation. Storm water discharge practices would strictly adhere to state and local agency water quality standards. The MLGS would comply with federal NPDES permits for water quality standard, further ensuring that cumulative impacts to the San Joaquin River would be avoided. Drainage volumes and peak-flow rates from the site would be managed in compliance with state and county storm water discharge permits and structural BMPs designed in compliance with the SWCP.

Soils

Construction of the proposed MLGS may cause a temporary increase in cumulative wind and water soil erosion due to soil-disturbing activities until all exposed soil is stabilized. The Applicant has provided a draft construction SWPPP and SWCP for construction activities. Implementation of the SWCP and DESCP in combination with the construction and industrial SWPPPs would mitigate significant adverse impacts from soil erosion. Staff believes that the project's contribution to soil erosion impacts would not be cumulatively considerable.

Groundwater Contamination

Groundwater may be encountered during construction. Groundwater beneath the site is expected to be contaminated and its storage, testing, and proper disposal are required under Condition of Certification **SOIL & WATER-3**. The removal and proper disposal of contaminated groundwater may improve groundwater quality beneath the MLGS site and would be beneficial to groundwater resources. Because all shallow, construction-depth on-site pollutants would be removed or remediated prior to construction, construction activities would not contribute to or pollute the groundwater.

Once constructed, the MLGS site would be covered with impervious material or gravel. Chemical storage areas would have secondary containment and on-site runoff would flow to the OWS or storm water drains. Contamination plumes within the local groundwater aquifer will likely attenuate prior to reaching the proposed pumping wells.

No cumulative impacts to groundwater resources are expected, though Staff proposes to monitor groundwater contamination as required by Condition of Certification **SOIL & WATER-5**.

Surface Hydrology

Disturbed soil could increase the sediment and pollutant loading to the San Joaquin River. However, no significant impacts are expected if BMPs are employed in accordance with the SWCP and the construction and industrial SWPPPs for storm water discharge. If contaminated groundwater is encountered during construction, the project owner is required to comply with Condition of Certification **SOIL & WATER-3** and submit a complete NOI for compliance with the Waste Discharge Requirements for Dewatering and Other Low threat Discharges to Surface Waters (CVRWQCB Order NO. R5-2008-0081). Compliance with Conditions of Certification **SOIL & WATER-1, -2, -3, and -4**, would mitigate the project's contribution to potential cumulative surface hydrology impacts to a level that is not cumulatively considerable.

Water Supply

Pumping via the proposed MLGS wells could affect groundwater availability for nearby users; however, there are no known groundwater wells located within 0.5 mile of the proposed MLGS process water supply wells. Should neighboring wells be drilled, the expected drawdown from MLGS would be nominal and no effect is expected for wells located more than 3 miles from the proposed site.

Additionally, subsidence can occur in groundwater basins with thick clay that could compress when dewatered. The permeable zone targeted as the MLGS water supply aquifer is underlain by a thick, continuous layer of dense clay. However, since the groundwater model shows that water level drawdown would be minimal and would not dewater the underlying clay layer, the potential to cause land subsidence in the vicinity of the proposed MLGS site would be considered less than significant. Staff expects that **SOIL & WATER-5** would allow staff to monitor project water use and ensure it is consistent with this analysis.

Wastewater

The wastewater streams from the MLGS would include plant process and sanitary wastewater. The DDSD wastewater treatment facility has the capacity to treat both the volume and concentration of wastewater proposed from the MLGS site. The City of Antioch municipal sewer line along Wilbur Avenue also has sufficient capacity to carry the proposed wastewater from the proposed MLGS site to the DDSD facility. Therefore, Staff believes that the project's wastewater impacts would not be cumulatively considerable.

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the MLGS would satisfy the requirements of the NPDES permits with the adoption of Conditions of Certification **SOIL & WATER-1** and **-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**).

THE RESOURCE CONSERVATION RECOVERY ACT

By proper remediation of on-site soil contamination and implementation of BMPs in accordance with the requirements of Conditions of Certification **SOIL & WATER-1, -2,** and **-3**, contamination of surface and groundwater would be prevented.

CALIFORNIA WATER CODE, SECTION 13260

Through compliance with Conditions of Certification **SOIL & WATER-2**, the project owner would submit a Notice of Intent for compliance with Central Valley RWQCB Order No. R5-2008-0081 that would establish waste discharge requirements prior to any dewatering activities associated with MLGS construction or operation.

CALIFORNIA ENERGY COMMISSION INTEGRATED ENERGY POLICY REPORT: WATER USE AND WASTEWATER DISCHARGE POLICY

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report*, (policy) 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. In keeping with State Water Resources Control Board Resolution 75-58 for the use and disposal of inland waters, the policy also requires the use of zero-liquid discharge technologies unless such technologies are shown to be “environmentally undesirable” or “economically unsound.”

The MLGS project intends to use 50 AFY of brackish groundwater for process water needs: makeup water for the CTG inlet air evaporative coolers, service water, and other industrial purposes. Resolution 75-58 encourages the use of nonpotable brackish water for power plant cooling. Through the use of degraded water such as the brackish groundwater supply for evaporative inlet air cooling, the project would comply with this policy. The low annual demand and minor volume of water needed for industrial uses would reduce the volume of wastewater that would be treated and disposed to waters of the state.

DDSD is permitted by the San Francisco Bay RWQCB for the discharge of treated wastewater, and the addition of MLGS’s wastewater effluent to the discharge stream would not cause a violation of San Francisco Bay RWQCB water quality objectives or waste discharge requirements.

The DDSD has been issued waste discharge requirements and a permit to discharge wastewater to waters of the state and nation under NPDES Permit No. CA003847 (Order No. 02-2004-027). Staff believes the impact of MLGS wastewater discharge to DDSD’s wastewater treatment facility would not be cumulatively considerable and would be in compliance with federal and state laws for the use and disposal of brackish water.

CONCLUSIONS

Staff was not able to fully assess all potential impacts to soil and water resources due to the unknown extent of contaminated soil and possibly contaminated groundwater. Site characterization is currently being conducted at the request of DTSC, staff must wait for these results and may recommend additional (**WASTE**) Conditions of Certification in a Staff Assessment Addendum when the information becomes available. In addition, there may be potential impacts to soil and water resources due to the development and delivery of a backup water supply from the City of Antioch. As proposed and to the extent that additional impacts are not identified after site remediation, staff has found that:

- Stormwater runoff from all disturbed areas of the 27 acre site would not cause significant impacts with the implementation of sedimentation basins that remain active throughout construction;
- Potential adverse impacts caused by erosion and storm water flows during construction and operation would be mitigated with the development and implementation of effective Storm Water Pollution Prevention Plans that include the requirements of the Contra Costa Clean Water Program;
- The potential for the proposed project to contribute to flood flows or increase the elevation of the 100-year floodplain during construction or operation is minimal and would not cause or contribute to an adverse impact;
- The maximum projected sea level rise of 18 inches by 2050 would not pose a threat to the MLGS site or its operation;
- The use of brackish groundwater as the source for project water supply would not have significant impact on groundwater quantity or quality at the site or for adjacent areas; and
- The proposed use of a limited volume of brackish groundwater for inlet air evaporative cooling is consistent with Energy Commission water policy .

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 Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (construction SWPPP) for the construction of the MLGS site, laydown area, and linears.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit to the Compliance Project Manager (CPM) copies of all correspondence between the project owner and the San Francisco Bay Regional Water Quality Control Board (RWQCB) regarding the Construction SWPPP within 10 days of its receipt or submittal. Information submitted to the CPM shall include a copy of the Notice of Intent for compliance with the General NPDES permit. 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 the San Francisco Bay RWQCB.

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 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 and identify all monitoring and maintenance activities. The DESCP shall meet local requirements for a post-construction Stormwater Control Plan.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to the Compliance Project Manager (CPM). The project owner shall provide evidence from Contra Costa County that the DESCP meets the requirements of the Contra Costa Clean Water Program. The project owner shall submit to the CPM copies of all correspondence between the project owner and Contra Costa County regarding the SWCP requirements within 10 days of its receipt or submittal. 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.

SOIL & WATER-3: If groundwater is encountered during construction or operation of the MLGS, the project owner shall comply with the requirements of the Central Valley RWQCB Order NO. R5-2008-0081 for Waste Discharge Requirements for Dewatering and Other Low threat Discharges to Surface Waters.

Verification: Prior to any groundwater discharge or dewatering activities, the project owner shall submit a complete Notice of Intent (NOI) to obtain coverage under Central Valley RWQCB Order No. R5-2008-0081. The project owner shall submit copies to the CPM of all correspondence between the project owner and the Central Valley RWQCB regarding Order No. R5-2008-0081 within 10 days of its receipt or submittal. This information shall include a copy of the NOI for compliance with Order No. R5-2008-0081 or other discharge requirements determined by the Central Valley RWQCB.

SOIL & WATER-4: 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 (industrial SWPPP) for the operation of the MLGS that has been approved by the CPM.

Verification: Prior to commercial operation, the project owner shall submit to the CPM a copy of the industrial SWPPP prepared in accordance San Francisco Bay RWQCB Order No. R2-2003-0022. The project owner shall submit copies to the CPM of all correspondence between the project owner and the San Francisco Bay RWQCB regarding the Industrial SWPPP within 10 days of its receipt or submittal. This

information shall include a copy of the Notice of Intent for compliance with the General NPDES permit for operation of the MLGS.

SOIL & WATER-5: The project owner shall provide the CPM two copies of the executed Wastewater Discharge Agreement (agreement) with the Delta Diablo Sanitation District (DDSD) for the long-term (30 – 35 years) discharge of all wastewater streams from the MLGS to DDSD's wastewater treatment facilities. The agreement shall specify a peak discharge rate of 117.6 gpm and all other terms and costs for the discharge of wastewater from the MLGS. The MLGS shall not connect to the City of Antioch's wastewater pipeline along Wilbur Avenue (which would transport MLGS wastewater to DDSD) without the final agreement in place and submitted to the CPM. During operation, any monitoring reports provided to DDSD shall also be provided to the CPM. The CPM shall be notified of any violations of discharge limits or amounts.

Verification: No later than 60 days prior to the connection to the DDSD's wastewater pipeline, the project owner shall submit two copies of the executed agreement for the discharge of wastewater from the MLGS. During MLGS operation, the project owner shall submit any wastewater quality monitoring reports required by DDSD to the CPM in the annual compliance report. The project owner shall submit any notice of violations from DDSD to the CPM within 10 days of receipt and fully explain the corrective actions taken in the annual compliance report.

SOIL & WATER-6: Prior to the use of groundwater or potable water for operation of the MLGS, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of groundwater and potable water supplied to the MLGS. The metering devices shall be operational for the life of the project. Once annually, the project owner shall sample groundwater quality at both pumping wells. An annual summary of daily water use by the MLGS, differentiating between groundwater and potable water as well as results from the groundwater quality sample, shall be submitted to the CPM in the annual compliance report. The two proposed project wells combined would pump no more than 50 AFY for process water use.

Prior to installing a connection to the City of Antioch water supply system for an alternative source of water, the project owner shall provide evidence to the CPM that City has agreed to supply emergency backup water that meets the MLGS maximum operation requirements of 420 gal/min. For the purpose of this condition, the term emergency shall mean the operation and/or emergency issues that arise with the two proposed wells or with mobile water filtration and ion exchange trailers, or the permanent water treatment plant. The City's supply must provide access to a quantity sufficient to meet MLGS demand due to Acts of God, natural disaster and other circumstances beyond the control of the project owner and it is necessary for the MLGS to continue to operate at peaking load capacity. Any connection to a water supply line shall be properly metered throughout the period of time of the emergency.

Verification: At least 60 days prior to use of any water source for MLGS operation, the project owner shall:

1 submit to the CPM evidence that metering devices have been installed and are operational on the groundwater wells and potable water pipelines serving the project. The project owner shall

2 provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

The project owner shall submit copies to the CPM of all correspondence between the project owner and the City of Antioch regarding alternative sources of water within 10 days of its receipt or submittal. No later than 30 days prior to installing a connection to the City of Antioch potable water main, the project owner shall submit to the CPM evidence that water meters have been installed and are operational. The project shall also provide proof that the City can deliver alternative water to the MLGS in the event of an emergency water interruption at a rate up to 420-gpm.

The project owner shall submit a water use summary report to the CPM in the annual compliance report for the life of the project. The annual summary report shall be based on and shall distinguish recorded daily groundwater and potable water use. Included in the annual summary of water use, the project owner shall submit copies of meter records from the City of Antioch documenting the volume of potable water supplied over the previous year. Water supplied to MLGS as an alternative source of water from the City of Antioch shall be reported separately. The report shall include calculated monthly range, monthly average, and annual use by the project in acre-feet. After the first year and for subsequent years, this information shall also include the yearly range and yearly average groundwater and potable water used by the project. The report shall also include the groundwater sample results.

REFERENCES

CCCC 2008 – California Climate Change Center. *Climate Change Scenarios and Sea Level Rise Estimates for California 2008 Climate Change Scenarios Assessment*, Draft Report, November 2008.

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URS 2008c– URS/J Sacks (tn: 49426). Marsh Landing Generating Station, Response to Data Requests, Set 1 (1-54), 12/12/2008

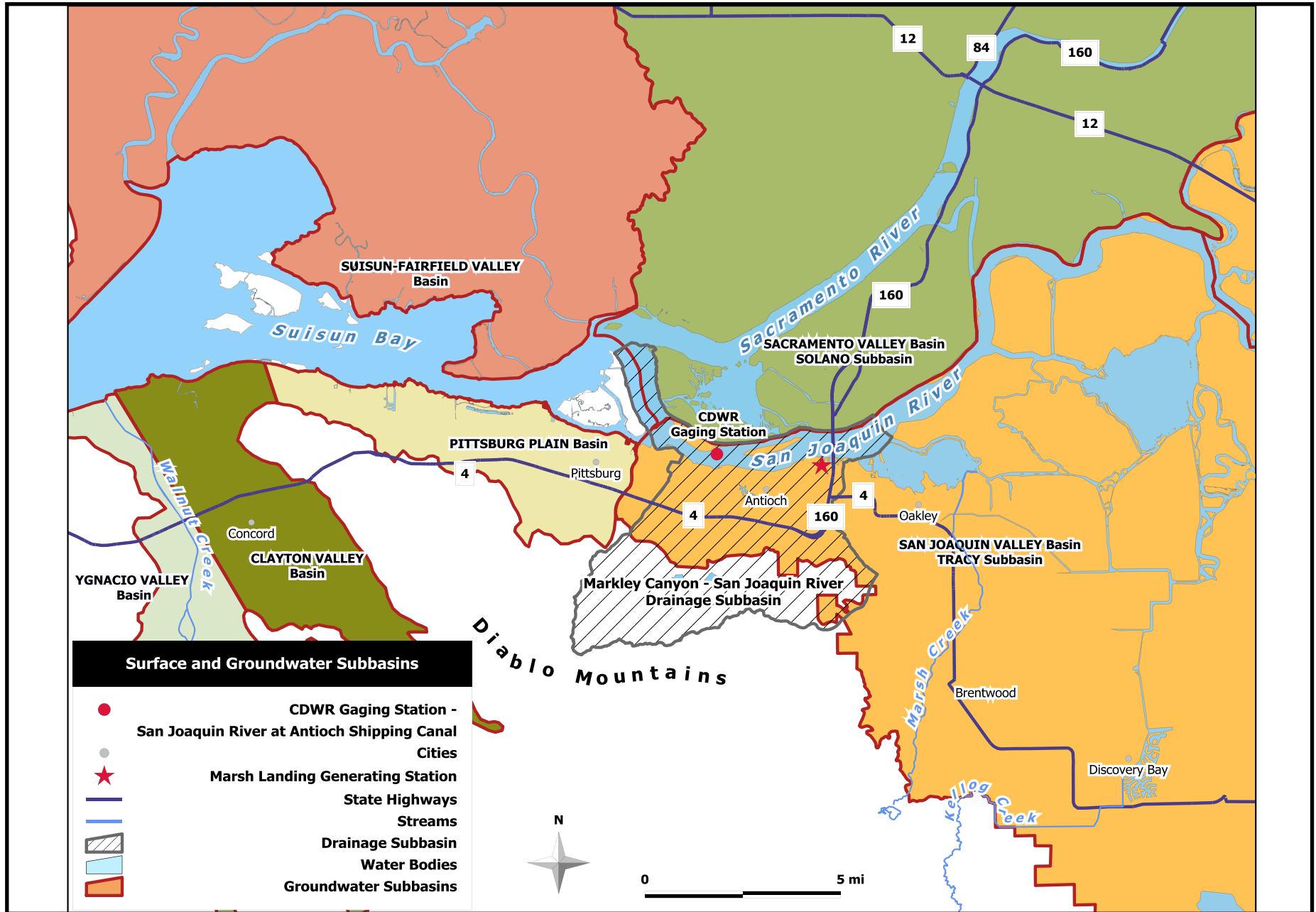
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URS 2009b – URS/Anne Connell (tn: 53293). Marsh Landing Generating Station Amendment to the AFC. 09/22/2009

URS 2010a – URS/Anne Connell (tn: 55010). Applicant's Focused Site Investigation Report & Human Health Risk Assessment. 1/15/2010

URS 2010b – URS/Anne Connell (tn: 55387). Applicant's Responses to Data Request Set 3, Number 70 through Number 98. 2/11/2010

SOIL AND WATER RESOURCES - FIGURE 3
Marsh Landing Generating Station - Surface and Groundwater Subbasins



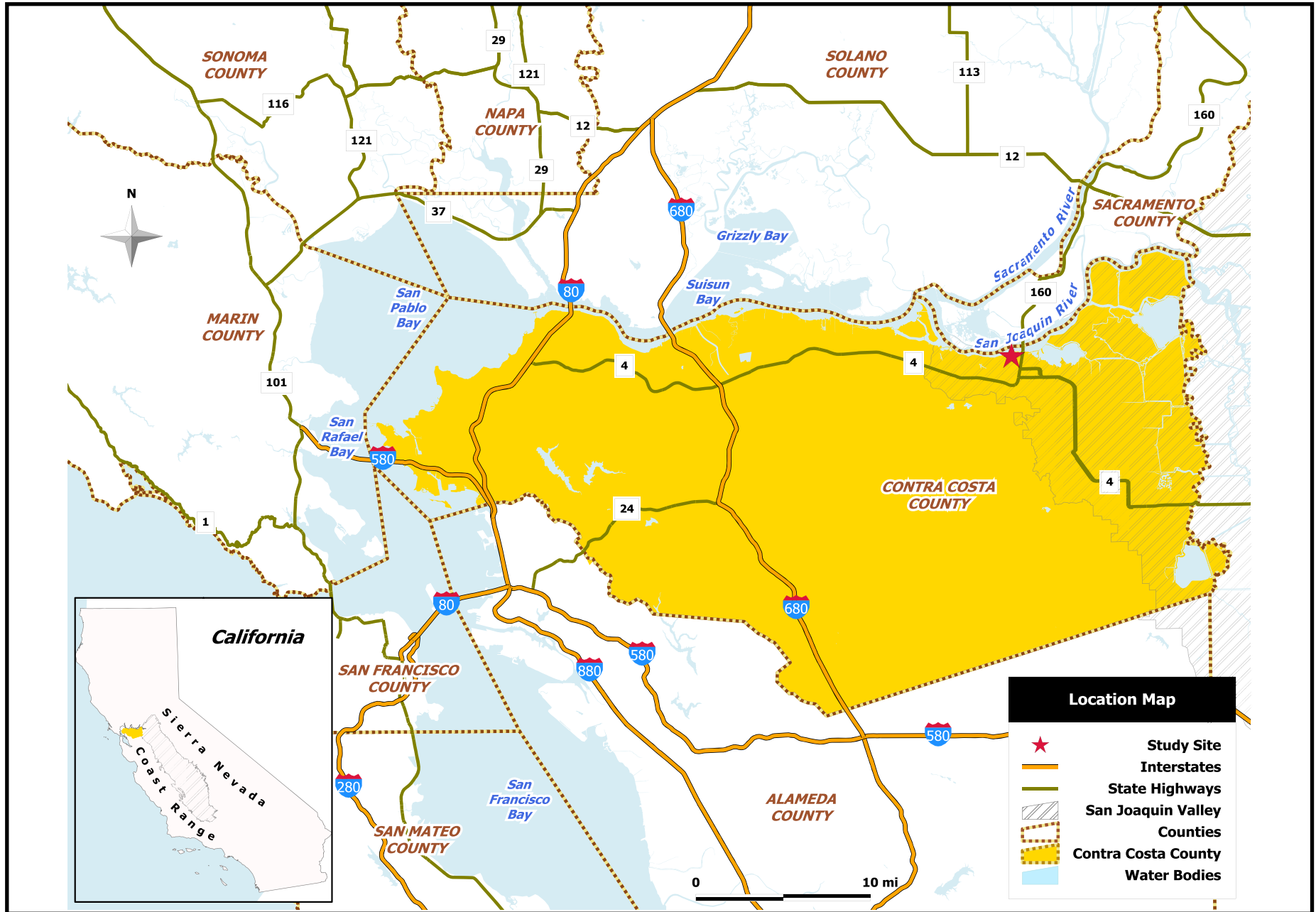
SOIL AND WATER RESOURCES - FIGURE 2
Marsh Landing Generating Station - Proposed Well Locations

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SOIL AND WATER RESOURCES



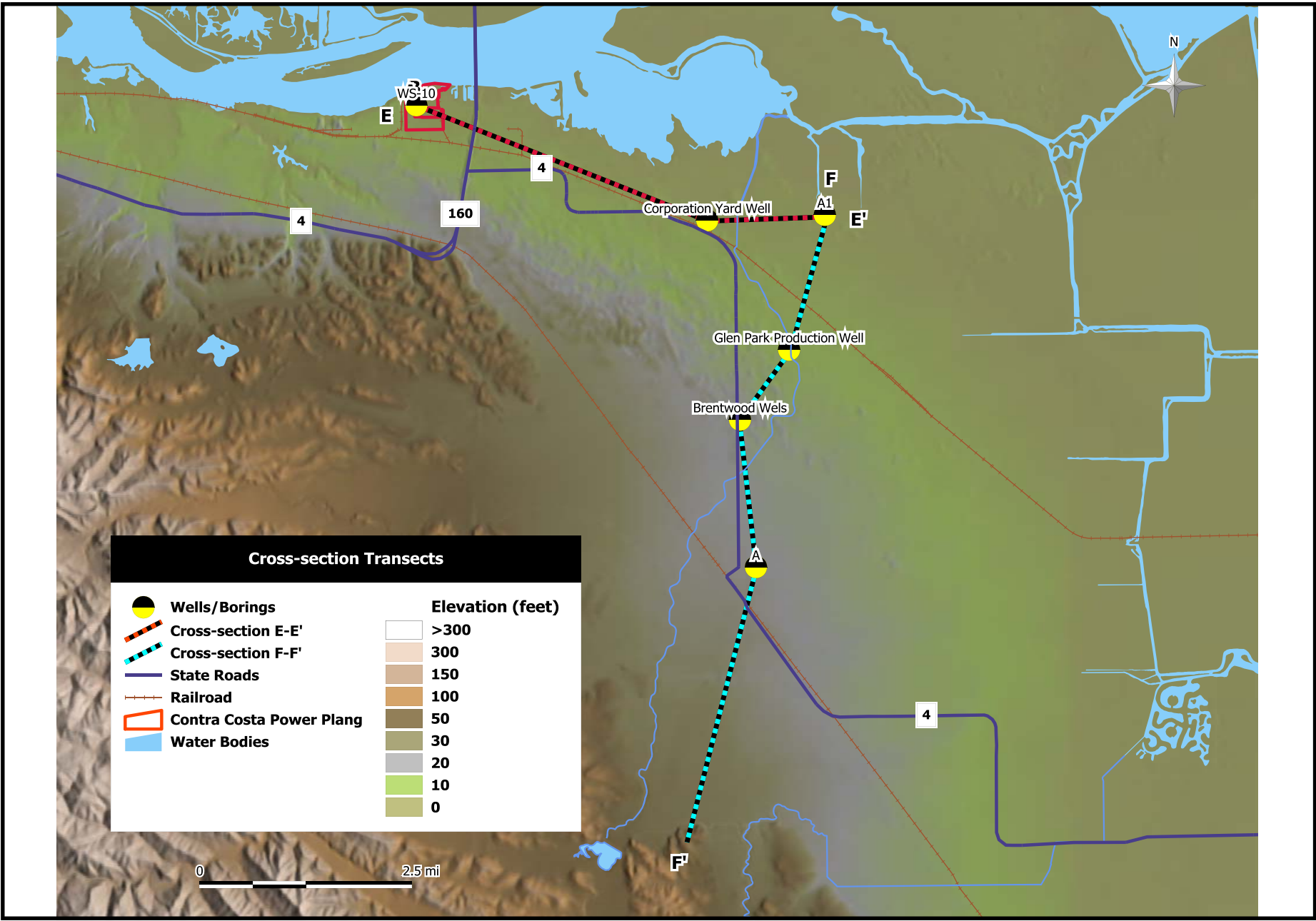
SOIL AND WATER RESOURCES - FIGURE 1
Marsh Landing Generating Station - Location Map



SOIL AND WATER RESOURCES - FIGURE 4
Marsh Landing Generating Station - Regional Cross-Section Transects

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SOIL AND WATER RESOURCES



TRAFFIC AND TRANSPORTATION

Testimony of James Adams

SUMMARY OF CONCLUSIONS

The Marsh Landing Generating Station Project (MLGS or project) would be consistent with the Circulation Element in the county of Contra Costa General Plan and all other applicable laws, ordinances, regulations, and standards (LORS) related to traffic and transportation. The project would not have a significant adverse impact on the local and regional road/highway network. During the construction and operation phases, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the county of Contra Costa. With staff's proposed mitigation, the MLGS would not degrade existing traffic conditions on Wilbur Avenue or State Route (SR) 4 or SR-160.

INTRODUCTION

The Traffic and Transportation section of the Staff Assessment addresses the extent to which the project may impact the transportation system within the vicinity of its proposed location. This section analyzes the potential traffic and transportation impacts associated with construction and operation of the MLGS and its ancillary systems.

This analysis includes an evaluation of the influx of large numbers of construction workers, and how, over the course of the construction phase, the movement of these workers can increase roadway congestion and also affect traffic flow. There are no permanent changes proposed by Mirant Delta, LLC (applicant) to the existing transportation network after completion of construction. On-going (post construction) operations and maintenance traffic will represent a negligible increase over current conditions; however, it will include an increase in the transportation of hazardous materials to the project site. The transportation of hazardous materials will need to comply with federal and state laws.

Staff has analyzed the information provided in the AFC and from other sources to determine the potential for the MLGS to have significant traffic and transportation impacts, and has assessed the availability of mitigation measures that could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to ensure that the project complies with the applicable LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The table below lists all the LORS that have been identified as applicable to the traffic and transportation impacts of the proposed MLGS project.

Traffic And Transportation Table1

Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Code of regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
Title 49, Subtitle B.	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
State	
California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, 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, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
Local	
Contra Costa County General Plan-Circulation Element	Emphasizes the efficient use of the existing transportation system, particularly existing roadways and transit systems, and cost effective enhancements to this system to accommodate planned growth consistent with the Land Use Element.

SETTING

REGIONAL DESCRIPTION

The MLGS is located in a section of unincorporated Contra Costa County, California just east of the city of Antioch. It is bordered on the west and south by industrial uses, on the east by a commercial marina, industrial uses, and open spaces, and on the north by the Contra Costa Power Plant. The MLGS site is located on Wilbur Avenue approximately one-half mile west of SR 160. The project is to be constructed wholly within the site of the existing Contra Costa Power Plant property (URS 2008a, pg. 7.10-1). Descriptions of some of the critical roads and highways in the study area are provided below.

State Highways and Local Roadways

SR-4 and SR-160 are the two major highways in the area of the project site. Most project traffic would utilize these two state highways and the interchange at SR-160 and Wilbur Avenue to access the MLGS site. Therefore, Wilbur Avenue would be the primary county and city-maintained roadway affected by the proposed project. This local road primarily serves traffic related to the mix of industrial land uses and open space surrounding the MLGS in a low-density portion of the County. **Traffic and Transportation Figures 1 and 2** show the regional and local transportation systems (figures are at the end of this analysis).

SR-4 is an east-west oriented highway that provides access to the site via its connection to SR-160 and the Wilbur Road interchange. SR-4 directly connects to SR-160 at the East 18th Street/Main Street interchange (see **Traffic and Transportation Figure 2**). SR-4 traverses most of the State of California from Alpine County to the Cities of Pinole and Martinez in Contra Costa County and is maintained by the California Department of Transportation (Caltrans). In the vicinity of the MLGS, SR-4 consists of two to three lanes per direction. SR-4 carries approximately 184,000 vehicles per day in both directions at the A Street interchange and has about 5,300 vehicles during peak hours near the SR-160 intersection (URS 2008a, pg. 7.10-1).

SR-160 is a north-south oriented highway that provides access to the project site via Wilbur Road. SR-160 extends from the city of Sacramento to its terminus at its junction with SR-4 just south of the Antioch Bridge in eastern Contra Costa County. In the vicinity of the project, SR-160 consists of four lanes (two lanes per direction except for the Antioch Bridge crossing) and carries an average daily volume of approximately 14,900 vehicles with approximately 1,000 vehicles during the peak hour (Caltrans, 2007).

Wilbur Avenue begins just east of the SR-160 interchange and connects with A Street in the city of Antioch. Wilbur Avenue is a two lane east/west oriented road approximately 42 feet wide (edge of pavement to edge of pavement) with no paved shoulders. Wilbur Avenue between Viera Avenue and SR-160 has a posted speed of 45 mph and carries approximately 15,000 vehicles per day (URS 2008a, pg.7.10-1).

Accident History

Vehicle accidents (collisions) on SR-4 between A Street and SR-160 averaged about seven per month during the last four years. SR-160 had a collision rate of one or two a month during the same period line based on information provided by Caltrans. The vast majority are property damage or non-fatal injuries (Caltrans 2009). Wilbur Avenue had an accident rate of approximately 3.2 accidents per year over a period ranging from January 1998 through December 2007. The AFC also indicates that most of the accidents (20 out of 32) occurred at the intersection of Wilbur Avenue and Minaker Drive (URS 2008a, pg. 7.10-5). Staff has visited the intersection where free flowing traffic on Wilbur Avenue is impacted by vehicles on Minaker Drive, which are controlled by a traffic light, and turn right or left onto Wilbur avenue. There are turning lanes on Wilbur Avenue and Minaker Drive as well as a merging lane on the west bound lane of Wilbur Avenue just past the intersection with Minaker Drive. Staff believes the traffic signal, turning lanes, and merging lane were put in to reduce the high accident rate

(62%) at this intersection compared to total accidents on this segment of Wilbur Avenue.

Railways

The Atchison Topeka & Santa Fe Railroad mainline runs alongside Wilbur Avenue in the vicinity of the proposed project. This mainline crosses Wilbur Avenue at a grade-separated crossing near Apollo Court in the City of Antioch. However, various spur lines off the mainline cross Wilbur Avenue at-grade near the project site including a line running parallel to the existing MLGS access road. Field observations indicate that these spur lines are not currently utilized and appear unsuitable for use. Railroad crossings within the commercial section of Antioch have railroad grade crossing warning equipment, including warning gates. Railroad crossings closer to the project site (i.e., spur line crossings) near the more industrial section of the City lack gates but display the legally required warning signs.

Public Transportation

The principal transit service provider for the Eastern Contra Costa communities including Pittsburg, Antioch, Brentwood and Oakley is Tri Delta Transit. This service provides 10 separate routes and two lines offering weekend service. Two transit lines also run along Wilbur Avenue; however, these lines terminate west of the power plant at Minaker Drive. No transit lines directly serve the MLGS facility location. BART (Bay Area Rapid Transit) is the rail transit service provider for the Bay Area. A Pittsburg/Bay Point station was recently opened that connects the Eastern Contra Costa communities with the rest of the Bay Area including Contra Costa communities such as Concord, Walnut Creek and Lafayette. BART also serves downtown Oakland and San Francisco (URS 2008aa).

Truck Traffic

According to the Contra Costa Public Works Department, the section of Wilbur Avenue near the project does not have any specific truck load limits (Contra Costa County 2009). Therefore, the California Vehicle Code limits would apply to Wilbur Avenue as well as to SR-4 and SR-160, which are under Caltrans jurisdiction. These limits are 20,000 pounds per axle and 10,500 per wheel or wheels on one end of the axle.

CURRENT ROADWAY AND INTERSECTION OPERATING CONDITION

The operating conditions of a roadway system are described using the term “level of service”. Level of service (LOS) is a description of a driver’s experience at an intersection or roadway based on the level of congestion (delay). However, it is not a measure of safety or accident potential. Intersection and roadway LOS can range from “A”, representing free-flow conditions with little or no delay, to “F”, representing saturated conditions with substantial delay.

LOS standards in Contra Costa County vary depending on the roadway facility and the particular section of the county in question. The proposed MLGS is located in the Eastern Contra Costa County section (East County). According to the Contra Costa Public Works Department, LOS C is considered the acceptable standard for streets not identified as a Route of Regional Significance (Contra Costa County 2009). **Traffic and**

Transportation Table 2 shows the existing peak hour traffic volume, average daily traffic, and LOS for SR-4 and 160, and applicable segments of Wilbur Avenue.

Traffic And Transportation Table 2
Roadway Segment, Existing Peak Hour Traffic Volume, Average Daily Traffic
and LOS

Roadway Segment	AM Peak Hour Volume	PM Peak Hour Volume	Average Daily Traffic (ADT)	LOS Peak/ADT
SR-4 at Willow Pass Road Intersection ¹	3,000 ²	6,000 ²	39,000 ¹	F/B&C ⁵
SR-160 at Wilbur Avenue ¹	990	n/a	14,900	C or better ⁵
Wilbur Avenue Viera Avenue to Fleming Avenue ³	601	164	9,400	C ⁴
Wilbur Avenue Fleming Avenue to SR-160 Southbound Ramp ³	572	122	9,600	B ⁴

Sources:

¹ Caltrans 2007 Traffic Counts.

² Metropolitan Transportation Commission, SR-4 Corridor, Draft Existing Conditions, January 23, 2009.

³ URS 2008a, Figure 7.10-7

⁴ URS 2008a, able 7.10-6

⁵ Caltrans Performance Monitoring System Data from the week of February 16-20, 2009

IMPACTS

PROJECT-SPECIFIC IMPACTS

Workforce Traffic

The construction of the proposed MLGS is expected to last a total of 33 months, with the peak construction period taking place during the 18th through the 23th month (URS 2008a, Table 7.10-9). Trip generation for the MLGS project was based on trip generation for similar projects. Using the number of construction workers on a monthly basis, staff believes that the MLGS project will generate 210 average daily construction personnel trips and 403 peak daily construction personnel trips (Ibid. Table 7.10-9). This estimate was derived based upon a conservative assumption that part of the workforce will carpool and the average vehicle occupancy will be 1.5 persons (Ibid, pg. 7.10-7).

According to the AFC, URS has assumed that approximately 85% of the construction trips will reach Wilbur Avenue via SR-4 and SR-160 from areas south, east and west of the Contra Costa Costa-Sacramento County line (Ibid, Figure 7.10-5). Staff believes that the construction worker trips to the proposed MLGS will originate from Contra Costa, San Joaquin, and Sacramento counties and will reach the project site via SR-4, SR-160 and Wilbur Avenue. The applicant's analysis assumes that 90% of the construction workforce traffic and 100% of the delivery trucks will arrival/depart MLGS site during the a.m. and p.m. peak hours (Ibid, pg. 7.10-7). Parking for the MLGS currently exists on-site.

Truck Traffic

Construction traffic will also consist of eight heavy vehicle truck trips per day during an average construction period. The project is expected to generate 16 to 18 heavy vehicle truck trips per day during the peak construction period. Staff assumes the same distribution of truck trips as the commute construction trips and would utilize SR-4, SR-160, and Wilbur Avenue to access the site. A passenger car equivalent (PCE) factor of three cars per truck was used by staff to determine the traffic impacts of trucks and heavy equipment deliveries (National Research Council 2000).

Total Project Construction Traffic

Total average construction traffic impact (workforce and trucks) would be 235 vehicle trips (210 workers plus 24 PCE for trucks and deliveries), or 437 one-way vehicle trips. Total peak construction traffic impact would be 457 vehicle trips (403 workers plus 54 PCE for trucks and deliveries), or 914 one-way vehicle trips. Both the average and peak construction increase in traffic would not be a major change when compared to existing conditions on SR-4, SR-160, and Wilbur Avenue, and the LOS B or C on local roads would not deteriorate. **Traffic and Transportation Table 3** presents some of the applicant's and Caltrans traffic study information plus staff's belief that with the implementation of proposed Condition of Certification **TRANS-1**, the MLGS peak construction traffic would not deteriorate the LOS on SR-4, SR-160 or Wilbur Avenue.

The applicant has agreed to develop and implement a construction phase traffic and monitoring control plan. This would address issues such as possible street or lane closures, use of signage and traffic control devices, and encouraging worker carpooling to minimize drive-alone worker trips (Ibid, pg. 7.10-12). In order to ensure that the LOS for local roads predicted by the models would be maintained, staff has incorporated these measures into staff's proposed Condition of Certification **TRANS-1**. A Caltrans traffic engineer familiar with local traffic conditions has recommended to staff that construction activities (workers and truck deliveries) that require freeway/ramp use avoid the commute (peak) period (Caltrans 2009). Condition of Certification **TRANS-1** complies with this recommendation.

In order to prevent dangerous road conditions, staff is proposing Condition of Certification **TRANS-2** which would require the project owner to repair any damage to local roads from construction traffic, particularly heavy trucks. The combination of commute, truck, and visitor traffic associated with the construction phase of the MLGS will increase the volume of traffic in the local area, however, the following roadway segments will remain at acceptable LOS:

Railways

The AFC indicates that freight rail service currently supplies the various industrial uses in proximity to the MLGS and the proposed MLGS Project will utilize the nearby rail facilities to transport heavy equipment (URS 2008a, pg. 7.10-9). Staff has been advised that the Contra Costa County Public Works Department and the city of Antioch Engineering Department will require heavy haul permits for using Wilbur Avenue (Contra Costa County Public Works Department 2009b, City of Antioch 2009). Staff has incorporated this requirement in proposed Condition of Certification **TRANS-1**. No

significant traffic impacts related to the existing railway facilities are anticipated with the addition of the proposed project.

Traffic And Transportation Table 3
Construction Traffic Impacts on Existing Levels of Service

Road Segment	Existing LOS Peak	Project Trips Peak Construction	Changes in Peak LOS with Project ³
SR-4 at Willow Pass Road Intersection	F/B&C ¹	457	F/B&C
SR-160 at Wilbur Avenue	C or better ¹	457	C or better
Wilburn Avenue – Viera Avenue to Fleming Avenue	C ²	457	C
Wilbur Avenue – Fleming Avenue to SR-60 Southbound Ramp	B ²	457	B

Sources:

¹ Caltrans Performance Monitoring System Data from the week February 16-20, 2009

² URS 2008a, Table 7.10-6

Linear Facilities

The Traffic and Transportation section of the AFC indicates that new water supply and waste water lines will be constructed for the project that will require trenching within or along Wilbur Avenue heading east to a connection with the Delta Diablo Sanitation District's Bridgehead Lift Station (just east of SR-160). This would require alternating partial road closure. These closures and other mitigation measures such as signage or flagman would be implemented in accordance with county and city requirements (Ibid, pg. 7.10-7).

Hazardous Materials

Construction of the MLGS will generate hazardous wastes consisting primarily of batteries, mercury (in switches and lights), asbestos-containing materials, and various liquid wastes (e.g., cleaning solutions, solvents, paint and antifreeze). Licensed hazardous waste transporters will have direct access to the MLGS via Wilbur Avenue. The close proximity of the MLGS to SR-160 and SR-4 eliminates the need to carry any hazardous wastes along residential streets. Routes for offsite removal of hazardous wastes would consist of SR-4 to Stockton with a connection to either I-5 or SR 99 to reach any of California's three Class I hazardous waste facilities (located in Kern, Imperial and Kings Counties).

The transportation and handling of hazardous substances associated with the MLGS can increase roadway hazard potential. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate the transportation of hazardous substances. Conditions of certification that ensure this compliance are discussed later in this analysis.

The State Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to carry a manifest, available for inspection by the California Highway Patrol at inspection stations along major highways and interstates. Drivers are also required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally important to ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol. For an in-depth description of the amount and type of hazardous materials that will be used during the construction of the facility, see the **WASTE MANAGEMENT** and **HAZARDOUS MATERIALS HANDLING** sections of the Preliminary Staff Assessment.

Operational Phase

Worker and Visitor Traffic

The operational phase of the MLGS generating plant will require the addition of 10 full-time employees. Adequate parking will be available for these employees on site. The existing state highway and county roadway system will not be impacted by any increase in commute traffic associated with the operation of the MLGS; therefore, the commuter and visitor traffic associated with the operational phase of the project is not expected to cause any significant traffic impacts. The Contra Costa Transportation Authority (CCTA) does not require a traffic impact study for projects that do not generate more than 100 peak hour trips (CCTA 2000c).

Truck Traffic

The transportation and handling of hazardous substances associated with the MLGS can increase roadway hazard potential. According to the AFC, operation of the project will require approximately two deliveries per week of aqueous ammonia solution. (URS 2008a, pg. 7.10-12). Direct access to the MLGS by licensed hazardous waste transporters will be via Wilbur Avenue. The close proximity of the MLGS to SR-160 and SR-4 precludes the need to carry any hazardous wastes along residential streets. Routes for offsite removal of hazardous wastes would consist of SR-4 to Stockton with a connection to either I-5 or SR 99 to reach any of California's three Class I hazardous waste facilities (located in Kern, Imperial and Kings Counties).

The existing state highway and county roadway system will not be significantly impacted by any increase in truck traffic associated with the operation of the MLGS Unit 8 project. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with Federal and State standards established to regulate the transportation of hazardous substances.

Linear Facilities

The operation of linear facilities that would serve the proposed MLGS is not expected to have any impacts on area roadways except for short-term maintenance or unplanned

difficulties. In either case, the impacts create traffic flow difficulties that are typically limited in duration and are not expected to cause any significant traffic impacts.

CUMULATIVE IMPACTS

The MLGS site is situated in a predominantly industrial land use area on the periphery of the City of Antioch. There are two existing power plants adjacent to the MLGS site; Contra Costa and Gateway. Combined with the relatively low density of other surrounding land uses, the addition of only 10 full-time employees, and the adequate roadway capacity on Wilbur Avenue, the MLGS is not expected to have any significant cumulative impacts (URS 2008aa). The applicant has assumed a four percent per year increase in peak hour turning movements on Wilbur Avenue through the year 2035 (URS 2008a, pg.7.10-10). Based on discussions with Contra Costa County Public Works staff, staff believes that this is a reasonable estimate. Contra Costa Transportation Authority staff has advised staff that SR-4 near the project area will be under construction from the present day until 2015 which involves widening a segment from the city of Antioch to the junction with SR-160 (CCTA 2009). In addition, Bay Area Rapid Transit will also build a new line from the city of Pittsburg to city of Antioch. Staff is unaware of any other development in the area that could combine with the MLGS project to produce cumulative impacts.

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its traffic impact analysis. There are no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues.

COMPLIANCE WITH LORS

The applicant has listed the applicable traffic and transportation LORS in the AFC table 7.10-16. Staff believes that the MLGS would be consistent with all applicable LORS identified in **Traffic and Transportation Table 4**.

Traffic & Transportation Table 4
Project Compliance with Applicable Traffic and Transportation LORS

Applicable LORS	Description
Federal: Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
	<u>Consistent:</u> The nearest airports are Buchanan (14 miles west) and Byron (15 miles southeast). Because of the distance between the airports and the MLGSD site, the applicant is not required to notify the FAA about project construction. No aeronautical studies are required to determine if project structures could affect operations at these or any other airport.

Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
	<u>Consistent:</u> Enforcement is conducted by state and local law enforcement agencies, and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., City of Victorville Department of Public Works).
<u>State:</u> California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, 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.
	<u>Consistent:</u> Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting, and/or local agency permitting.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
	<u>Consistent:</u> Enforcement is provided by state and local law enforcement, and through ministerial state agency licensing and permitting, and/or local agency permitting.
<u>Local:</u> Contra Costa County General Plan – Circulation Element.	Emphasizes the efficient use of the existing transportation system, particularly existing roadways and transit systems, and cost effective enhancements to this system to accommodate planned growth consistent with the Land Use Element.
	<u>Consistent:</u> With staff's proposed conditions of certification, the project would be consistent with the Circulation Element by ensuring the efficient use SR-4, SR-160, and Wilbur Avenue.

CONCLUSIONS AND RECOMMENDATIONS

1. The project as proposed would be consistent with the Circulation Element in the Contra Costa General Plan and would comply with all applicable LORS related to ground and air traffic, and would not degrade the LOS or have an adverse impact on SR-4, SR-160, and Wilbur Avenue.
2. During the construction and operation phases, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the county of Contra Costa.
3. Staff is proposing Condition of Certification **TRANS-1** which would, with the participation of the Contra Costa County Public Works Department, require the development and implementation of a construction traffic control plan which would require, among other things, workers to arrive and depart the site during off-peak hours. This would also apply to truck deliveries. This will ensure that the levels of service on SR-4, SR-160, and Wilbur Avenue do not deteriorate.

4. Staff is also proposing Condition of Certification **TRANS-2** which would require that any damage to Wilbur Avenue by project construction would be repaired to original condition. This will ensure that any damage will not be a safety hazard to motorists.
5. There would be no unmitigated significant direct or cumulative traffic and transportation impact and therefore no environmental justice issues.

The proposed conditions of certification identified below are those that staff believes are necessary to mitigate project traffic impacts. With these conditions, the MLGS will comply with all applicable LORS and will have no significant adverse traffic impacts.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall, in coordination with the Contra Costa County Public Works Department, develop and implement a construction traffic control plan prior to earth moving activities. Specifically, the overall traffic control plan shall include the following:

- Construction workers should arrive at and depart from the MLGS during off-peak traffic periods; before 7a.m. and after 9a.m. and before 4p.m. or after 6p.m.;
- Schedule delivery of heavy equipment and building material deliveries, as well as the movement of hazardous materials to the site, including the adjacent lay-down area, to occur during off-peak hours;
- Obtain heavy haul permits from the Contra Costa County Public Works Department and the city of Antioch Engineering Department;
- Coordinate with the Contra Costa County Public Works Department to mitigate any potential adverse traffic impacts from other proposed construction projects that may occur during the construction phase of the project; and
- Ensure there is adequate access for emergency vehicles at the project site.

The construction traffic control plan shall also include the following activities for water and waste water pipeline installation:

- Signing, lighting, and traffic control device placement;
- Temporary travel lane closures and potential need for flaggers;

Verification At least 60 days prior to start of site mobilization, the project owner shall provide to the Contra Costa County Public Works Department and the city of Antioch Engineering Department for review and comment and to the CPM for review and approval, a copy of the construction traffic control plan. The plan must document consultation with Contra Costa County Public Works Department and the city of Antioch Engineering Department.

TRANS-2 Prior to site mobilization activities, the project owner shall prepare a mitigation plan for Wilbur Avenue should it be damaged by project construction. The plan is should ensure that if Wilbur Avenue is damaged by project construction they will

be repaired and reconstructed to original or as near original condition as possible and shall include:

- Documentation of the pre-construction condition of the segment of Wilbur Avenue that provides access road to the site. Prior to the start of site mobilization, the project owner shall provide to the CPM photographs or videotape of Wilbur Avenue;
- Documentation of any portions of Wilbur Avenue that are not adequate to accommodate oversize or large construction vehicles, and identify necessary remediation measures;
- Provide for appropriate bonding or other assurances to ensure that any damage to Wilbur Avenue due to construction activities will be remedied by the project owner; and
- Reconstruction of portions of identified roads that are damaged by project construction.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a mitigation plan focused on restoring the local identified road to its pre-project condition to the city of Victorville for review and comment, and to the CPM for review and approval. Within 90 days following the completion of construction, the project owner shall provide photo/videotape documentation to the Contra Costa County Public Works Department and the city of Antioch Engineering Department, and the CPM that the damaged sections of the Wilbur Avenue have been restored to their pre-project condition.

REFERENCES

California Highway Patrol 2009. E-mail from Dawn Roe to James Adams, California Energy Commission, regarding vehicle collisions on SR-4 between A Street (city of Antioch) and SR-160 from January 2005 to June 2008, and on SR-160 from SR-4 to the Sacramento/Contra Costa County line from January 2005 to March 2008. E-mail was sent on February 24, 2009.

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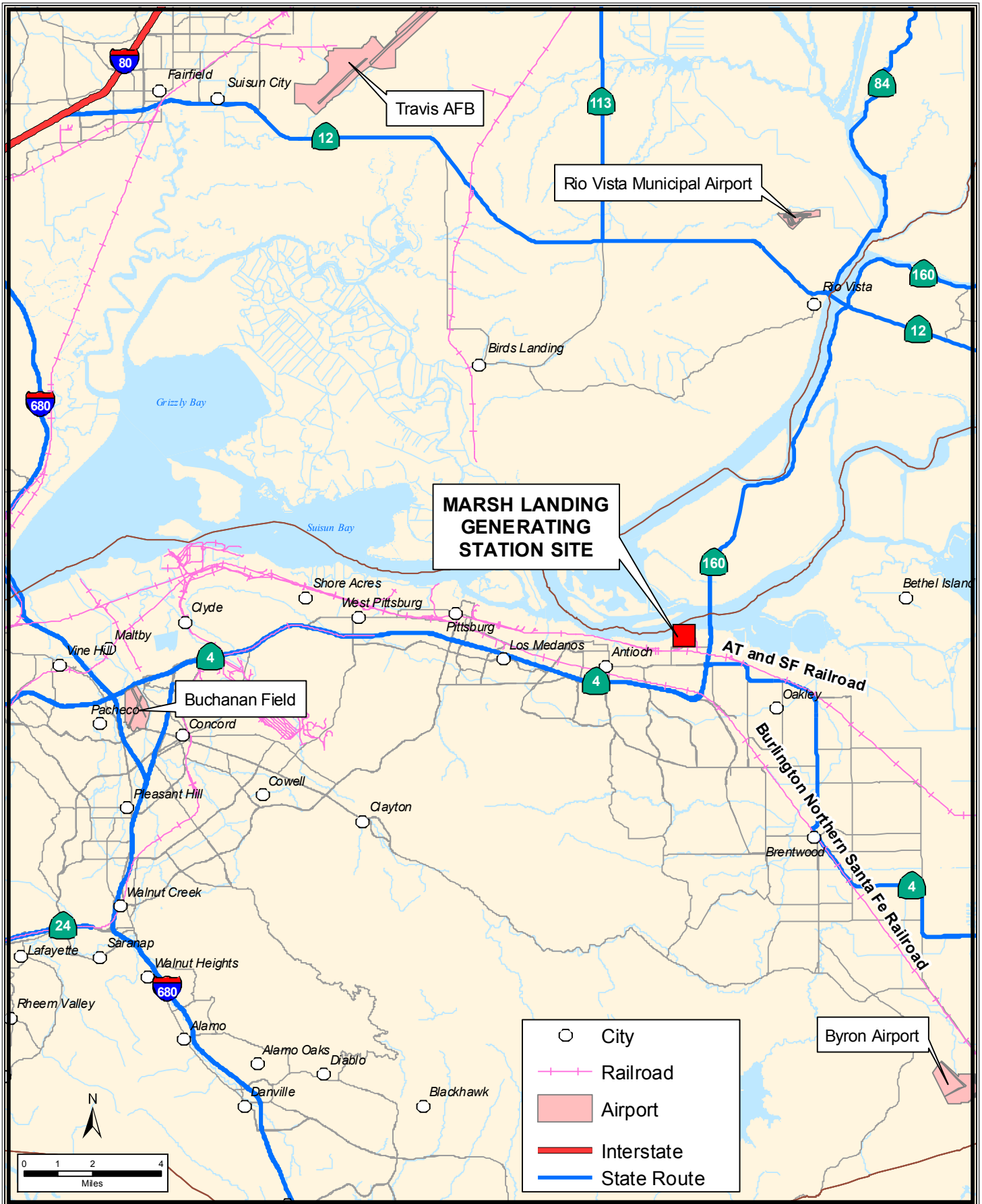
URS 2008a. Marsh Landing Generating Station (MLGS) Application for Certification, submitted to the California Energy Commission on May 30, 2008.

URS 2008b. MLGS Responses to Data Request, Set, submitted to the California Energy Commission on December 12, 2009.

URS 2008c. MLGS Site visit handouts, distributed on December 18, 2008.

URS 2009. E-mail from Anne Connell to James Adams on February 13, 2009.

TRAFFIC & TRANSPORTATION - FIGURE 1
Marsh Landing Generating Station - Regional Transportation System



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010
SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC & TRANSPORTATION - FIGURE 2
Marsh Landing Generating Station - Local Transportation System



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010
SOURCE: California Energy Commission - USGS TOPO QUADS

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelum, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, Mirant Marsh Landing , LLC (Mirant Marsh Landing) proposes to transmit the power from the proposed Marsh Landing Generating Station (MLGS) to the regional Pacific Gas and Electric (PG&E) 230-kilovolt (kV) transmission grid through three new single-circuit overhead 230-kV PG&E transmission lines connecting MLGS to the PG&E switchyard adjacent to the MLGS site. The lines and related switchyards would be designed, built, and maintained according to PG&E guidelines for line safety and field management that conform to applicable laws, ordinances, regulations and standards (LORS). MLGS would occupy approximately 27 acres in the western portion of the property of the existing Contra Costa Power Plant (CCPP) owned and operated by Mirant Delta, LLC (Mirant Delta). There are no nearby area residences, meaning that there would be no nearby residents to be exposed to the generated electric and magnetic fields. With adoption of staff's five proposed conditions of certification, any safety and nuisance impacts from use of the proposed MLGS lines would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the line design and operational plan for the transmission lines proposed for transmitting the power from the proposed Marsh Landing Generating Station to determine whether their related field and non-field impacts would constitute a significant environmental hazard in the area around the proposed routes. All related health and safety LORS are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- 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.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

**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	
Contra Costa County General Plan, Noise Element	References the County's Ordinance Code for noise limits.
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.

Applicable LORS	Description
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	
GO-131-D, CPUC "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.
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 site for the MLGS is a 27-acre plot in the western portion of the existing CCPP where the retired CCPP Units 1 through 5 are located. The site is at 3201 Wilbur Avenue in unincorporated contra Costa County, California. With the area presently utilized for industrial activities, the nearest residential area is approximately 2,500 feet southwest of the site boundary meaning that there would be no residences to be exposed to the line-generated electric and magnetic fields. The generated power would be transmitted to the area PG&E power grid using three new, single-circuit overhead 230-kV lines connecting the MLGS electric generators to the PG&E switchyard immediately adjacent to the project site. These lines would be located mostly within the MLGS site but will cross a small portion of the CCPP and then connect directly to the PG&E switchyard, meaning that they would be entirely located within the property boundaries of MLGS, CCPP, and the PG&E switchyard. Their total length would be 1,700 feet (MLGS 2008a, pp.1-3, 4-, and 4-4).

PROJECT DESCRIPTION

The proposed MLGS lines would consist of the following:

- Three new, 230-kV, overhead transmission lines connecting the MLGS generators to the adjacent PG&E switchyard;

- MLGS's on-site 230 -kV switchyard to which the new 230-kV lines would be connected; and
- Project-related upgrades at the PG&E switchyard to be connected.

The proposed lines would be supported on 11 steel pole structures 100 feet tall and would utilize standard low-corona aluminum, steel-reinforced cables utilized by PG&E and the major utilities for lines in this voltage class and current-carrying capacity. The applied design and construction methods would be in keeping with PG&E guidelines that ensure line safety and efficiency together with reliability, and maintainability (MLGS 2008a, pp. 4-1 through 4-8).

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 standards. These LORS and standards have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the proposed MLGS lines 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. Since there are no major airports in the vicinity of MLGS and proposed lines, there would be no collision hazard to area aircraft. Furthermore, the maximum height of the line support structures would, at 100 feet, be significantly below the 200-foot threshold of concern to the FAA in this regard. This means that an FAA notice of construction would not be required for the lines.

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 is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed lines would be built and maintained in keeping with standard 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 for those of 230-kV as proposed. The proposed low-corona designs are used for all PG&E and major utility lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Since there are no residences in the vicinity of the proposed line, staff does not expect any residential corona-related radio-frequency interference or related complaints in the general project area. However, staff recommends Condition of Certification **TLSN-2** to ensure mitigation as required by the FCC in the unlikely event of complaints.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. 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 MLGS. 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. 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-4** is recommended to ensure compliance with important aspects of the fire prevention measures (MLGS 2008a, p. 4-5).

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 (MLGS 2008a, p. 4-1, 4-2 and Figure 4-2) 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 right-of-way. This would be accomplished through standard industry grounding practices (MLGS 2008a, p. 4-5). Staff recommends Condition of Certification **TLSN-5** to ensure such grounding for the proposed line.

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 CPUC, other regulatory agencies, and staff have evaluated the available evidence and concluded that such fields do not 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 exposed 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. 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, the proposed line's fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the chosen 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 CPUC found that there is no need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project line, 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 line. These types of exposures are short term and well understood as not significantly related to the health concern. Given the potential for human exposures, staff recommends measurements of each line's maximum fields to allow for uniform, field strength-related characterization of all lines. It is such field strength measurements that are required in Condition of Certification **TLSN-3**

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 are 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 design of the proposed line 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 proposal to route the proposed line away from areas of human habitation is in keeping with present CPUC policy on field management. Staff recommends the measurement requirements in **TLSN-3** to validate the applicant's assumed reduction efficiency.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or estimated 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. As noted by the applicant (MLGS 2008a, p. 4-5), the conductors for the proposed line would be located entirely within MLGS, CCPP, or PG&E property boundaries or close to existing line corridors meaning that any measured intensities would reflect the interactive and thus cumulative impacts of fields from the proposed and contributing lines. Since the proposed lines would be designed according to applicable field-reducing PG&E guidelines (as currently required by the CPUC for effective field management), any contribution to total 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 line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-3**.

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 line and related switchyard 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 presented design and operational plans to be in compliance with the health and safety requirements of concern in this analysis and recommends approval. The actual contribution of the new or modified lines chosen line to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-3**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed MLGS.

CONCLUSIONS

Since the proposed lines would not 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 design, 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 proposed route.

Since electric or magnetic field health effects have neither been established nor ruled out for fields from the proposed MLGS 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 designs and operational plans would be adequate to ensure that the 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 line given the absence of residences along their proposed routes. 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 along a route without nearby residences, staff considers the proposed design, maintenance, and construction plans 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 new 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 thirty days before starting construction of the proposed new lines, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines and related structures will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the chosen line option or associated switchyard.

Verification: At least thirty days before starting operation of either line option, the project owner shall submit to the CPM a letter signed by a California registered electrical engineer affirming the project owner's intention to comply with this requirement.

TLSN-3 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the constructed line and system upgrades at the points of maximum intensity for which intensity estimates were provided by the applicant. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed no later than six months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-4 The project owner shall ensure that the rights-of-way of the MLGS 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: At least thirty days before the start of operations, the project owner shall transmit to the CPM a letter affirming the project owner's intention to comply with this condition.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the constructed project line are grounded according to industry standards regardless of ownership.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter affirming the intention to comply with this condition.

REFERENCES

Electric Power Research Institute (EPRI), 1982. Transmission Line Reference Book: 345 kV and Above.

MLGS, 2008a. Application for Certification (08-AFC-3) for Marsh Landing Generating Station, Volumes I and II submitted to the California Energy Commission on May 30, 2008.

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 David Flores

SUMMARY OF CONCLUSIONS

Staff has analyzed visual resource related information pertaining to the proposed Marsh Landing Generating Station and found that the project, with staff-recommended conditions of certification, would not introduce an adverse “Aesthetic” impact under the California Environmental Quality Act and Guidelines, and would comply with applicable laws, ordinances, regulations, and standards pertaining to aesthetics or preservation and protection of sensitive visual resources.

INTRODUCTION

Visual resources are the visible natural and man-made features of the environment. In this section, staff evaluates the proposed project’s construction and operation using the “Aesthetic” criteria of the California Environmental Quality Act (CEQA) Guidelines to determine if the project would introduce a significant impact under CEQA, and if the project would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or preservation and protection of sensitive visual resources.

In order to provide a consistent framework for the analysis, a standard visual assessment methodology developed by Energy Commission staff and applied to numerous siting cases in the past was employed in this study. A description of this methodology is provided in **Appendix VR-1**.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Visual Resources Table 1 provides a general description of identified adopted federal, state, and local LORS pertaining to aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project.

Policy 3-43	Industrial employment centers shall be designed to be unobtrusive and harmonious with adjacent areas and development.
Transportation and Circulation Element-Scenic Routes	
Policy 5-35	Scenic corridors shall be maintained with the intent of protecting attractive natural qualities adjacent to various roads throughout the county.
Policy 5-37	Scenic views observable from scenic routes shall be conserved, enhanced, and protected to the extent possible.
Open Space Element Scenic Resource Policies and Goals	
Goal 9-11	To protect major scenic ridges, to the extent practical, from structures, roadways, or other activities which would harm their scenic qualities.
Goal 9-12	To preserve the scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento-San Joaquin River/Delta shoreline.
Goal 9-20	New power lines shall be located parallel to existing lines in order to minimize their visual impact.

SETTING

The proposed Marsh Landing Generating Station (MLGS) would be built within Contra Costa County. The project is not within the current boundary of the City of Antioch. The City plans to annex the project area in the near future, but no timeline has been indicated as to when this will occur.

The proposed project is located on the southern shore of the San Joaquin River within close proximity to the Antioch Bridge, the principle gateway into the Sacramento/San Joaquin Delta from the San Francisco Bay Area. Scenic hills and ridgelines of Contra Costa County rise to the south, framing views of Mt. Diablo, the most prominent regional landmark. To the north lies the Sacramento/San Joaquin Delta, an extensive and highly distinctive regional landscape type dominated by the Sacramento and San Joaquin Rivers and characterized by large tracts of level reclaimed agricultural land and wetland. The project site itself is situated between these two landscapes, at the eastern edge of

a heavily industrial area on the San Joaquin River's southern shore, amid a very heterogeneous mix of land uses adjoining the eastern boundary of urban Antioch.

PROJECT SITE

The Marsh Landing Generating Station project site is located on relatively flat, previously disturbed terrain, south of the San Joaquin River, behind and to the west of the existing Units 1 through 7 of the Contra Costa Power Plant site (CCPP). PG&E's Gateway Generating Station (GGS) is just east of the project site. Five existing storage tanks will be demolished for use of the site for the new facility. **Visual Resources Table 2** depicts architectural elevations of the proposed power plant structures.

The 27-acre site is located in the western portion of the existing CCPP property on the northern side of Wilbur Avenue, in an unincorporated area of Contra Costa County among a diverse mix of industrial uses adjoining the eastern boundary of the City of Antioch. Immediately north of the project site is the San Joaquin River which is characterized by open, flowing water between flat meandering shorelines.

Mature eucalyptus and one oak tree currently located along the western edge of the project site would remain. The earthen berms surrounding the tanks will be removed as part of the demolition of the five tanks. The area will be re-graded to make room for the project.

Existing lighting at the CCPP facility is shielded from upward light casting and is of low-intensity, amber color. While this lighting highlights the facility at night, it is perceptibly less bright and intrusive than that of other nearby industrial facilities in the immediate vicinity, notably the brightly lit GWF power facility southeast of the site.

VISUAL RESOURCES Table 2
Summary of Major Publicly Visible Structures

Proposed New Project Component	Number of Units	Length and Width (approximately)	Height (approximately)
Raw Water Tank	1	82 feet diameter	45 feet
Turbine Enclosures	4	75 x 47 feet	76 feet
SCR stacks	4	31 feet	165 feet
Demineralized Water Storage	1	55 feet diameter	55 feet
Waste Water Storage Tank	1	50 feet diameter	50 feet

Transmission Lines – The transmission line interconnection will be a single circuit 230-kV transmission lines from the new generators to the adjacent PG&E switchyard.

Water Discharge and Water Supply – Offsite facilities include water supply and water discharge pipelines and connections to the City of Antioch's water system along Wilbur Avenue. Total length of the water pipelines is approximately 1,500 ft.

Natural Gas Pipeline – The natural gas interconnection pipeline will run east from the MLGS compressor building through the CCP site to an existing gas transmission line (Line 400) adjacent to the Gateway Generating Station.

Construction Staging Area – Both construction laydown and parking areas are located on the project site primarily south of the transformer block of the PG&E switchyard and north of the tree line along Wilbur Way. Total acreage for the laydown and parking area is approximately 14 acres.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, Energy Commission staff reviews the project using the 2008 CEQA Guidelines Appendix G Environmental Checklist pertaining to "Aesthetics." The checklist questions 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?

Staff evaluates both the existing visible physical environmental setting, and the anticipated visual change introduced by the proposed project to the view, from representative, fixed vantage points (called "Key Observation Points" [KOPs]). KOPs are selected to be representative of the most characteristic and most critical viewing groups and locations from which the project would be seen. The likelihood of a visual impact exceeding Criterion C of the CEQA Guidelines, above, is determined in this study by two fundamental factors: the susceptibility of the setting to impact as a result of its existing characteristics (reflected in its current level of visual quality, the potential visibility of the project, and the sensitivity to scenic values of its viewers); and the degree of visual change anticipated as a result of the project. These two factors are summarized respectively as *visual sensitivity* (of the setting), and *visual change* (due to the project) in the discussions below. Briefly, KOPs with high sensitivity (due to outstanding scenic quality, high levels of viewer concern, etc.), that experience high levels of visual change from a project, are more likely to experience adverse impacts. KOPs with low sensitivity or low levels of visual change are less likely to experience adverse impacts.

Staff also reviews federal, state, and local LORS and their policies or guidelines for aesthetics or preservation and protection of sensitive visual resources that may be applicable to the project site and surrounding area. These LORS include local government land use planning documents (e.g., General Plan, zoning ordinance).

Visual Resources Figure 2 shows the locations of the seven KOPs used in this analysis:

- KOP 1 – view looking directly south across the San Joaquin River at the MLGS project site;
- KOP 2 – view represents views of motorist in southbound lanes of SR 160 at the approach of the Antioch Bridge;
- KOP 3 – represents viewers from the Sportsmen Yacht Club
- KOP 4 – represents the closest residential viewers in eastern Antioch;
- KOP 5 – represents recreational viewers of an Antioch driving range and batting cages;
- KOP 6 – represents commuters and residential views along Oakley Road at Calle de Oro road near SR 160; and
- KOP 7 – represents views from the back of a residential development off a cul de sac along Bluebell Circle.

The seven KOPs were selected to represent the overall project viewshed or area of potential visual effect (the area within which the project could potentially be seen). See Appendix VR-1 for information about the process used to evaluate each KOP. Staff's analysis of the project's effect on each KOP is presented under Operation Impacts and Mitigation section of this analysis.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following four criteria from CEQA Guidelines Appendix G: scenic vistas, scenic resources, visual character or quality, and light or glare.

A. SCENIC VISTAS

"Would the project have a substantial adverse effect on a scenic vista?"

A scenic vista for the purpose of this analysis is defined as a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality. There are no scenic vistas in the KOP 1 through KOP 7 viewsheds, based on staff's field reconnaissance, review of topographical maps, and review of the Contra County's General Plan documents. In addition, there are no scenic vistas designated by Contra Costa County or the City of Antioch. The proposed project would not cause a significant visual impact to a scenic vista.

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?”

A scenic resource for the purpose of this analysis includes 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 other scenically important physical features, particularly if located within a designated federal scenic byway or state scenic highway corridor.

SR 160 is a designated State Scenic Highway, and SR 4 east of the Antioch Bridge is eligible for designation as a State Scenic Highway. Scenic corridor controls applied to SR 160 by Sacramento County (the responsible agency) are limited to a sign ordinance.

The identification of road corridors as either eligible or designated scenic highways is a strong indication of the scenic value of that corridor’s viewshed and an indicator of high visual sensitivity in the assessment of potential visual impacts.

Other notable scenic resources identified within the project viewshed are the San Joaquin River which is discussed under the KOP 2 analysis of potential impacts. As reflected in KOP 2 visual discussion and as shown in Visual Resources Figure 4b, the proposed project will not result in substantial damage to scenic resources.

C. VISUAL CHARACTER OR QUALITY

“Would the project substantially degrade the existing visual character or quality of the site and its surroundings?” The project aspects evaluated under this criterion are broken down into two categories: Construction Impacts and Operation Impacts.

Construction Impacts and Mitigation

The AFC and Supplemental material indicates that both construction laydown and parking areas are located on the northern project boundary near the San Joaquin River and also south of the transformer block of the PG&E switchyard and north of the tree line along Wilbur Avenue (see **Project Description Figure 3**). The equipment and material storage would be prominent and the effect would potentially not be beneficial, but adverse, for the duration of project construction. In the worst case, prominent and unsightly construction staging at this location could result in adverse impacts to viewers on Wilbur Avenue and recreational viewers along the San Joaquin River. To address this potential impact, staff recommends Condition of Certification **VIS-2**, which provides for screening during construction. With this condition, and considering the temporary nature of construction, impacts at the project site would be less than significant.

Trenching for cut-and-cover construction of a proposed potable water supply and discharge pipeline along Wilbur Avenue would create a temporary visual disturbance. These disturbances would be phased, and given the temporary short-term effect, the visual impact would be less than significant.

Other major project construction activities would be largely screened from off-site viewpoints by the three existing storage tanks on the southwest boundary of the property site, and tree line along Wilbur Avenue. Considering the moderate existing visual quality of this segment of Wilbur Avenue, the fleeting nature of views within it, the relatively limited number of affected viewers, and the temporary nature of impacts, these effects are considered to be less than significant.

Anticipated impacts from construction lighting are discussed under **Light or Glare**.

Staff-Recommended Mitigation: To address the potential adverse impacts of construction and construction staging at the project site, staff recommends Condition of Certification **VIS-2** which would include the following:

- planting of additional landscape screening, including tree and shrubs on the western boundary of the project site at the earliest feasible time, during early stages of project construction; and,
- temporary, dark-colored opaque fabric or slated chain link fencing surrounding the staging areas to provide screening in the short term, as landscape screening matures.

Operation Impacts and Mitigation

As described above, operation impacts are discussed by representative key observation points (KOPs). As also described previously, potential impacts are identified by two fundamental factors for each KOP: *visual sensitivity* (the susceptibility of the setting to impact as a result of its existing characteristics, including current level of visual quality, potential visibility of the project, and sensitivity to scenic values of viewers); and the degree of *visual change* anticipated as a result of the project.

KOP 1 – View looking directly south across the San Joaquin River at the MLGS project site

Visual Resources Figures 3a and 3b depict the view looking directly south across the San Joaquin River at the MLGS project site and is primarily representative of recreational boaters embarking from the marinas adjacent to the project site who would have views of the site from very close foreground distances see (**VISUAL RESOURCES Figure 3b**). Although the river landscape is of high visual quality overall, views from boats traveling west of the Antioch Bridge are already degraded by the existing CCPP, PG & E's GGS and other prominent industrial facilities near the water. Views from the river near the marinas are thereby considered to have moderate to high visual quality, depending upon the segment of view, and moderate quality overall. Viewers from the river are considered to have moderate to high sensitivity, depending upon location and activity.

Visual Sensitivity

Several marinas are located immediately east of the project site. Views of the MLGS from these marinas are highly filtered by intervening structures and trees. Where views of the MLGS may be seen is generally low quality due to the highly industrial character. Viewer exposure to the project site, which occupies the visual foreground of the river front to the south, is moderate. The viewers along this portion of

the river are generally local recreational boaters traveling to and from the marinas and out towards the San Francisco Bay and can vary in number depending upon the time of the year. In this area of the river, the duration of view will be moderately low, from 10 to 20 seconds, because the recreationist attention tends to be drawn to maneuvering their boats along this stretch of water to avoid sand bars on their way out to bay, but the prominent and striking upper portions of the power plant structures would draw viewers' attention toward the site momentarily. Visual quality is considered low to moderate for the views of the project site from the river, because of the existing industrial features. Viewer concern is considered moderate due to the moderate scenic quality of this portion of the San Joaquin River.

The overall visual sensitivity for recreationist is considered moderate from KOP 1. This assessment is the result of the moderately low visual quality, moderate viewer concern, and low to moderate viewer exposure.

Visual Change

As depicted in **Visual Resources Figure 3b**, the project would be clearly seen from this segment of the viewshed. From some viewpoints, such as this one, the project would be seen with minimal filtering by existing landscaping. From other segments of the river, the project would be partially screened by tree canopy, with the upper portions of the exhaust stacks visible above the canopy. In either case, the project would introduce contrasting elements of vertical and rectilinear form and line, light and contrastive coloring in relation to the visual background of natural hillsides, resulting in a moderate level of contrast.

The applicant shows in their photo simulations and architectural rendering that the exteriors of major project structures would be treated with an earth tone finish intended to optimize its visual integration with the hillsides in the background. (see **Visual Resources Figure 3b**).

Staff has proposed Condition of Certification **VIS-1** which requires that all project features be colored to blend in with the existing landscape to the greatest extent feasible in accordance with a Surface Treatment Plan that would be approved by the Compliance Project Manager (CPM).

The photo simulation of the project structures shows the proportionate size relationship to other manmade and natural elements. The project would occupy a small portion of the total field-of-view of KOP 1. In addition, the project's lower profile design features such as the lower stack heights and shielding of night lighting would minimize and reduce potential viewer impacts in this KOP view. The overall visual scale of the structures as simulated in the KOP 1 viewshed is considered to be moderate.

Overall visual dominance of the project would remain visually subordinate to the hillsides in the background. The vertical form and line of stacks would silhouette against the hillside to a degree, increasing dominance and attracting attention to a moderate degree.

The project would not block high quality or scenic views from key viewpoints in this general area. Vertical features would not intrude into the sky, but remain visually subordinate.

Due to the moderate level of contrast, subordinate visual dominance, and low view blockage, overall visual change due to structures would be moderate.

Impact Significance – In the context of the setting's moderate visual sensitivity, and the moderate level of project visual change, the project's visual impact at KOP 1 would be adverse, but less-than-significant.

Staff-Recommended Mitigation- Reduction of the structure's color contrast would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff recommends adoption of Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast. In this instance, a color more closely matching the color value of the background hills would reduce color and overall contrast. Additional screening of the facility with in-fill perimeter landscape plantings and directional lighting requirements would further reduce project line and form contrast. Staff recommends Condition of Certification **VIS-2**, Perimeter Landscape Screening and Replacement Planting, and **VIS-3** which addresses permanent lighting for the project.

Residual Impact Significance After Mitigation with Staff-Recommended Measures- With staff recommended measures; the adverse visual impact generated by the proposed project can be minimized for the life of the project.

KOP 2– View taken from southbound SR 160 on Antioch Bridge

Visual Resources Figures 4a and 4b represents views of the project site from the nearest viewpoint on SR 160 prior to the Antioch Bridge at a foreground distance of roughly 1.5 miles. Views from this point and from background distances (5 miles) on SR 160 are similar but with the project becoming less prominent with increased distance. At these distances the new project structures would be a very subordinate new element in the view and would not be noticed by most casual viewers.

Visual Sensitivity

This view is representative of views of motorists in southbound lanes of the Antioch Bridge. Panoramic views of the river and hills are compromised by the prominent, highly industrial character of the existing CPPP and GGS in the foreground, and other industrial facilities to the west as well as industrial and commercial developments along SR 4 to the south.

The mix of transmission structures and lines, existing power plant structures and stacks, storage tanks and industrial buildings near the project site filter views of the site. In this area, motorists' attention tends to be drawn to the roadway due to the bridge's narrow width, protective concrete walls and bridge railing along this stretch of highway rather than westward toward the project site. Existing visual quality in the vicinity,

characterized by views of the hillsides and ridgelines, is moderate. Viewer concern is also considered moderate due to the visual quality of this portion of this state route.

Approximately 12,942 vehicles per day use SR-160. About half of these vehicles would be southbound; therefore the number of viewers will be moderate. Staff traveled along this stretch of SR-160 and estimated the duration of view of the power plant site for motorists traveling south through the KOP 2 viewshed at the legal speed limit (45 miles per hour) to be 5 to 10 seconds. This is considered to be a low visual duration. As indicated earlier, surrounding industrial uses (i.e., existing power plants and transmission towers) disrupt the continuity of a motorist's ground level view of the project site along this segment of SR-160. The taller power plant structures would be visible from a greater distance. The visibility of the project site is considered low. Overall exposure for the motorist is considered to be moderately low.

The overall visual sensitivity for motorist is considered low to moderate from KOP 2. This assessment is the result of the moderately low visual quality, moderate viewer concern, and moderate overall viewer concern.

Visual Change

As depicted in **Visual Resources Figure-4b**, the project would introduce elements of vertical and rectilinear form and line contrast, silhouetted against the backdrop of the surrounding hills. It would also present light, contrastive coloring in relation to the dark visual foreground of natural vegetation of low profile native shrubs on the hillsides, resulting in a moderately low level of contrast.

The project would attract viewers' attention due to its contrastive, vertical form and industrial character. It would remain visually subordinate to the hillsides within the same view, but would also compound the industrial character of this view. Overall dominance would be moderate (co-dominant).

The project would introduce vertical structural lines and linear forms, specifically the combustion generators and stacks. The introduced forms and lines would be consistent with forms and lines already established by the industrial features in close proximity of the project site (transmission towers and existing stacks from the existing CPPP and Gateway Generating Station). Contrast is therefore considered low from this KOP.

From KOP 2, visual dominance of the MLGS structures would be subordinate to the existing power plant structures (i.e., it would be smaller in height, bulk, massing and overall magnitude than the existing power plant facilities) and generally weak. As motorists continue south along SR 160 the power plant moves out of the 45 degree cone of vision, and would no longer be visible to the viewer, therefore dominance of the power plant structures would be negligible.

The project would not block scenic views from vantage points in this general area. Vertical features would not intrude into the sky and would not alter the existing tree canopy.

Overall visual change would therefore be moderate.

Impact Significance – In the context of the setting’s moderate visual sensitivity, and the moderate level of project visual change, the project’s visual impact at KOP 2 would be less-than-significant.

Staff-Recommended Mitigation- To insure that adverse impacts are minimized for the life of project, staff recommends Condition of Certification **VIS-1**, painting of all project structures to ensure feasible color blending with the surrounding landscape. In this instance, an earth tone color more closely matching the color value of the surrounding background hillsides would reduce color and overall contrast against the hillsides. Staff also recommends Condition of Certification **VIS-2**, which provides additional perimeter landscape screening, and replacement planting to enhance screening of tall project features in the long term.

KOP 3 – View from Sportsmen Yacht Club

Visual Resources Figures 5a and 5b depict the view from the balcony of the Sausalito Ferry, Sportsmen Yacht Club. The view is from the outdoor south-facing balcony of the Sausalito Ferry, which is connected to the main meeting area on the ferry’s second level and receives heavy use during periodic social events at the club. The existing view is of low visual quality due to the industrial character presented by the existing CCPP and the GGS.

Visual Sensitivity

The Sportsmen Yacht Club has immediate foreground views of the project site across an existing access road and through PG&E’s GGS project site. The club has 170 members with two to three long-term ‘live-aboard’ members and one on-site caretaker residence. The club’s historic Sausalito Ferry is dry-docked approximately 50 feet from the GGS property line and approximately 2,000 feet from the MLGS property line, and serves as the principal meeting place for club members. The clubhouse receives frequent use, for both weekly gatherings and regular special events throughout the year. Members regularly stay overnight and the clubhouse is heavily used as a meeting place on weekends. An estimated 175 persons gather for larger events approximately 15–18 times per year.

The main use area is the second level meeting hall. A south-facing balcony on this level (approximately 15 feet above ground level) is the location of KOP 3, and is an extension of that meeting area. This balcony and a similar north-facing balcony are the principal locations from which open views to the site occur. Trees along portions of the property line intermittently filter existing views from the Sportsmen Yacht Club to the project site. Interior views from the ferry to the project site are very limited and of much less importance.

From KOP 3, visual quality towards the MLGS is low, reflecting the mix of transmission structures and lines, the CCPP and GGS structures and stacks, storage tanks and industrial buildings.

As part of the GGS proposed landscape screening plan, new trees are now being planted along the GGS’s eastern property line boundary to form a solid, dense visual

screen. At maturity (10-15 years) proposed trees would be approximately 30 feet in height (somewhat taller than the existing trees seen in this view).

VISUAL RESOURCES Figure 5b shows a worst-case view of the MLGS. Almost all viewers exposed to this view of the project would have moderately low level of concern due to their brief, transitory exposure. From this KOP and the general vicinity of the project would be visually subordinate to the existing power plant structures. Worst-case views of the cooling towers would remain co-dominant until proposed landscape screening reaches a height of about 20 feet (approximately 5 years), becoming subordinate as landscaping approaches maturity (30 feet in height, an estimated 10–15 years).

Because of the low to moderate visual quality of the view from KOP 3, the very transient nature of viewers, and the limited visibility of the MLSG from most activity areas of the yacht club, views of the project site are largely screened now by intervening structures, the adverse impact of the view of the project from balcony of the Sportsmen Yacht Club would eventually be reduced as a result of proposed landscape screening now being instituted by the Gateway Project. When the screening approaches maturity (10 to 15 years) it would substantially mitigate moderately high project effects and in would provide a higher degree of screening of the CCPP and MLSG as a whole than currently exists.

Visual exposure to the project site is considered moderate because of the limited viewer exposure which would generally be in the evening hours, distance from the project site, and adjacent screening at the site. Overall visual sensitivity of this viewer group is therefore considered moderate.

Visual Change

As depicted in **Visual Resources Figure 5b**, the vertical and rectilinear form and line of the power plant would contrast with the irregular silhouette of the background hills and sky. Overall, visual contrast at these distances would be moderate.

The photo simulation of the project structures shows the proportionate size relationship to other man-made and natural elements. The project would occupy a small portion of the total field-of-view of KOP 3. The structures would not visually appear dominant when compared to other elements (transmission towers, two existing power plants) in the view. The overall visual scale of the structures as simulated in the KOP 3 viewshed is considered to be moderately low.

The project would introduce publicly visible structures to the KOP 3 viewshed; the degree of view blockage introduced by the structures is considered to be moderately low. There is no identified or designated scenic resource or vista in the viewshed that would be blocked from view by project structures.

The overall visual change to the KOP 3 viewshed is considered moderately low as a result of moderately low visual contrast, moderately low dominance, and low view blockage.

Impact Significance-Staff concludes the introduction of the MLGS project structures would not substantially degrade the existing viewshed at KOP 3. Considering the overall moderately low visual sensitivity of viewers from KOP 3 and the moderately low overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

*Staff-Recommended Mitigation- To insure that adverse impacts are minimized for the life of project, staff recommends Condition of Certification **VIS-1**, painting of all project features to blend in with the existing landscape to the greatest extent feasible in accordance with a Surface Treatment Plan that would be approved by the CPM.*

KOP 4 – View from Residential Viewers in Eastern Antioch.

Visual Resources Figures 6a and 6b depict the view from an estimated 78 residences that comprise the Viera Avenue and Santa Fe Avenue neighborhood located within one mile of the proposed MLGS site. Views toward the existing power plants are of low visual quality

Visual Sensitivity

The major elements in this view are the transmission lines, large storage tanks and the CCPP and GGS exhaust stacks, and other vertical structures in the foreground and middle ground. The KOP 4 viewshed does not include a scenic resource or vista. The visual quality from KOP 4 is considered to be low.

From this KOP, the residential viewers are accustomed to a view of the storage tanks, the existing CCPP and GGS plant sites, and the transmission line corridor in the middle ground of the viewshed. There is no focal point in the viewshed that draws the viewer's eye to a unique feature. For these reasons, viewer concern from KOP 4 is considered to be low.

The visibility of the project site is considered low to moderate due to relatively few and scattered views because of yard landscaping, intervening homes and railcars situated on the rail tracks outside the fence lines of the residential homes. Viewer exposure is rated low because of low duration of view from approximately 20 viewers and moderately low visibility. Overall visual sensitivity is moderately low due to moderately low visual quality, low viewer concern, and low viewer exposure.

Visual Change

The applicant prepared a photo simulation that shows that the proposed project's publicly visible structures are visible from the KOP 4 location (see **Visual Resources Figure 6b**). The photo simulation of the project structures shows the proportionate size relationship to other man-made and natural elements. The project would occupy a small portion of the total field-of-view of KOP 4. The structures would not visually appear dominant when compared to other elements (transmission towers, two existing power plants, storage tanks) in the view. The overall visual scale of the structures as simulated in the KOP 3 viewshed is considered to be moderate.

The proposed projects exhaust stacks' vertical and cylindrical form would be noticeable from the KOP 4 location. The introduced forms and lines would be consistent with the existing stacks from the SSG and GGS power plants in the area. The degree of contrast introduced by the project's structures is considered moderately low when compared to the natural elements in the KOP viewshed (see **Visual Resources Figure 6b**).

Staff concludes the introduction of the MLGS structures would not substantially degrade the existing viewshed at KOP 4. When considering the moderately low overall visual sensitivity of the viewers at KOP 4 and moderately low overall visual change, the introduction of the proposed project's structures would generate a less than significant visual effect at this KOP.

Impact Significance – In the context of the setting's moderately low visual sensitivity, and the moderately low level of project visual change, the project's visual impact at KOP 4 would be less-than-significant.

KOP 5 – Represents Recreational Viewers of a Driving Range and Batting Cages in eastern Antioch.

Visual Resources Figures 7a and 7b depict the view from an Antioch golf driving range. Viewers from KOP 5 are primarily high sensitivity recreational viewers. The driving range has foreground view with significant screening from the above ground storage tanks as reflected in Figure 7b. The existing CCP and GGS are partially screened by the netting associated with the driving range. An existing steel lattice transmission towers span the foreground view.

Visual Sensitivity

The major elements in this view are the above ground storage tanks, electrical transmission towers and the CCP and GGS facilities in the foreground, with a partial view of the MLGS stacks visible in the background. The KOP 5 viewshed does not include a scenic resource or vista. The visual quality of the KOP 5 viewshed is considered to be low.

From this KOP, the recreational viewer is accustomed to a view of the storage tanks transmission towers, and the existing power plant sites in the foreground of the viewshed. There is no focal point in the viewshed that draws the viewer's eye to a unique feature. The estimated level of viewer concern from preserving the existing KOP 5 viewshed is considered to be low and overall viewer exposure is considered low.

The visual sensitivity for recreational viewers at the golf driving range from KOP 5 would be considered moderately low. This assessment is the result of a moderately low visual quality, moderately low viewer concern, and moderately low viewer exposure.

Visual Change

Visual Resources Figure 7b represents a photo simulation of the proposed project's publicly visible project structures after the completion of construction in the KOP 5 viewshed.

The projects exhaust stacks' vertical and cylindrical form would not be considerably noticeable from the KOP 5 location due to the existing storage tanks and electrical transmission facilities. The introduced forms and lines would be consistent with the existing stacks from the CCPP and GGS power plants in the area. The degree of contrast that would be introduced by the project's structures is considered low when compared to the elements in the KOP-5 viewshed.

The photo simulation of the project's structures shows the proportionate size relationship to the other elements in the view. The project structures would occupy a minor portion of the total field-of-view of KOP 5. In addition, the structures would not appear visually dominant when compared to other elements in the KOP view (storage tanks, existing power plant facilities, and transmission towers in the foreground) but would appear as a minor addition to the existing setting in comparison to the existing storage tanks, SSGS and GGS power plant structures and exhaust stacks. The relative dominance of the new structures, as simulated for the KOP 5 viewshed, is considered to be low.

Although the project would introduce publicly visible structures to the KOP viewshed, the degree of view disruption introduced by the structures is considered to be low. There are no identified or designated scenic resources or vistas that would be blocked by the project structures in this viewshed.

Impact Significance – Staff concludes the introduction of the MLGS project would not substantially degrade the existing viewshed at KOP 5. When considering the overall low visual sensitivity of the recreational receptor at KOP 5, and overall low visual change, the introduction of the proposed project structures would not substantially change or degrade the visual setting of the surrounding area. The impacts therefore are considered to be less than significant.

KOP 6 – View from the intersection of Calle de Oro and Oakley Road near SR-160

Visual Resources Figures 8a and 8b represents views from a residential neighborhood located about one and a half miles southwest of the project site as well as travelers on SR-160.

Visual Sensitivity

The major elements in this view looking toward the MLGS project site are industrial structures which include the SSGS and GGS power plants with its vertical exhaust stacks in the middle ground.

A high number of viewers travel on SR-160. The Caltrans traffic count in 2000 near this location had a vehicle count of 198,000 vehicles per day. A vehicle traveling through this portion of SR-160 would experience highway speeds between 15 mph during morning and evening commute times and 65 mph or more during non-peak periods. It is estimated that the traveling viewer in the project viewshed could see the proposed project for about 10 seconds or less under normal driving situations. Existing industrial structures are in the middle ground and foreground views with the upper portions of the exhaust stacks most noticeable from KOP 6.

Residential viewers leaving the residential subdivision and onto Calle de Oro Road are accustomed to a view of the existing vineyard, SR-160 and industrial developments in the foreground, the transmission lines in the middle ground and the existing power plant sites in the middleground. There is no focal point in the viewshed that draws the viewer's eye to a unique feature other than the vineyard.

From KOP 6, visual quality is considered moderately low. Viewer concern is moderately low because most viewers along SR-160 and residential viewers expect a visual setting with a mix of commercial and industrial buildings. Visibility is moderately low because of some screening by buildings and trees. Although the potential number of viewers is high, overall viewer exposure is rated low to moderate because of low duration of view and moderate visibility. Overall visual sensitivity is low due to low visual quality, low viewer concern, and low viewer exposure.

Visual Change

Visual Resources Figure 8b represents photo simulation of the proposed project's publicly visible project structures after the completion of construction in the KOP 6 viewshed.

The photo simulation shows that the proposed project's publicly visible structures are visible from the KOP 6 location (see **Visual Resources Figure 8b**). The photo simulation of the project structures shows the proportionate size relationship to other man-made and natural elements. The project would occupy a small portion of the total field-of-view of KOP 6. The structures would not visually appear dominant when compared to other elements (transmission towers, two existing power plants) in the view. The overall visual scale of the structures as simulated in the KOP 3 viewshed is considered to be moderately low.

The proposed projects exhaust stacks' vertical and cylindrical form would be noticeable from the KOP 6 location. The introduced forms and lines would be consistent with the existing stacks from the SSG and GGS power plants in the area. The degree of contrast introduced by the project's structures is considered moderately low when compared to the natural elements in the KOP viewshed.

The photo simulation of the proposed project's structures shows the proportionate size relationship to the elements in the view. The project structures would occupy a minor portion of the total field-of-view of KOP 6. In addition, the structures would not appear co-dominant when compared to other elements in the KOP view (commercial/industrial development and transmission towers) but would appear as a minor addition to the existing setting in comparison to the existing SSG and GGS power plant structures and exhaust stacks. The relative dominance of the structures as simulated in the KOP 6 viewshed is considered to be moderately low.

Although the project would introduce publicly visible structures to the KOP viewshed, the degree of view disruption introduced by the structures is considered to be low. There are no identified or designated scenic resources or vistas that would be blocked by the project structures in this viewshed.

Impact Significance – Staff concludes the introduction of the MLGS project would not substantially degrade the existing viewshed at KOP 6. Considering the overall low visual sensitivity of the vehicle traveler at KOP 6, and overall moderately low visual change, the introduction of the proposed project structures would not substantially change or degrade the surrounding area. The impacts are considered less than significant due to the fact that viewers would not notice the introduction of an additional industrial structure within an area of the county already zoned for industrial.

KOP 7 – View from a Hillside Residential Subdivision south of SR-4

Visual Resources Figures 9a and 9b depict views from a hillside neighborhood that is a residential development mixed with associated commercial services that occupies the lower hills south of SR 4 approximately two miles southwest of the project site. Homes on these north-facing slopes have scenic, panoramic views of the San Joaquin River and the arch of the Antioch Bridge, but also overlook heavy industrial facilities in the foreground of those views (see **(VISUAL RESOURCES Figure 9a**, the view from KOP 7). Despite the elevated position of this viewpoint, views to the project site were found to be scattered and spotty due to variations in topography and the presence of other scattered homes and vineyards in the foreground. The area is of moderate visual quality typical of a suburban residential neighborhood and has a high level of visual sensitivity due to its residential use.

Visual Sensitivity

The major elements in this view are the rolling hills, vineyard, and scattered homes in the foreground and middle ground. The KOP 7 viewshed does not include a scenic resource or vista. The visual quality from KOP 7 is considered to be moderate.

From this KOP, the residential viewer along this roadway is accustomed to a view of the exhaust stacks from the CCPP and PG&E's GGS, the existing Mirant storage tanks, and the commercial and industrial corridor in the foreground of the viewshed. The one large exhaust stack and the Antioch Bridge draw the viewer's eye. For these reasons, viewer concern from KOP 7 is considered to be moderate.

Due to the topography and partial blockage by the trees and various structures, viewers in the area of KOP 7 would only be exposed to a partial view of the project's stacks and the upper portion of the dry cooling unit. The neutral color and non-reflective surface of the MLGS will reduce its visual contrast with the surroundings. The visibility of the MLGS project is considered moderate because it would be screened by the surrounding industrial setting (e.g. transmission structures, storage tanks, industrial buildings). The viewer impact levels in this area are expected to be low and would not be significant. Viewer exposure is rated low because of low duration of view and moderate visibility. Overall visual sensitivity is low due to visual quality, viewer concern, and viewer exposure.

Visual Change

The applicant prepared a photo simulation of the publicly visible project structures after the completion of construction in the KOP 7 viewshed. The photo simulation shows that the project's publicly visible structures are noticeable but appear to blend well within the

general industrial setting (see **Visual Resources 9b**). The project structures would not attract attention in the KOP 7 viewshed and as a result, contrast, dominance, and view blockages are all low.

Impact Significance – Staff concludes the introduction of the MLGS structures would not substantially degrade the existing viewshed at KOP 7. When considering the low overall visual sensitivity of the viewers at KOP 7 and low overall visual change of low, the introduction of the proposed project's structures would generate a less than significant visual effect at this KOP. In the context of the setting's moderate visual sensitivity, and the moderate level of project visual change, the project's visual impact at KOP 7 would be less-than-significant.

Overall Project Operation Impacts on Existing Visual Character or Quality

Project operation impacts from all identified KOPs on the existing visual character and quality of the setting would be less than significant with project owner and staff recommended color mitigation (Condition of Certification **VIS-1**), perimeter landscape screening (Condition of Certification **VIS-2**), and lighting mitigation (Condition of Certification **VIS-3**). With these measures, the impacts from project at operation would not substantially degrade the existing visual character or quality of the site and its surroundings, as perceived by sensitive receptors in the project viewshed.

LINEARS

Water supply and discharge pipeline – As discussed earlier in this analysis, both the water supply and discharge pipeline would be constructed underground in a common trench. The construction activities would create a temporary visual disturbance along Wilbur Avenue. No long-term impacts would occur as a result of the 1,500 ft. pipeline and transmission line and temporary impacts from construction activities are discussed above, under Construction Impacts. No significant visual impacts would be anticipated.

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?”

The proposed project during operation has 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 or glare to the vicinity.

Project construction lighting would occur between 7:00 PM and 7:00 AM for up to 33 months. Some construction activities may take place 24 hours a day, 7 days a week.

According to the AFC Project Description, night lighting would be directed downward and would be down-shielded or capped to reduce glare and light trespass. Where lighting is not required for normal operation, safety or security, switches or photocells would be provided to allow these areas to remain dark except as needed for safety or security (MLGS 2008a, pg. 7.11-19). To the extent possible, night construction lighting would be pointed toward the center of the site.

With the effective implementation of the applicant's proposed light trespass mitigation measures as described in the AFC, the project's construction and operation-related lighting impacts in the context of the existing lighting are anticipated to meet the County requirements for night time lighting. With adequate screening and shielding, proposed new lighting would remain subordinate to the surrounding area. Staff recommends Condition of Certification **VIS-4** to ensure full compliance and verification of night lighting measures.

Impact of Cooling Tower and Combustion Exhaust Stack Plumes

The proposed MLGS would be air-cooled. Therefore the wet-cooling towers that are typically responsible for the largest and most frequent visible plumes from power plant projects would not be a part of this project. Visible plumes from the project's exhaust stacks could occur, though at much lower magnitudes and frequencies than from wet-cooling systems.

Staff's predicted visible plume frequency falls below the staff threshold of 20% of seasonal daylight clear hours, those visible plumes would, by staff's definition, be less than significant. For predicted overall plume frequencies below the 20% threshold, plume dimensions are thus not calculated, since by definition they are not within the range of concern.

Nighttime plumes would also be anticipated, although their frequency was not modeled either by the applicant or staff. With sufficient up-lighting, nighttime plumes could, if frequent enough, potentially represent an adverse impact, particularly to nearby residences. However, such up-lighting from the project itself would be prohibited under staff-recommended Condition of Certification **VIS-3**. Therefore, adverse impacts from visible nighttime plumes are not anticipated, assuming implementation of Condition **VIS-3**.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In other words, while any one project may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in an area may create significant impacts. A significant cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) view of a scenic resource is impaired; or (3) visual quality is diminished.

The proposed MLGS would be built within an unincorporated area of Contra Costa County, within an expanse of heavy industrial uses with scattered residences. There are no identified scenic resources or vistas in the KOP 1 through KOP 7 viewsheds.

The proposed project would add to the existing heavy industrial character of the viewshed, particularly along the San Joaquin River shoreline. The principal existing projects within view from the river in the vicinity of the proposed MLGS are the existing

CCPP and PG&E's GGS, which establish a highly industrial visual character. The project's visual impacts would add to and thus incrementally contribute to the already significant cumulative impact caused by this extensive past industrial development in the viewshed. To mitigate the project's contribution to this cumulative impact, staff recommends adoption of additional landscape screening (see staff's Condition of Certification VIS-2). In the long term this measure would substantially reduce the project contribution to this cumulative impact on views from the San Joaquin River.

Even with the landscaping mitigation required by Condition of Certification **VIS-2**, the project would contribute to cumulative visual impacts in the viewshed. The additional screening would not mitigate impacts from elevated view locations, including the Antioch Bridge. However, impacts would not appreciably alter the existing industrial landscape character and the project contribution to the cumulative industrial landscape character of the viewshed is considered minimal and less than significant.

Industrial development along the south shore of the San Joaquin River in the project vicinity has introduced substantial exterior lighting, causing a significant cumulative impact through the creation of a distinctly industrial character in the nighttime landscape. In particular, night lighting of the existing CCPP, GGS, and the GWF Wilbur East facilities identify them as industrial as seen from various locations within the viewshed at near-middle-ground distances, particularly the Antioch Bridge and Highway 160. As a result, the impression received by visitors entering the City of Antioch at this primary gateway at night is of an industrial area. Exterior night lighting of the proposed project, even with the proposed project-specific mitigation, would add incrementally to this cumulative visual impact (see **Visual Resources Figure 4b**). Staff recommends that exterior lighting at the existing MLGS facility be shielded from public view areas to the extent feasible to compensate for the contribution of the proposed project to cumulative lighting impacts. Proposed Condition of Certification **VIS-3** specifies this requirement. With implementation of this measure the existing cumulative impact would remain, but additional contributions by the proposed project would be minimal.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 3 provides an analysis of the applicable LORS pertaining to aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project. Conditions of certification are proposed to make the project conform to a LORS where appropriate.

**Visual Resources Table 2
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources**

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
Federal			

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
National Route Preservation Bill			
Transportation Equity Act for the 21 st Century of 1998, and Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2005.	Involves federal managed lands, and recognized National Scenic Byway or All-American Road within its vicinity.	YES	The project site does not involve federal managed lands, nor a recognized National Scenic Byway or All-American Road within its vicinity.
State			
California Streets and Highways Code, Sections 260 through 263 – Scenic Highways	Ensures the protection of highway corridors that reflect the State's natural scenic beauty.	YES	State Highway 160 is designated a scenic highway. Because of the distance of the transmission lines and the MLGS from the highway, they would be hardly noticeable, therefore not considered significant.

Local			
Contra Costa County			
General Plan-Land Use Element Policy 3-19.	Buffers shall be provided between new industrial developments and residential areas by establishing setbacks, and park-like landscaping or other appropriate mechanisms.	YES	No mitigation measures are warranted as the project will meet the necessary setbacks as required by the industrial of the project site. Design features will be incorporated into the project to reduce potential visual impacts.
Policy 3-42	Industrial development shall be concentrated in select locations adjacent to existing major transportation corridors and facilities.	YES	The MLGS project is sited in a industrial setting adjacent to the CCPP and GGS as well as other industrialized developments in close proximity of the project site.
Policy 3-43	Industrial employment centers shall be designed to be unobtrusive and harmonious with adjacent areas and development.	YES	As indicated above, the MLGS project is sited in an industrial area, and no significant visual impacts have been identified.
Circulation/Scenic Highways Element Policy 5-35	Scenic corridors shall be maintained with the intent of protecting attractive natural qualities adjacent to various roads throughout the county.	YES	State Route 160 has been designated as a scenic highway in Contra Costa County. Because of the distance of the transmission lines and the MLGS from the highway, they would be hardly noticeable, therefore not considered significant.
Policy 5-37	Scenic views observable from scenic routes shall be conserved, enhanced, and protected to the extent possible.	YES	As indicated above, State Route 160 has been designated as a scenic highway in Contra Costa County. Because of the distance of the transmission lines and the MLGS from the highway, they would be hardly noticeable, therefore not considered significant.

Open Space Element Scenic Resource Policies and Goals			
Goal 9-11	To protect major scenic ridges, to the extent practical, from structures, roadways, or other activities which would harm their scenic qualities.	YES	The project is sited in a highly industrialized area adjacent to the CCPP and GGS as well as other industrial developments. There will be no expected significant visual impacts to protected scenic ridges.
Goal 9-12	To preserve the scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento-San Joaquin River/Delta shoreline.	YES AS CONDITIONED	The proposed project incorporates certain aesthetic design measures to reduce the visual bulkiness of major structures as summarized in Condition of Certification VIS-1. Landscaping as described in condition VIS-2 would have a beneficial aesthetic effect on neighbors within 5 – 10 years, and a somewhat beneficial effect on the River/Delta viewshed, though this effect would not be substantial for 10 to 15 years. With the recommended landscape screening the project would therefore substantially conform to this policy.
Goal 9-20	New power lines shall be located parallel to existing lines in order to minimize their visual impact.	YES	The MLGS project will connect with the adjacent PG&E switchyard; no new offsite power lines are necessary.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None received at this time.

CONCLUSIONS

The visual analysis focused on two main issues: (1) would construction and operation of the project cause an aesthetic impact under CEQA; and (2) would the project comply with applicable local LORS pertaining to aesthetics or preservation and protection of sensitive visual resources.

The construction and operation of the Marsh Landing Generating Station as proposed, with the effective implementation of the applicant's proposed design measures and staff's recommended conditions of certification (below) would ensure that visual impacts generated by the project are less than significant, and ensure that the project complies with all applicable LORS regarding visual resources.

The project, with all proposed conditions of certification would not have a substantial adverse effect on an identified scenic vista; on a scenic resource; would not

substantially degrade the existing visual character or quality of the site and its surroundings; would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area, and would not result in a cumulatively considerable impact. The project with recommended mitigation would thus not cause a significant aesthetic impact under CEQA. Staff concludes that the MLGS would conform with applicable aesthetics-related LORS.

PROPOSED CONDITIONS OF CERTIFICATION

Surface Treatment of Project Structures and Buildings

VIS-1 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion and contrast by blending with the landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. Surface color treatment shall include painting of HRSGs, turbine inlet filters, and other features in an earth tone color and value to match the surrounding hillsides.

The project owner shall submit for CPM review and approval, a specific surface treatment plan that will satisfy these requirements. The treatment plan shall include:

1. 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, building, tank, pipe, and wall; 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 11" x 17" color photo simulations at life size scale, of the treatment proposed for use on project structures, including structures treated during manufacture, from a representative point of view (Key Observation Point 1-location shown on Visual Resources Figure 1 of the Staff Assessment);
- d) A specific schedule for completion of the treatment; and
- e) A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to the Contra Costa County or responsible jurisdiction for review and comment.

If the CPM determines that the plan requires revision, the project owner 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 review and approval.

Prior to the start of commercial operation, the project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed and are ready for inspection and shall submit one set of electronic color photographs from the same key observation points identified in (d) above.

The project owner 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) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

Additional Perimeter Landscape Screening

VIS-2 The project owner shall provide landscaping that reduces the visibility of the power plant structures in accordance with local policies. Trees and other vegetation consisting of informal groupings of native shrubs shall be strategically placed around the facility boundaries. The objective shall be to create landscape screening of sufficient density and height to screen the power plant structures to the greatest feasible extent within the shortest feasible time; and to provide timely replacement for aging or diseased tree specimens on site in order to avoid future loss of existing visual screening.

The project owner shall submit to the CPM for review and approval and simultaneously to Contra Costa County for review and comment a landscaping plan whose proper implementation will satisfy these requirements. The plan shall include:

- a) A detailed landscape, grading, and irrigation plan, at a reasonable scale. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction.
- b) A list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the

objective of providing the widest possible range of species from which to choose;

- c) Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project; and
- d) A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project.

The plan shall not be implemented until the project owner receives final approval from the CPM.

Verification: The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to Contra Costa County for review and comment at least 90 days prior to installation.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and simultaneously to Contra Costa County a revised plan for review and approval by the CPM.

The planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the CPM and the Contra Costa County within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

Temporary and Permanent Exterior Lighting

VIS-3 To the extent feasible, consistent with safety and security considerations, the project owner shall design and install all permanent exterior lighting such that a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky; d) illumination of the project and its immediate vicinity is minimized, and e) the plan complies with local policies and ordinances.

The project owner shall submit to the CPM for review and approval and simultaneously to the Contra Costa County for review and comment a lighting mitigation plan that includes the following:

- a) Location and direction of light fixtures shall take the lighting mitigation requirements into account;
- b) Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements;
- c) Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

- d) Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security;
- e) All lighting shall be of minimum necessary brightness consistent with operational safety and security; and
- f) 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.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to discuss the documentation required in the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and simultaneously to the Contra Costa County for review and comment a lighting mitigation plan.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM.

The project owner shall not order any exterior lighting until receiving CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been completed and is ready for inspection. If after inspection the CPM notifies the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a lighting complaint, the project owner 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 project owner shall notify the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days.

REFERENCES

Caltrans (California Department of Transportation), 2006. Scenic Highway Master Plan.

Federal Highway Administration (FHWA), 1988. Visual Impact Assessment for Highway Projects.

Smardon, R. and J. Palmer, J. Felleman, 1986. Foundations of Visual Project Analysis.

URS 2008a – URS/Anne Connell (tn: 46509). Marsh Landing Generating Station, AFC
5/30/2008

URS 2009b – URS/Anne Connell (tn: 53293). Marsh Landing Generating Station
Amendment to the AFC. 09/22/2009

APPENDIX VR-1

ENERGY COMMISSION VISUAL RESOURCE ANALYSIS EVALUATION CRITERIA

Energy Commission staff conducts a visual resource analysis according to Appendix G, “Environmental Checklist Form—Aesthetics,” California Environmental Quality Act (CEQA). The CEQA analysis requires that commission staff make a determination of impact ranging from “Adverse and Significant” to “Not Significant.”

Staff’s analysis is based on Key Observation Points or KOPs. KOPs are photographs of locations within the project area that are highly visible to the public — for example, travel routes; recreational and residential areas; and bodies of water as well as other scenic and historic resources.

Those photographs are taken to indicate existing conditions without the project and then modified to include a simulation of the project. Consequently, staff has a visual representation of the viewshed before and after a project is introduced and makes its analysis accordingly. Information about that analytical process follows.

Visual Resource Analysis Without Project

When analyzing KOPs of existing conditions without the project, staff considers the following conditions: visual quality, viewer concern, visibility, number of viewers, and duration of view. Those conditions are then factored into an overall rating of viewer exposure and viewer sensitivity. Information about each condition and rating follows.

Visual Quality

An expression of the visual impression or appeal of a given landscape and the associated public value attributed to the resource. Visual quality is rated from *high* to *low*. A high rating is generally reserved for landscapes viewers might describe as picture-perfect.

Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are free from encroaching elements, thus retaining their visual integrity. Finally, landscapes with high visual quality are visually coherent and harmonious when each element is considered as part of the whole. On the contrary, landscapes rated *low* are often dominated by visually discordant human alterations.

Viewer Concern

Viewer concern represents the reaction of a viewer to visible changes in the viewshed — an area of land visible from a fixed vantage point. For example, viewers have a high expectation for views formally designated as a scenic area or travel corridor as well as for recreational and residential areas. Viewers generally expect that those views will be preserved. Travelers on highways and roads, including those in agricultural areas, are generally considered to have moderate viewer concerns and expectations.

However, viewers tend to have low-to-moderate viewer concern when viewing commercial buildings. And industrial uses typically have the lowest viewer concern. Regardless, the level of concern could be lower if the existing landscape contains discordant elements. In addition, some areas of lower visual quality and degraded visual character may contain particular views of substantially higher visual quality or interest to the public.

Visibility

Visibility is a measure of how well an object can be seen. Visibility depends on the angle or direction of views; extent of visual screening; and topographical relationships between the object and existing homes, streets, or parks. In that sense, visibility is determined by considering any and all obstructions that may be in the sightline—trees and other vegetation; buildings; transmission poles or towers; general air quality conditions such as haze; and general weather conditions such as fog.

Number of Viewers

Number of viewers is a measure of the number of viewers per day who would have a view of the proposed project. *Number of viewers* is organized into the following categories: residential according to the number of residences; motorist according to the number of vehicles; and recreationists.

Duration of View

Duration of view is the amount of time to view the site. For example, a high or extended view of a project site is one reached across a distance in two minutes or longer. In contrast, a low or brief duration of view is reached in a short amount of time—generally less than ten seconds.

Viewer Exposure

Viewer exposure is a function of three elements previously listed, *visibility*, *number of viewers*, and *duration of view*. Viewer exposure can range from a *low* to *high*. A partially obscured and brief background view for a few motorists represents a low value; and unobstructed foreground view from a large number of residences represents a high value.

Visual Sensitivity

Visual sensitivity is comprised of three elements previous listed, *visual quality*, *viewer concern*, and *viewer exposure*. Viewer sensitivity tends to be higher for homeowners or people driving for pleasure or engaged in recreational activities and lower for people driving to and from work or as part of their work.

Visual Resource Analysis with Project

Visual resource analyses with photographic simulations of the project involve the elements of contrast, dominance, view blockage, and visual change. Information about each element follows.

Contrast

Contrast concerns the degree to which a project's visual characteristics or elements — form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from *low* to *high*. A landscape with forms, lines, colors, and textures similar to those of a proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent.¹ Generally, visual absorption is inversely proportional to visual contrast.

Dominance

Dominance is a measure of (a) the proportion of the total field of view occupied by the field; (b) a feature's apparent size relative to other visible landscape features; and (c) the conspicuousness of the feature due to its location in the view.

A feature's level of dominance is lower in a panoramic setting than in an enclosed setting with a focus on the feature itself. A feature's level of dominance is higher if it is (1) near the center of the view; (2) elevated relative to the viewer; or (3) has the sky as a backdrop. As the distance between a viewer and a feature increases, its apparent size decreases; and consequently, its dominance decreases. The level of dominance ranges from *low* to *high*.

View Blockage

The extent to which any previously visible landscape features are blocked from view constitutes view disruption. The view is also disrupted when the continuity of the view is interrupted. When considering a project's features, higher quality landscape features can be disrupted by lower quality project features, thus resulting in adverse visual impacts. The degree of view disruption can range from *none* to *high*.

Visual Change

Visual change is a function of *contrast*, *dominance*, and *view disruption*. Generally, *contrast* and *dominance* contribute more to the degree of visual change than does *view disruption*.

¹ Typically, the Energy Commission does not consider texture in its visual analyses.

VISUAL RESOURCES - FIGURE 9a

Marsh Landing Generating Station - KOP 7 - View from Hillside Residence - Existing Conditions

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-8

VISUAL RESOURCES - FIGURE 8b

Marsh Landing Generating Station - KOP 6 - View from Oakley Road and Calle De Oro near SR 160 - Simulation Showing Project

APRIL 2010



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-15

VISUAL RESOURCES - FIGURE 8a

Marsh Landing Generating Station - KOP 6 - View from Oakley Road and Calle De Oro near SR 160 - Existing Conditions

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-7

VISUAL RESOURCES - FIGURE 7b

Marsh Landing Generating Station - KOP 5 - View from Local Driving Range - Simulation Showing Project

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-14

VISUAL RESOURCES - FIGURE 7a

Marsh Landing Generating Station - KOP 5 - View from Local Driving Range - Existing Conditions

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-6

VISUAL RESOURCES - FIGURE 6b

Marsh Landing Generating Station - KOP 4 - View from Closest Residential Area - Simulation Showing Project

APRIL 2010



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-13

VISUAL RESOURCES - FIGURE 6a

Marsh Landing Generating Station - KOP 4 - View from Closest Residential Area - Existing Conditions

APRIL 2010



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-5

VISUAL RESOURCES - FIGURE 5b

Marsh Landing Generating Station - KOP 3 - View from Sportsmen Yacht Club - Simulation Showing Project

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-12

VISUAL RESOURCES - FIGURE 5a

Marsh Landing Generating Station - KOP 3 - View from Sportsmen Yacht Club - Existing Conditions

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

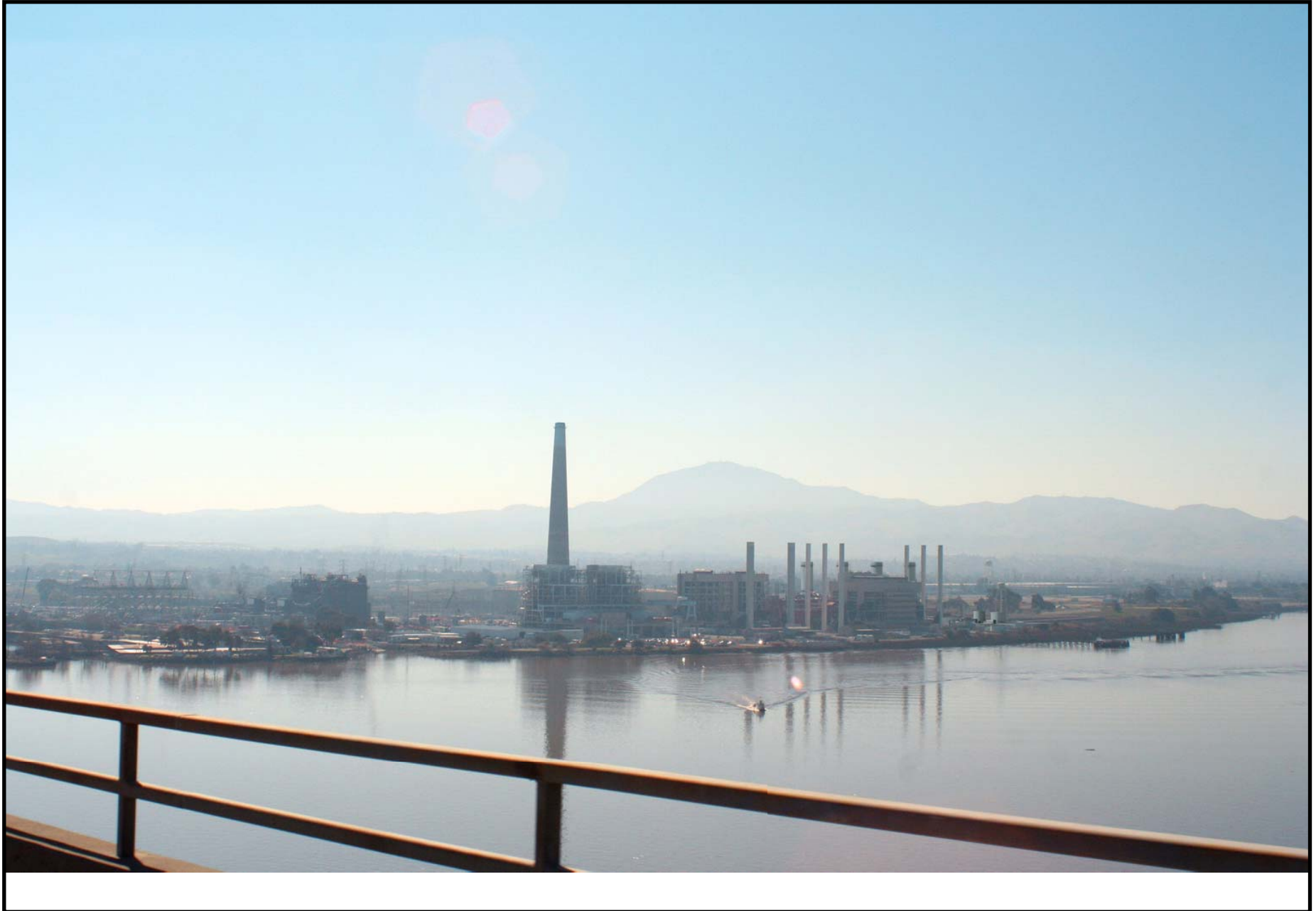
SOURCE: AFC Figure 7.11-4

VISUAL RESOURCES - FIGURE 4b

Marsh Landing Generating Station - KOP 2 - View from Antioch Bridge - Simulation Showing Project

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

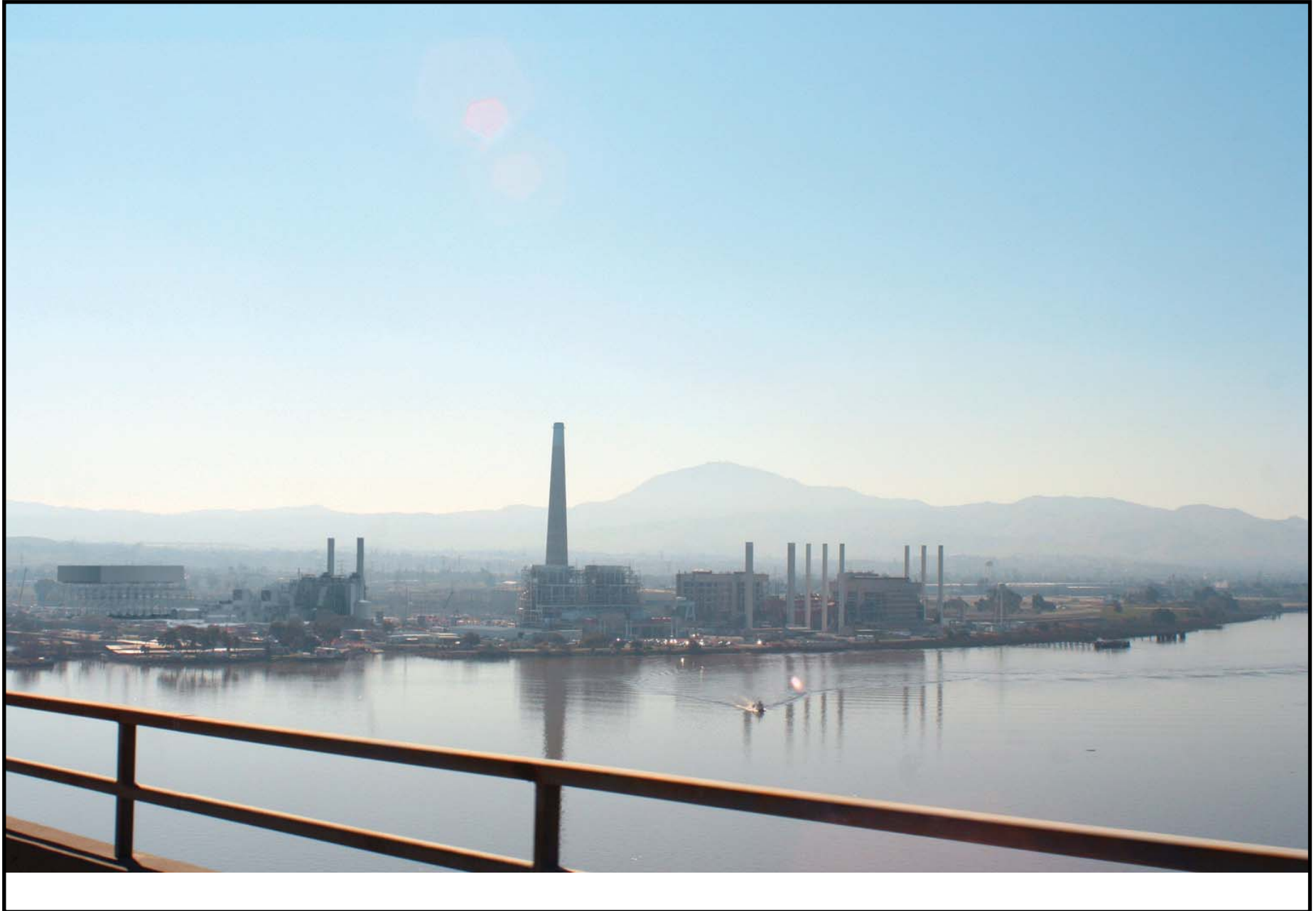
SOURCE: AFC Figure 7.11-11

VISUAL RESOURCES - FIGURE 4a

Marsh Landing Generating Station - KOP 2 - View from Antioch Bridge - Existing Conditions

APRIL 2010

VISUAL RESOURCES



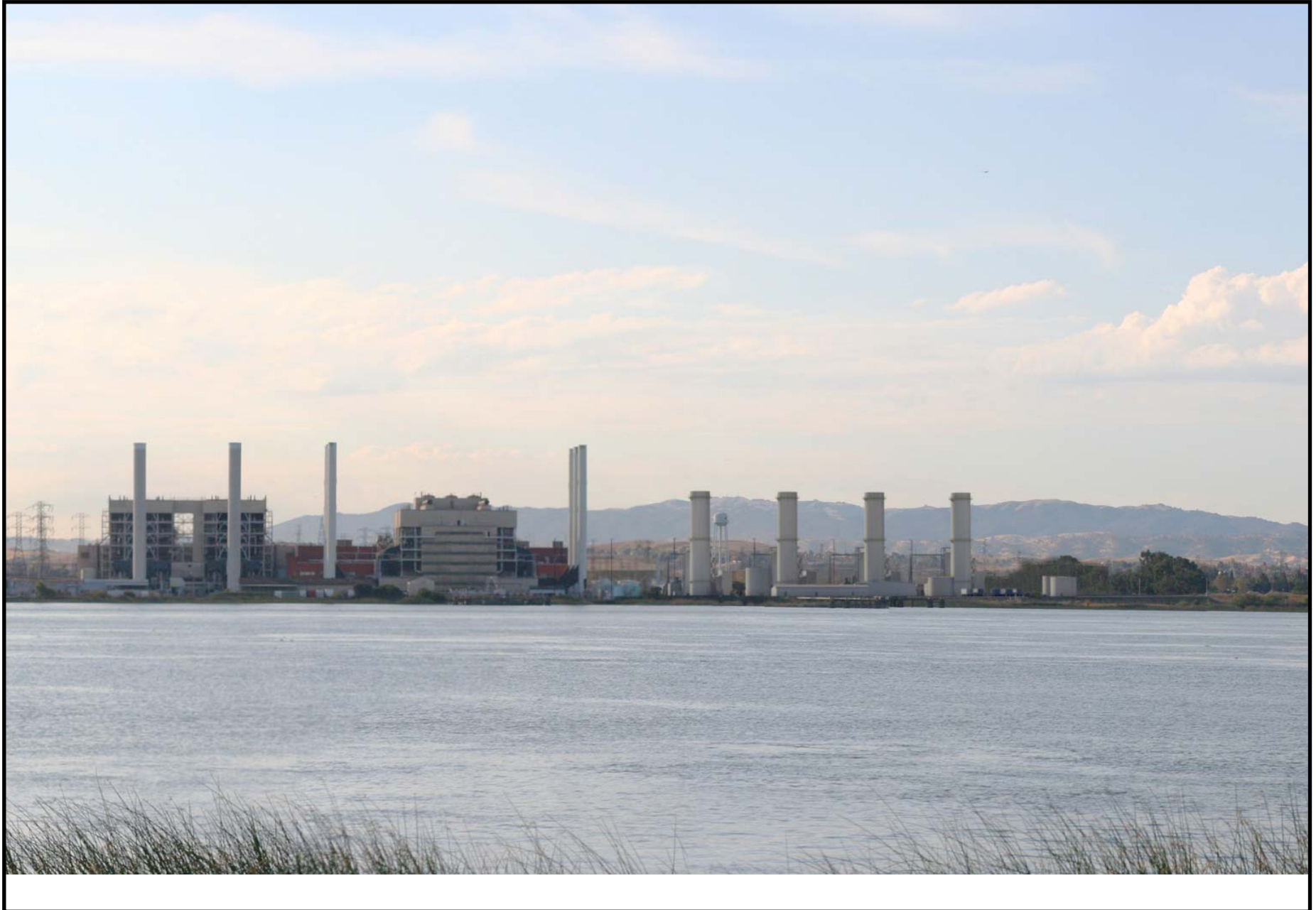
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-3

VISUAL RESOURCES - FIGURE 3b

Marsh Landing Generating Station - KOP 1 - View from the North Side of San Joaquin River - Simulation Showing Project

APRIL 2010



VISUAL RESOURCES

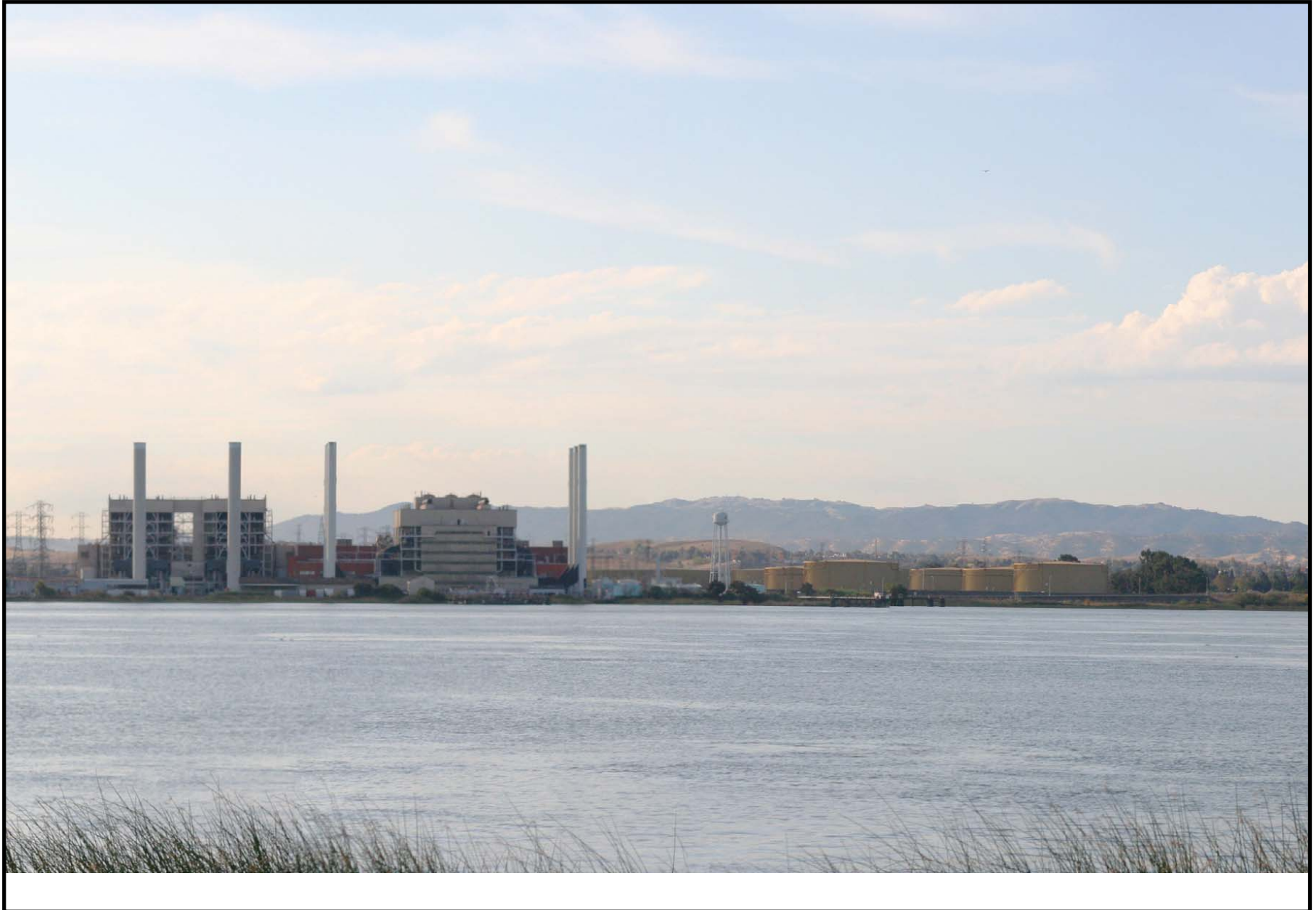
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-10

VISUAL RESOURCES - FIGURE 3a

Marsh Landing Generating Station - KOP 1 - View from the North Side of San Joaquin River - Existing Conditions

APRIL 2010



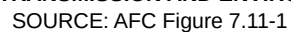
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-2

APRIL 2010

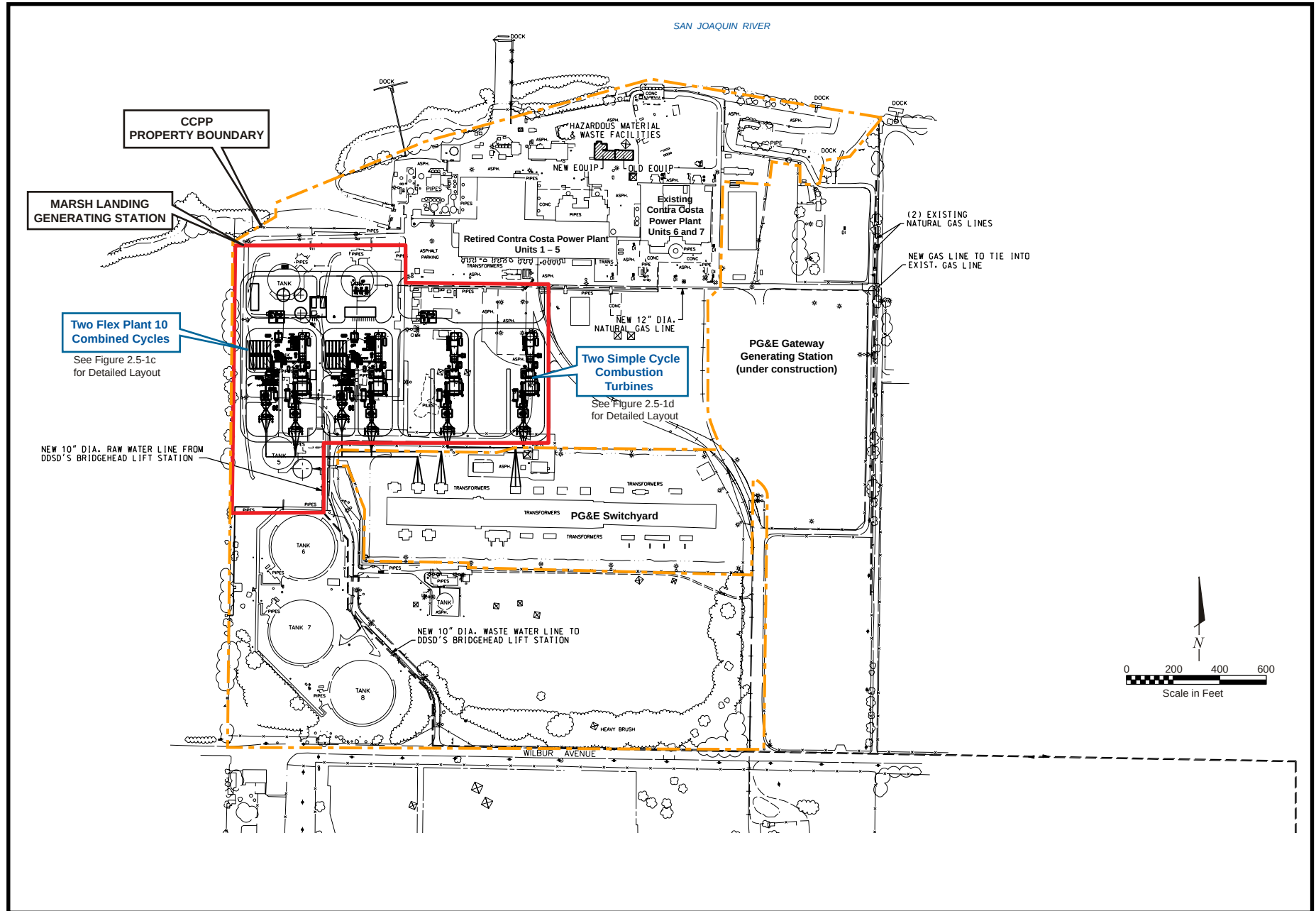
VISUAL RESOURCES



VISUAL RESOURCES - FIGURE 1 **Marsh Landing Generating Station - General Plot Plan**

APRIL 2010

VISUAL RESOURCES

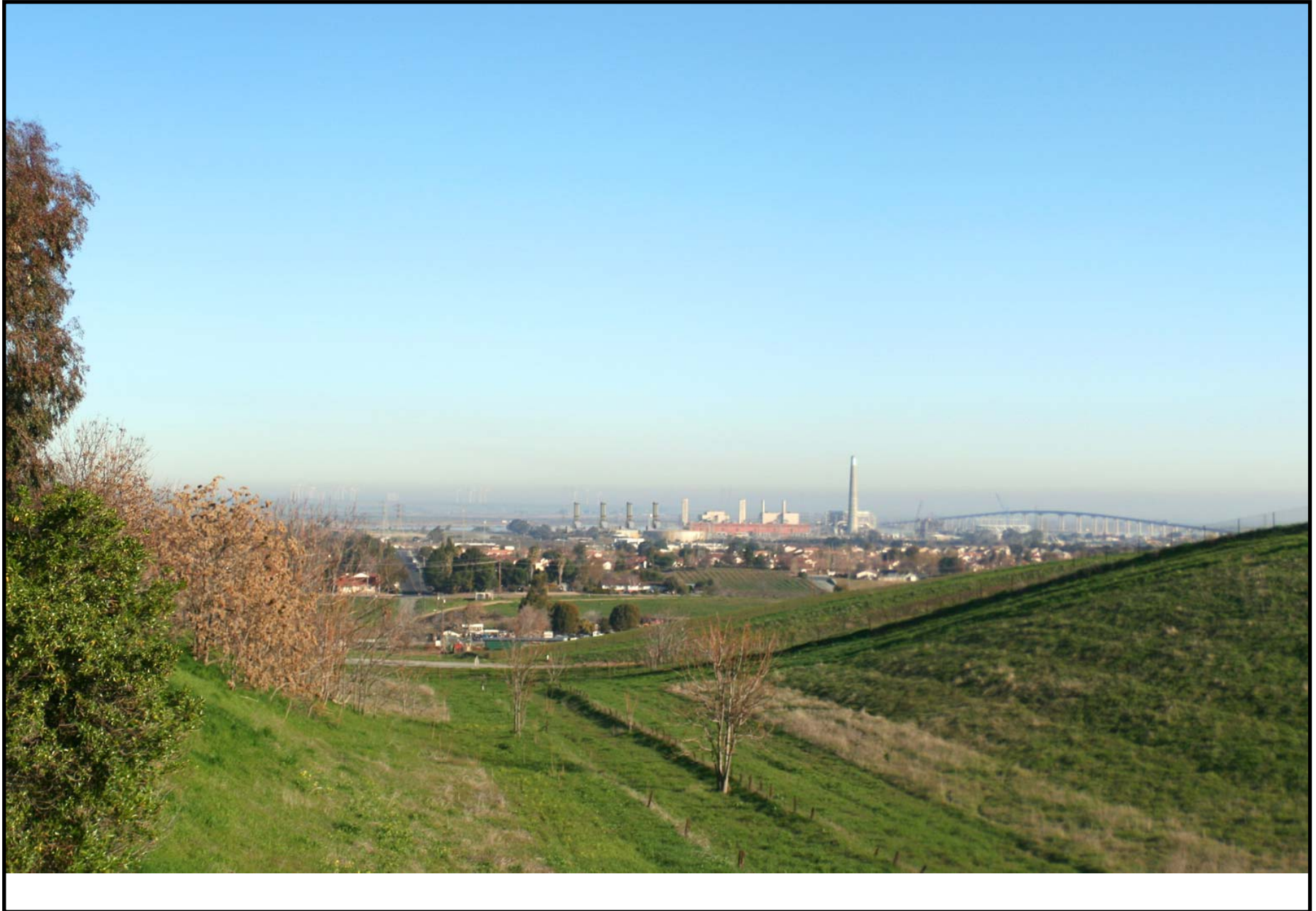


VISUAL RESOURCES - FIGURE 9b

Marsh Landing Generating Station - KOP 7 - View from Hillside Residence - Simulation Showing Project

APRIL 2010

VISUAL RESOURCES



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, APRIL 2010

SOURCE: AFC Figure 7.11-16

WASTE MANAGEMENT

Testimony of Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Management of the waste generated during demolition, construction and operation of the Marsh Landing Generating Station (MLGS) 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.

In regards to the existing soil and groundwater contamination on the site, staff issued a number of data requests that were satisfactorily completed by the applicant. The data was included in two reports issued by the applicant in January and February 2010. However, the Department of Toxic Substance Control subsequently asked for further site characterization and this data is not yet available. Staff therefore cannot reach any conclusion about existing site conditions and possible contamination or recommend Conditions of Certification if needed in order to protect workers and the off-site public until this information is gathered and reviewed. Staff will provide a Staff Assessment Addendum when the information becomes available.

INTRODUCTION

This Staff Assessment (SA) presents an analysis of issues and potential impacts associated with wastes generated from the proposed construction and operation of the MLGS project. The technical scope of this analysis addresses wastes and contamination already existing at the site as well as wastes that would likely be generated during facility construction and operation. However, 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/Fire Protection** 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 helps ensure 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 (LORS) 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 MLGS project with respect to management of waste.

WASTE MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards

<u>Applicable Law</u>	<u>Description</u>
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 (U.S. EPA) or other authorized agency; and - Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, U.S.C., §9601, et seq. Comprehensive Environmental Response, Compensation	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as <i>Superfund</i>, 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;

and Liability Act	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 15, U.S.C., §2601, et seq. Toxic Substances Control Act of 1976	The federal Toxic Substances Control Act (TSCA) establishes authority for reporting, record-keeping, and testing requirements and restrictions relating to certain chemical substances and/or mixtures. Among other things, the act addresses use and disposal of polychlorinated biphenyls (PCBs), asbestos, and lead-based paint.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes	These regulations were established by U.S. EPA 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 257 addresses the criteria for classification of solid waste disposal facilities and practices. Part 258 addresses the criteria for municipal solid waste landfills. Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is an RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, CFR, Parts 172 and 173. Hazardous Materials Regulations	The United States Department of Transportation (DOT) established these standards and requirements 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	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

seq. Hazardous Waste Control Act of 1972, as amended	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, CCR include: Identification and Listing of Hazardous Waste (Chapter 11, §66261.1, et seq.). Standards Applicable to Generator 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.). Management of Tanks (Chapter 32, §67383.1 - §67383.5). The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.
HSC, Chapter 6.67, §§25270 - 25270.13 Aboveground Petroleum Storage Act	This law establishes requirements for the management and oversight of aboveground petroleum storage tanks. The law includes provisions for cleanup and abatement of any releases of petroleum from storage tanks at a tank facility.
HSC, Chapter 6.8, §25300 et seq.	The Hazardous Substances Account Act establishes state authority for responses to releases of hazardous substances. Requirements include provisions for site assessment, identification and evaluation

Carpenter-Presley-Tanner Hazardous Substance Account Act	of remedial actions, and clean-up or removal of released substances.
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 Petroleum Storage Program. Hazardous Materials Release and Response Plans and Inventories (Business Plans). California Accidental Release Prevention (CalARP) Program. Hazardous Material Management Plan / Hazardous Material Inventory Statements. Hazardous Waste Generator / Tiered Permitting Program. Underground Storage Tank Program. The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. The Contra Costa County Health Services Department, Hazardous Materials Program is the CUPA for the MLGS project. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.
Title 27, CCR, Division 1, Sub-division 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	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.

of 1989	
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.
HSC, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (as 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 (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four-year cycle, with a summary progress report due to DTSC every fourth year.
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.
Title 8, CCR, §1529 and §5208 Construction Safety Orders and Control of Hazardous Substances - Asbestos	These regulations require proper management and removal of asbestos containing materials in all demolition and construction work. The regulations are enforced by the California Department of Industrial Relations, Division of Occupational Safety and Health (known as Cal/OSHA).
Local	
Bay Area Air Quality Management District (AQMD), Regulation 11, Rule 2 Asbestos Demolition,	This rule addresses management of asbestos wastes during demolition. It requires demolition projects removing asbestos containing material to provide notification to the district prior to demolition and also establishes requirements for disposal of asbestos containing material.

Renovation and Manufacturing	
City of Antioch Ordinance No. 1018-C-S	This ordinance establishes requirements for diversion from landfilling of at least 50 percent of construction and demolition wastes generated by projects within the city of Antioch. (The ordinance adds article 2, chapter 3 to Title 6 of the Antioch Municipal Code addressing construction and demolition debris recycling.). The ordinance requires projects to submit a waste management plan for approval prior to construction as well as submittal of a completed plan documenting compliance with the waste recycling and diversion requirements.
Policies	
Contra Costa County Countywide Integrated Waste Management Plan, December 1993	This document sets forth the county's goals, policies, and programs for reducing dependence on landfilling solid wastes and increasing source reduction, recycling, and reuse of products and waste, in compliance with the CIWMA.

PROJECT DESCRIPTION AND SETTING

The proposed MLGS project would consist of the construction and operation of a 760-megawatt (MW) natural gas electrical generation facility, and associated linear facilities, in unincorporated Contra Costa County, adjacent to the city of Antioch. Annexation of the project site and surrounding areas into the city of Antioch is currently contemplated (URS 2008c, Data Response 16). The project would be located on a 27-acre parcel in the northwest corner of the existing Contra Costa Power Plant (CCPP) property, with another 14 acres within the CCPP property to be used for construction laydown and parking. The CCPP property has been used for power generation and associated industrial activities since 1951 (URS 2008c, Data Response 47).

The main project site is bounded to the north by the existing CCPP and the San Joaquin River, to the west by the largely vacant Gaylord Corporation East Mill industrial property, to the south by an existing Pacific Gas and Electric (PG&E) electrical switchyard, and to the east by CCPP facilities. East of the CCPP fence line is the Gateway Generating Station. The proposed site is currently occupied by five aboveground petroleum storage tanks (Tanks 1 through 5 out of the eight large aboveground tanks on the CCPP property in an area known as the Fuel Tank Farm) and several small buildings and structures. Demolition of the aboveground tanks and structures would occur as part of the proposed project prior to facility construction.

In general, soils at the project site consist of silty sand fill material underlain by fine to coarse-grained deltaic deposits of sand with interbedded lenses of clay, silt, and peat. Depth to groundwater ranges from six to ten feet below ground surface and fluctuates according to the delta tides and seasonal river discharges. The direction of groundwater flow is north-northwest toward the San Joaquin River (URS 2008a). Contaminants

known to exist at the site include arsenic in groundwater and petroleum hydrocarbons in both soil and groundwater.

Equipment for the proposed facility would consist of four natural gas-fired power 190-MW simple cycle (CTGs) equipped with inlet air evaporative coolers and emissions control systems that include oxidation catalysts, and selective catalytic reduction (SCR) for control of oxides of nitrogen (NO_x). The project would also include construction and maintenance of a 2,100-foot gas pipeline and a 2,200-foot water supply pipeline to two new wells located on adjacent CCPP property to the south of the project. Wastewater would be disposed of via a new 4,800-foot pipeline to a sewer main. Electric transmission lines will connect directly to the adjacent PG&E switchyard.

Construction of the proposed MLGS project (including demolition of the existing aboveground storage tanks and structures) is estimated to take 27 months. Once constructed, the plant would be capable of operating seven days a week, 24 hours a day, with a planned operational life of 30 years (URS 2008a). The actual maximum capacity factor will be 20 percent per year. Construction, operation and maintenance of the plant and associated facilities would generate a variety of wastes, including hazardous wastes. (Summary tables of the wastes anticipated from project demolition, construction, and operation activities and proposed management methods are provided in Tables 2.5-6 and 2.5-7 of the project Application for Certification.) Sanitary wastes and wastewater would be discharged with process wastewaters via pipeline to the sewer main. The air emissions control systems, SCR, and oxidation catalyst equipment and chemicals would also generate both nonhazardous and hazardous waste.

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.

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 release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to 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 prepared¹ and submitted as part of an application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) on or near the site.

In general, the Phase I ESA uses a qualified environmental professional to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and 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 environmental professional then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional 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 or other assessment work may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and any need 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 substances releases or contamination identified.

To address the management of project-related wastes generated during construction and operation of the proposed project, staff reviews the applicant's proposed solid and hazardous waste management methods 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 nonhazardous 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 waste would have a significant impact on the volume of waste a facility is permitted to accept.

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 (ASTM) protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions and Possible Contamination

Two Phase I Environmental Site Assessments (Phase I ESAs) were prepared for the proposed MLGS project by URS Corporation. The main project site was addressed in a May 2008 Phase I submitted as part of the project AFC (URS 2008a, Appendix R), while the gas and water pipeline linear properties were addressed in a February 2009 Phase I submitted in response to data requests (URS 2009a, Appendix B). Results from previous environmental assessments were also discussed in both project Phase I documents. These prior assessments include a 1997 Phase I ESA prepared by Camp Dresser and McKee for the entire CCPP property and a Phase II ESA for the CCPP site prepared by Fluor Daniel GTI.

The MLGS project Phase I documents identified the following Recognized Environmental Conditions (RECs)² and areas of concern associated with past operation of the CCPP facility and industrial activities at surrounding property.

The CCPP Fuel Tank Farm, comprised of eight large aboveground storage tanks (ASTs), is identified as an REC due to the potential for releases from the tanks and associated piping. The tanks have been in place since the early 1950's and 1960's but have not been used for over ten years because the CCPP switched to using natural gas for power generation. The farm includes five 120,000 barrel tanks (Tanks 1 – 5) and three 500,000 barrel tanks (Tanks 6 – 8). Most of the tanks were previously used to store No. 6 fuel oil and approximately 2.2 million gallons of oil remain in the tanks. Tank 7 was reported to have stored black liquor³ from the adjacent Gaylord paper mill and a release is reported to have occurred from the pipeline leading from Tank 7. However, after further investigation by the applicant at the request of staff, it was determined that no black liquor was stored in Tank 7.

According to previous Phase I documents for the CCPP site, a paint storage area/shed was previously located to the east of Tank 4. The MLGS Phase I reported that information regarding the paint storage area was not available and so it identified the paint storage area/shed as an area of concern.

A concrete pad located just south of the CCPP access road and west of the hazardous waste storage sheds is identified as an area of concern. Dried paint was observed on the western part of the pad indicating that painting activities were conducted on the pad. Additional assessment may be necessary to determine if rain and storm water runoff in contact with the pad after painting activities mobilized paint constituents and impacted soil or groundwater.

² A Recognized Environmental Condition (REC) is defined as the presence or likely presence of a hazardous substance or petroleum product on a property under conditions indicating an existing release, a past release, or a material threat of a future release of the hazardous substance or petroleum product into structures or to the ground, groundwater, or surface water of the property. *ASTM Standard 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

³ Black liquor is a byproduct of the kraft paper production process. It is generally made up of the lignin from wood, chemicals used in the production process, and water and is known to contain chlorinated dioxins.

Construction debris piles were previously located in the southeast portion of the project site. Prior studies of the area detected petroleum hydrocarbons in the soil at 322 parts per million. Consequently, the area of the former piles is identified as a REC due to the potential for soil and groundwater impacts from the petroleum hydrocarbons.

The former CCPP septic system leach mound and field located to the east of the project site is identified as a REC. Prior Phase I assessments indicated that laboratory wastes were disposed of through the septic system and discharged to the leach field. Since groundwater flow is to the north-northwest in the area, hazardous substances discharged to the leach field may have migrated from CCPP and impacted groundwater at the project site.

Several areas on the project site and along the water pipeline route were identified in the Fluor Daniel GTI Phase II as areas with “remedial issues” due to total petroleum hydrocarbons (TPH) or arsenic in soil or groundwater at concentrations exceeding regulatory thresholds (see Figure 3 from the project site May 2008 Phase I for area locations). Additional review and assessment of these areas is necessary to determine the level of impact and any remediation that may be required.

The Gaylord Corporation property immediately to the west of the project site is identified as an offsite REC because of a black liquor release near the CCPP Fuel Tank Farm. The Phase I stated that information on sampling and cleanup of the release was not available.

The PG&E Switchyard directly south and east of the project site is reported to have had two circuit breaker explosions in the late 1970s. The dielectric fluid released in the explosions may have contained polychlorinated biphenyls (PCBs) and possibly impacted soil and groundwater. The property is identified as an offsite REC because the proposed project site is adjacent to the switchyard and site soil and/or groundwater may have been impacted by the releases or by migration of impacted ground water.

Staff has reviewed the project Phase I documents and supporting CCPP Phase I and II documentation and consulted with staff from the Department of Toxic Substances Control (DTSC). Staff acknowledges that some areas of the site cannot be fully assessed and remediated until after demolition of the existing aboveground tanks and structures. However, staff determined that additional information is necessary before a staff assessment can be completed.

The DTSC is the state agency vested with the oversight authority for site assessment and corrective action/remediation at all of the former CCPP facility properties, including the proposed project site (DTSC 2009a). As noted above, due to existing structures onsite that limit access, a complete assessment of site conditions, contaminants, environmental and health risks, and remediation requirements for the site can only be made after demolition of the existing tanks and structures. In order to ensure that the project site was fully characterized and remediated as necessary after demolition and prior to initiation of site mobilization/project construction, staff held a workshop on October 14, 2009. The applicant, Pacific Gas and Electric (PG&E - the Responsible

Party for the hazardous wastes on the MLGS site), and staff agreed that the following investigations and reports would be prepared as soon as practicable:

1. Groundwater sampling and analysis on the property directly between the river and Tanks 1 and 2 will be conducted.
2. A Sampling and Analysis Workplan will be provided, in abbreviated outline format, for PCBs in soil and groundwater in the areas of the project site nearest to and/or down-gradient from the locations of the switchyard circuit breaker explosions and associated releases of dielectric fluid. Also, the results of the sampling and analysis will be provided in tabular format showing all values and reporting non-detects in "less-than" values using the Method Detection Limit (MDL), the Reporting Limit (RL) or the Practical Quantitation Limit (PQL).
3. Sampling and analysis will be conducted in areas near the storm water drains that are located near the tank farm berms and in the construction yard.
4. An outline of a Human Health Risk Assessment (HRA) Workplan and a revised short-format HRA based upon existing data and any new data from samples obtained solely from the MLGS site footprint will be prepared and submitted to the Energy Commission for approval. The revised short-format HRA shall assess the following receptors:
 - the trenching and excavation worker during construction,
 - the off-site public during construction,
 - the on-site worker during operations,
 - the off-site worker during operations, and
 - the off-site public during operations.

These requirements were issued as staff Data requests in late October 2009. On November 24, 2009, staff reviewed the applicant's Sampling and Analysis Workplan and the HRA Workplan submitted in partial satisfaction of numbers 2 and 4, above (URS 2009c). Staff found both work plans to be satisfactory and meet the requirements of the data requests.

On January 15, 2010, the applicant submitted its *"Focused Site Investigation Report and Human Health Risk Assessment"* for the MLGS site to satisfy the requirements of staff's four data requests listed above (URS 2010a). Staff found the site investigation and HRA to be acceptable and demonstrative that the site has been adequately characterized so that the data can be used in a HRA. Furthermore, staff found that the HRA was both transparent and verifiable, it adequately and accurately depicts the upper-bound risk for the receptors assessed, it was conducted according to California Environmental Protection Agency (Cal EPA) standards and methods, and therefore the HRA can be used to show that risks to workers and the off-site public would be below a level of significance. However, subsequent to making this finding, staff learned that DTSC had requested additional site characterization of open areas (areas not under tanks or structures which staff agreed could be conducted post-certification). The applicant has prepared two additional work plans (a *Facility Investigation and Risk*

Assessment Work Plan, March 17, 2010 and a *Facility Investigation and Risk Assessment Work Plan Addendum*, April 8, 2010) addressing soils and groundwater on the MLGS site. It is not unusual for DTSC staff or Energy Commission staff to require different sampling and staff often relies on the expertise of DTSC as added input regarding site characterization. In this case, DTSC's request will cause a delay in staff's final review and recommendations.

Demolition Impacts and Mitigation

Demolition of the existing buildings, aboveground tanks, and associated structures would take approximately four to six months and would generate approximately 3,000 tons of scrap metal; 890,000 gallons of residual fuel oil; 1,500 cubic yards of concrete waste; 13,000 cubic yards of asphalt debris (from tank berms); and 1,416 cubic yards of asbestos containing material/waste (URS 2008a). As with project construction wastes, all demolition wastes would be managed and recycled or disposed of in a manner to comply with applicable regulatory requirements.

Most of the demolition wastes would be recycled to the extent practicable. However, the asbestos containing materials present within the fuel oil tank equipment and pipe insulation and potentially in structure roofing would require special handling to prevent worker or public exposure to asbestos fibers. In addition to the Title 8 safety requirements addressed in the **Worker Safety and Fire Protection** section of this document, the Bay Area Air Quality Management District (BAAQMD) has requirements for management and disposal of asbestos-containing material removed during project-related structure demolition. The BAAPCD Regulation 11, Rule 2 requires the owner or operator of a demolition project to submit an asbestos demolition notification form and complete an asbestos survey report at least 10 working days before any demolition work begins, and comply with established waste management regulations, including requirements for proper disposal of asbestos containing wastes. To help ensure compliance with the BAAQMD asbestos waste management requirements, staff proposes Condition of Certification **WASTE-1** requiring that the project owner submit the BAAQMD asbestos notification form and survey to the CPM for review and approval prior to removal and disposal of asbestos.

In addition to the asbestos containing materials, lead-based paint may also be present at the project site on the painted surfaces of the tanks and structures. To help ensure that lead-based paint debris and wastes generated during demolition of existing structures are properly identified and managed, staff propose Condition of Certification **WASTE-2** requiring the project owner to complete a lead survey of structures onsite prior to demolition and to manage all lead-based paint debris and wastes in accordance with applicable LORS.

The city of Antioch has established a Construction and Demolition (C&D) Debris Recycling Ordinance (Ordinance No. 1018-C-S) to comply with state waste diversion goals and requirements. This ordinance requires that at least fifty percent of all C&D debris generated by covered projects be diverted from landfilling through reuse or recycling. To help ensure compliance with the city's ordinance during both project demolition and construction activities, staff proposes Condition of Certification **WASTE-5** requiring project compliance with all applicable provisions of the city's ordinance,

including submittal of a Construction and Demolition Debris Recycling Ordinance Waste Management Plan.

With implementation of staff's proposed conditions of certification, staff believes that management and disposal of project-related demolition wastes would have a less than significant impact on the environment and would comply with applicable LORS.

Construction Impacts and Mitigation

Site demolition, construction, and startup of the proposed power plant and associated facilities would take approximately 27 months and would generate both nonhazardous and hazardous wastes in solid and liquid forms (URS 2008a, section 7.13; URS 2009b, revised Table 2.5-6).

Staff proposes Conditions of Certification **WASTE-3** and **WASTE-4** be adopted to address any additional soil contamination that may be encountered during project construction. **WASTE-3** 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-4** 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 CPM and DTSC with findings and recommended actions.

Nonhazardous Wastes

Nonhazardous solid wastes generated weekly during construction would include approximately 120 cubic yards of scrap wood, steel/metal, paper, glass, and plastic waste (URS 2008a). All non-hazardous wastes would be recycled to the extent possible and nonrecyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility in accordance with applicable LORS. As with project demolition waste, construction debris would be subject to the diversion requirements established in the city of Antioch's Construction and Demolition Debris Recycling Ordinance. Implementation of staff's proposed Condition of Certification **WASTE-5** would reinforce project compliance with the city's ordinance and further support reuse and recycling of project construction wastes to the extent practicable.

Nonhazardous liquid wastes would also be generated during construction, including dust suppression and storm water drainage, tank and equipment wash and rinse water, and hydrotest water. Sanitary wastes would be collected in portable, self-contained chemical toilets and pumped periodically for disposal at an appropriate facility by an outside contractor. Potentially contaminated equipment wash and/or test water would be contained at designated areas, tested to determine if hazardous, and either discharged (if nonhazardous) or transported to an appropriate treatment/disposal 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 that would likely be generated during construction include solvents, waste paint, oil absorbents, used oil, oily rags, batteries, cleaning wastes, spent welding

materials, and empty hazardous material containers (URS 2008a, Table 2.5-6; URS 2009b, revised Table 2.5-6).

Both the construction contractor and the project owner/operator could be considered the generators of hazardous wastes at the site during the construction period. Hazardous waste generator status is determined by site; therefore, 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-6**. Wastes would be accumulated on site for less than 90 days (or according to accumulation time limits allowed for specific wastestreams such as universal wastes) and then properly manifested, transported to and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

Staff has reviewed the proposed waste management methods described in Application for Certification (AFC) section 7.13.2.1, and in the responses to data requests, and concludes that project construction wastes would be managed in accordance with all applicable 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. To facilitate continuous project compliance with LORS, staff proposes Condition of Certification **WASTE-9**, requiring the project owner to notify the CPM if and when the owner becomes aware of any project waste management-related enforcement action being initiated or taken by a regulatory agency. Along with the notification, the project owner must also describe the steps to be taken to address the violation. In the event that construction excavation, grading, or trenching activities for the proposed project encounter potentially contaminated soils, specific waste handling, disposal, or other precautions may be necessary pursuant to hazardous waste management LORS. Staff finds that proposed Conditions of Certification **WASTE-3** and **WASTE-4** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would further support compliance with LORS.

Operation Impacts and Mitigation

The proposed MLGS project would generate nonhazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. (Revised Table 2.5-7 of the Amendment to the AFC gives a summary of the anticipated operation waste streams, estimated waste volumes and generation frequency, and management methods proposed.)

Nonhazardous Solid Wastes

Nonhazardous solid wastes that may be generated during project operation could include routine maintenance wastes (such as used air filters, scrap metal, and plastics) as well as domestic/sanitary and office wastes (such as office paper, newsprint, aluminum cans, glass, and septic system sludge). All nonhazardous wastes would be recycled to the extent practicable, and nonrecyclable wastes would be regularly transported offsite to a solid waste disposal facility (URS 2008a).

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would also 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-6**, would be retained and used for hazardous waste generated during facility operation.

Hazardous wastes expected to be generated during routine operation of the powerplant facility include used oil, oil filters and oily rags, spent SCR and oxidation catalysts, and chemical cleaning solutions and solvents, as well as universal wastes (batteries, fluorescent light tubes, and similar items) (URS 2008a). In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or cleanup materials that may require management and disposal as hazardous waste. Proper hazardous material handling and good housekeeping practices would 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-8** requiring the project owner/operator to document, clean up, and properly manage and dispose of wastes from any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on project hazardous material management (including spill reporting, containment, and spill prevention, control and countermeasures plan requirements) is provided in the **Hazardous Materials Management** sections of this document.

The estimated 4 tons of hazardous wastes that would be routinely generated each year during the operation of MLGS project would be nominal, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §66262.10 et seq.). In addition to the routinely generated waste, once every seven to ten years project operation would generate up to 129 tons of spent SCR and carbon monoxide catalysts that would likely be recycled by the catalyst manufacturer. This waste would be removed by licensed contractors and returned to the manufacturer or properly disposed of at a Class I landfill.

To facilitate proper management of project operation wastes, staff proposes Condition of Certification **WASTE-7** requiring the project owner to develop and implement an Operations Waste Management Plan. Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would also be required by proposed Condition of Certification **WASTE-9** to notify the Energy Commission Compliance Project Manager (CPM) of the impending action and provide a description and timeline for steps to be taken to address the action.

Impact on Existing Waste Disposal Facilities

Nonhazardous Solid Wastes

While approximately 120 cubic yards of nonhazardous solid waste (wood, paper, plastic, concrete, etc.) would be generated weekly during project construction, the city of Antioch's waste recycling and diversion requirements would potentially reduce the volume of waste disposed at a Class III landfill by fifty percent, thereby reducing the impact on local landfills. The nonhazardous solid wastes generated annually at MLGS would also be recycled whenever possible, or disposed of in a Class III landfill.

Table 7.13-1 of the project AFC identifies three nearby nonhazardous (Class III) waste disposal facilities (Potrero Hills Landfill near Suisun City; Altamont Pass Landfill in Livermore; and Forward Landfill in Manteca) that could potentially take the nonhazardous construction and operation wastes generated by the MLGS project. The remaining capacity for the three landfill facilities combined is over 93 million cubic yards. The total amount of nonhazardous waste generated from project construction and operation would contribute less than 0.01 percent of the available landfill capacity. Staff believes that disposal of the solid wastes generated by the MLGS project could occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

As noted previously, hazardous wastes generated during construction and operation would be recycled to the extent practicable. Section 7.13.2.3 and Tables 7.13-1 and 7.13-2 of the project AFC provide information on treatment, storage, or disposal facilities (TSDFs); landfills; recycling facilities; and transfer stations that could be used to manage project wastes. Any hazardous wastes that cannot be recycled would be transported off site to a permitted TSDF or Class I landfill.

Two hazardous waste (Class I) disposal facilities in California are currently accepting waste and could be used to manage MLGS wastes: the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County. In total, there is in excess of 15 million cubic yards of remaining hazardous waste disposal capacity at these landfills.

Given the availability of recycling facilities for high volume hazardous wastes such as used oil and solvents, along with the remaining capacity available at Class I disposal facilities, staff concludes that the volume of hazardous waste from the MLGS project requiring off-site disposal would be less than 0.01 percent of remaining disposal capacity and would therefore not significantly impact the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

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 [14 Cal. Code Regs., § 15065(A)(3)]. Cumulative impacts can result from

actions taking place over time in the same area that are minor when taken individually, but are collectively significant.

In addition to the MLGS, the most closely related existing or planned projects in the area are the existing Contra Costa Power Plant facility, the newly operational Gateway Generating Station, and the proposed Willow Pass Generating Station in the nearby city of Pittsburg. As proposed, the amount of nonhazardous and hazardous wastes generated during construction and operation of the MLGS project would add to the total quantity of waste generated in the area. However, project wastes would be generated in modest quantities, waste recycling would be employed wherever feasible, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes generated by the project and the other existing and proposed powerplant facilities. Therefore, staff concludes that the waste generated by the MLGS project would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed MLGS project would comply with all applicable LORS regulating the management of hazardous and nonhazardous wastes generated during project demolition, construction and operation. First, the applicant (through the Responsible Party, PG&E) would be required to adequately remediate any existing contamination at the site prior to facility construction. This would be under the regulatory review of DTSC and would ensure project compliance with applicable health and safety LORS. The applicant would be required to recycle and/or dispose of hazardous and nonhazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the MLGS project would be required to obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (U.S. EPA). The MLGS project would also be required to properly store, package, and label all hazardous waste; use only approved waste transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

In addition, staff concludes that construction and operation of the MLGS project would not result in any waste management-related environmental justice issues. While the **Socioeconomics** section of this staff assessment presents census information identifying minority populations within a six mile radius of the project, staff is proposing conditions of certification that would reduce any risks associated with management of project wastes to a less than significant level. Consequently, staff concludes that minority populations in the vicinity of the proposed project would not experience significant impacts from project waste generation and management.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

On March 2, 2009, the Department of Toxic Substances Control (DTSC) submitted a letter to the Energy Commission affirming DTSC's oversight authority for site assessment and corrective action at the Contra Costa Power Plant properties, including

the proposed MLGS site. DTSC stated that they will review the project AFC and supplemental information and will work with Energy Commission staff to incorporate appropriate conditions for site assessment and remediation into the Staff Assessment (DTSC 2009a).

CONCLUSIONS

Staff provides the following conclusions and observations:

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 nonrecyclable wastes would be collected by a licensed transporter 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 **9**. These conditions would require the project owner to do all of the following:

Ensure that any contamination that is encountered during soil disturbance, demolition, and construction is remediated as necessary with appropriate professional and regulatory agency oversight (**WASTE-3**, and **4**).

Obtain a hazardous waste generator identification number (**WASTE-6**).

Prepare Construction and Demolition Debris Recycling Ordinance 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-5** and **7**).

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-8**).

Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-9**).

Existing conditions at the MLGS project site include areas where prior site uses have resulted in releases of hazardous wastes thus resulting in soil and groundwater contamination. To ensure that the project site is investigated and remediated as necessary and to reduce any impacts from prior or future hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes Conditions of Certification **WASTE-1**, **2**, **3**, **4**, and **8**. Because further site

characterization is currently being conducted at the request of DTSC, staff must wait for these results and may recommend additional Conditions of Certification. These currently proposed and possible future conditions would require the project owner to ensure that the project site is investigated and remediated as necessary; demonstrate that project wastes are managed properly; and ensure that any future spills or releases of hazardous substances or wastes are properly reported, cleaned-up, and remediated as necessary.

With respect to impacts on existing waste disposal facilities from disposal of project wastes, staff concludes that project wastes would contribute less than 0.01 percent of the combined remaining capacity at the identified non-hazardous and hazardous waste landfills. Therefore, disposal of project generated wastes would have a less than significant impact on existing waste disposal facilities.

Significant cumulative impacts are also not expected from wastes generated by the proposed MLGS project because wastes would be generated in modest amounts, waste recycling would be employed wherever feasible, and sufficient landfill capacity is available to manage both project wastes and wastes from other existing or proposed projects in the area.

Staff concludes that management of the waste generated during demolition, construction, and operation of the MLGS project 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. Staff cannot make any conclusion at this time about the potential impact of hazardous wastes currently existing on this site until site characterization is completed.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall comply with the Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2 requirements for management and disposal of asbestos-containing material removed during project-related structure demolition. The project owner shall provide to the BAAQMD the required demolition notification, including the appropriate fee and structure survey, no later than 30 days prior to commencement of demolition activities. Not less than 15 days prior to demolition, the project owner shall provide to the CPM copies of the notification form and associated structure survey submitted to BAAQMD, along with a copy of the acknowledgement letter and job number assigned by BAAQMD for the project demolition activities. Demolition shall not commence until the CPM receives the required BAAQMD documents and gives approval for demolition to proceed.

Verification: No less than fifteen (15) days prior to commencement of structure demolition, the project owner shall provide to the CPM copies of the BAAQMD notification materials, acknowledgment letter and job number assigned by the BAAQMD for review and approval. The project owner shall provide summary report(s) to the CPM on asbestos waste management via the monthly compliance report as appropriate. The report(s) shall include dates of asbestos removal, disposal information, and copies of

any correspondence with the BAAQMD regarding compliance with district asbestos waste management rules.

WASTE-2 Prior to initiation of structure demolition activities, the project owner shall complete a lead-based paint survey of all structures to be demolished and ensure that demolition debris containing lead-based paint is properly managed and disposed of in accordance with all applicable LORS.

Verification: At least 30 days prior to the start of site demolition, the project owner shall submit to the CPM for review and approval a copy of the lead-based paint survey conducted for the project site. The project manager shall also provide to the CPM a description of the procedures to be employed during demolition to ensure that lead-based paint debris and wastes are managed in accordance with all applicable LORS.

WASTE-3 The project owner shall contract with an experienced and qualified Professional Engineer or Professional Geologist, who shall be available for consultation and oversight of earth moving activities throughout all phases of project demolition and construction. The Professional Engineer/Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil. Selection of the Professional Engineer/Geologist shall be subject to CPM approval.

Verification: At least 30 days prior to the start of site demolition mobilization, the project owner shall submit to the CPM the resume of the project owner's preferred Professional Engineer/Geologist for CPM review and approval. Prior to the start of demolition activities, the project owner shall provide to the CPM a copy of the contract with the approved Professional Engineer/Geologist.

WASTE-4 If additional potentially contaminated soil is identified during site construction, 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/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 DTSC, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer /Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers, the public, or the environment. The Professional Engineer /Geologist shall contact the project owner, the CPM, and representatives of the DTSC for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the Professional Engineer/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-5 The project owner shall comply with all applicable provisions of the city of Antioch's Construction and Demolition Debris Recycling Ordinance No. 1018-

C-S., including preparation of a Construction and Demolition Debris Recycling Ordinance Waste Management Plan for all wastes generated during project demolition and construction activities. The project owner shall submit the plan, and any fee that would normally apply, to the city of Antioch for review and comment prior to submittal to the CPM for approval.

Verification: At least 45 days prior to the start of demolition, the project owner shall submit to the city a draft Construction and Demolition Debris Recycling Ordinance Waste Management Plan for review and comment. Not less than 15 days prior to the start of demolition, the project owner shall submit to the CPM for review and approval the draft Waste Management Plan and any comments on the plan provided by the city. The project owner shall require all project contractors and subcontractors to adhere to the city's waste diversion requirements and provide to the project owner adequate documentation of the types and volumes of wastes generated, how the wastes were managed, and volumes of wastes diverted. Not later than 30 days after completion of project construction, the project owner shall submit documentation to the city of Antioch, with copies to the CPM, demonstrating compliance with the diversion program requirements. The required documentation shall include a final completed Waste Management Plan (as set forth by the city ordinance) and all necessary receipts or records of measurement from entities receiving project wastes. The project owner shall provide documentation to the CPM that the project has satisfactorily complied with the city of Antioch Ordinance No. 1018-C-S prior to the start of project operation.

WASTE-6 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 project demolition, construction, or operation.

Verification: The project owner shall provide a copy of the hazardous waste generator identification number to the CPM prior to the start of construction and maintain a copy of the identification number on file at the project site throughout the life of the project.

WASTE-7 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:

1. A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
2. Management methods to be used for each waste stream, including temporary on-site 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;
3. Information and summary records of conversations with the Contra Costa County Health Services Department (the local Certified Unified Program

Agency) and DTSC 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;

4. 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
5. A detailed description of how facility wastes will be managed and disposed of 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-8 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are documented and cleaned up and that wastes generated from the release/spill are properly managed and disposed of, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document management of all unauthorized releases and spills of hazardous substances, hazardous materials, or hazardous wastes that occur on the project property or related linear facilities. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; how release was managed and material cleaned up; amount of contaminated soil and/or cleanup wastes generated; if the release was reported; to whom the release was reported; any corrective action and/or 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 been generated by the release. A copy of the unauthorized release/spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

WASTE-9 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 that may be related to management of project wastes. As part of the notification made to the CPM, the project owner shall describe the steps to be taken to address the impending enforcement action.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action and provide a description and timeline for steps to be taken to address the action.

REFERENCES

DTSC 2009a – DTSC/Janet Naito (tn: 50352). Letter affirming DTSC oversight authority at CCPP property and DTSC review of MLGS AFC, 3/2/2009.

URS 2008a – URS/Anne Connell (tn: 46509). Marsh Landing Generating Station, AFC, 5/30/2008.

URS 2008c– URS/J Sacks (tn: 49426). MLGS Response to Data Requests Set 1 (1-54), 12/12/2008.

URS 2009a– URS/Anne Connell (tn: 50082). MLGS Responses to the December 18, 2008 Data Response and Issues Resolution Workshop, 2/12/2009.

URS 2009c – URS/Anne Connell (tn: 54221). Work Plans for Soil & Ground Water Sampling & Focused Health Risk Assessment 11/20/2009

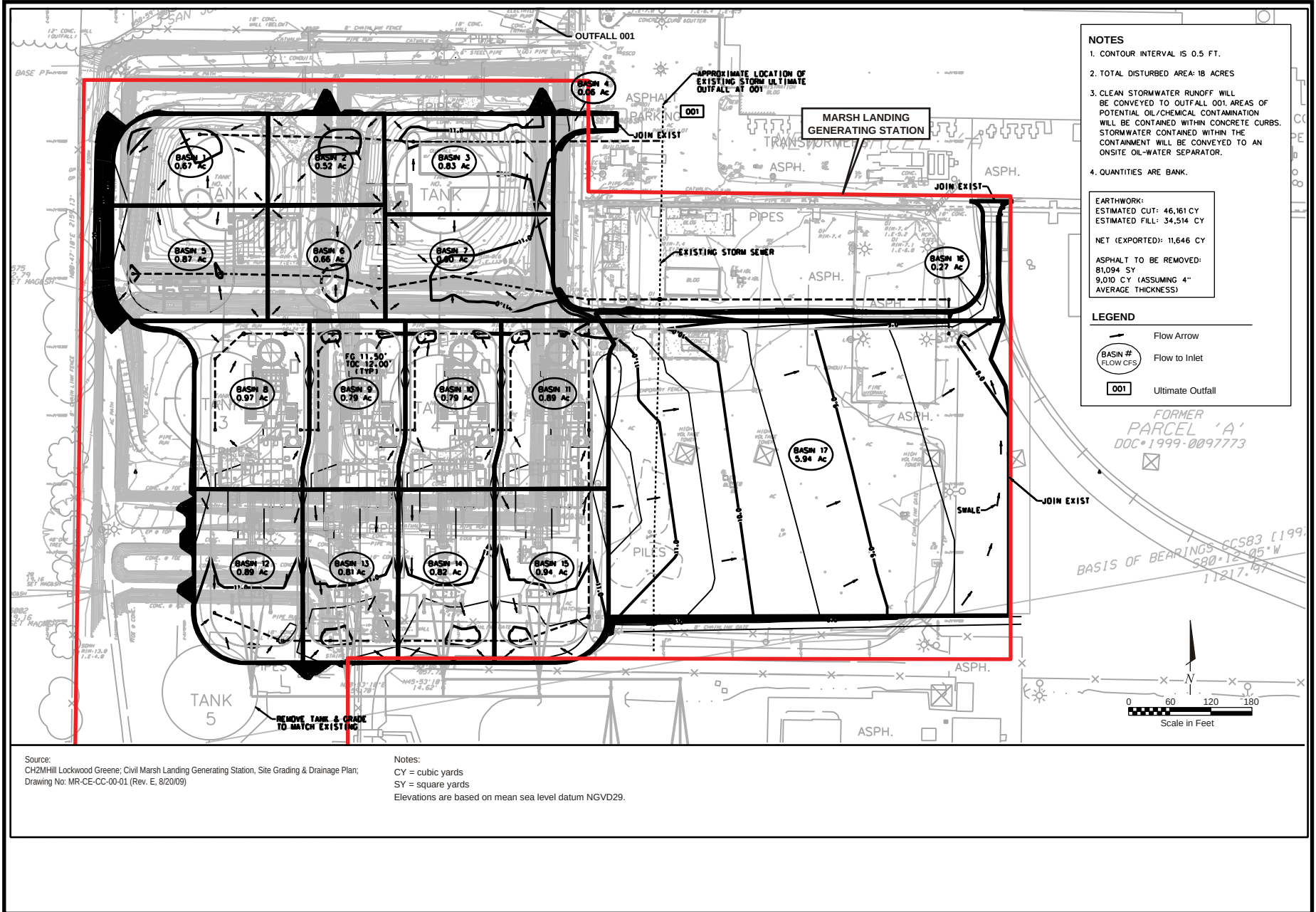
URS 2010a – URS/Anne Connell (tn: 55010). Applicant's Focused Site Investigation Report & Human Health Risk Assessment. 1/15/2010

WASTE MANAGEMENT - FIGURE 1

Marsh Landing Generating Station - Site Grading and Drainage Plan

APRIL 2010

WASTE MANAGEMENT



WORKER SAFETY AND FIRE PROTECTION

Alvin Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Marsh Landing Generating Station (MLGS) 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 fulfills 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 local fire protection services. Additionally, staff concludes that the Contra Costa County Hazmat Team located in Martinez is adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility with an adequate response time.

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 Preliminary Staff Assessment (PSA) is to assess the worker safety and fire protection measures proposed by the MLGS 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)

<u>Applicable Law</u>	<u>Description</u>
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 Contra Costa County Fire Protection District.
National Fire	These standards provide specifications and requirements for fire

Protection Association standards	safety, including the design, installation, and maintenance of fire protection equipment. Enforced by the Contra Costa County Fire Protection District.

SETTING

The proposed facility would be located within the existing Contra Costa Power Plant (CCPP) site, just north the City of Antioch within an area that is currently served by the local fire department. Fire support services to the site would be under the jurisdiction of the Contra Costa County Fire Protection District (CCCYPD). There are a total of 30 fire stations operated by the CCCYPD with a total of 325 full-time personnel on staff. The closest station to the MLGS site would be Station #81, located at 315 West 10th Street, Antioch, approximately 2.9 miles southwest of the site. The total response time from the moment a call is made to the point of arrival at the site would be approximately 8 minutes (URS 2008a, Sections 2.9.1.3 and 7.8.1.4; CCCYPD 2009a). The next nearest station would be Station #88, located about 5.2 miles away at 4288 Folsom Drive in Antioch, with a total response time of up to 12 minutes (due to driving through a more congested area). Another nearby station that would respond through an automatic aid agreement is the East Contra Costa Fire Protection District (ECCYPD) station #93, located about 3.5 miles away, with a total response time of 11-12 minutes (CCCYPD 2009a). In addition there are two other nearby CCCYPD stations that could also serve this site if necessary, as summarized in **Table 2** below.

In the event of a hazardous materials incident, the CCCYPD would call upon the Contra Costa County Health Services Department Hazmat Team located in Martinez. This hazmat team is fully equipped and could respond to any incident at the MLGS with a response time of typically 30 minutes or up to one hour (CCCYPD 2009b).

Worker Safety and Fire Protection Table 2
Equipment and Personnel at Contra Costa County Fire Protection District*

CCCYPD Station	Response Time**	Distance to WPGS	EMS/Hazmat Response***
Station #81	7 min	~2.9 miles	Yes
Station #88	12 min	~5.2 miles	Yes
Station #85	14 min	~9.4 miles	Yes
Station #84	16 min	~10 mile	Yes

*Source: AFC Section 7.8.1.4 (URS 2008a) and communications with the CCCYPD (CCCYPD 2009a and CCCYPD 2009b).

**Total response times are estimated from the moment a 911 call is made to arrival at the site and are dependent upon traffic conditions and other variables.

***All personnel are trained to EMT-1 level and there is one paramedic present per shift at every station. All personnel are also trained as first responder for hazardous materials incidents.

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment (ESA) conducted for this site by URS Corporation in May 2008 concluded that the areas beneath the existing tank farm (aboveground storage tanks 1 through 8) may have environmental conditions that would require remediation and that this should be assessed during the time these structures are removed. In addition, several other areas within the MLGS site were identified as requiring remediation according to a Phase II ESA that was conducted in 1988. These areas contain TPH or arsenic in soil and/or groundwater at levels exceeding regulatory thresholds (URS 2008a, Section 7.13.1). To address the possibility that soil contamination would be encountered during construction of the MLGS, proposed Conditions of Certification **Waste-1** and **Waste-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

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 a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response time in each area and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. 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 that the applicant mitigate this impact by providing increased resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during demolition, construction and operation of facilities. Workers at the proposed MLGS 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 MLGS 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

MLGS encompasses demolition of existing structures, 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 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 (URS 2008a, Table 7.7-2):

- 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 demolition and site-preparation for the MLGS, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the CCCFPD pursuant to the Condition of Certification

WORKER SAFETY-1.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at MLGS, 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 MLGS, 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 2008a, Sections 7.7.3.2 and 7.7.5.2 and Table 7.7-8). Prior to operation of MLGS, all detailed programs and plans would be provided to the CPM and CCCFPD 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 (URS 2008a, Section 7.7.3.2):

- 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 (URS 2008a, Section 7.7.5.2 and Table 7.7-11). 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 CCCFPD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-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 MLGS 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 (URS 2008a, Table 7.7-8).

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;
- 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 MLGS 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 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 CCCFPD 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 CCCFPD (URS 2008a, Section 2.5.10).

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 2008a, Section 7.7.5.1).

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 existing underground firewater loop would be extended to supply the hydrants and fixed suppression systems installed for the MLGS structures. The same firewater source (San Joaquin River water) and pumps currently in use at the CCPP would maintain the water supply and pressure in the MLGS loop extension (URS 2008a, Section 2.5.10).

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 CO₂ system would be equipped with fire detection sensors that would automatically trigger alarms, shut down the turbines, stop ventilation, and release the CO₂ (URS 2008a, Sections 2.5.10 and 7.7.5.2).

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 (URS 2008a, Section 2.5.10 and Table 7.7-12). 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 primary access point to the site would be via the existing CCPP entrance from Wilbur Avenue, which provides access to the MLGS site from the eastern boundary. A secondary access point for fire and emergency services would be provided via an access road from Wilbur Avenue that is located approximately 1,500 feet west of the main entrance and which provides access to the MLGS site from the southern boundary (URS 2008c, Data Response #50 and Figure 50-1).

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 CCCFPD 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 arrhythmias 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 MLGS combined with existing industrial facilities and expected new facilities to result in impacts on the fire and emergency service capabilities of the CCCFPD. When discussing the project and potential impacts on fire services with the CCCFPD, Mr. Leach stated that the fire district is adequately staffed and equipped to respond to incidents at the MLGS and he does not anticipate that the proposed facility would impact the department. The CCCFPD noted that their jurisdiction includes many industrial facilities and several power plants and that it was not known if the proposed MLGS would add a cumulative burden to the department (CCCFPD 2009a). However, in the 12 months since making that statement, the CCCFPD has not informed staff of any cumulative burden or requested mitigation. Therefore, staff concludes that given the lack of unique fire hazards associated with a modern natural gas-fired power plant, this project will not have any significant 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 MLGS 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 fulfills 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 Contra Costa County Fire Protection District for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of demolition, 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 Contra Costa County Fire Protection District 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 Contra Costa County Fire Protection District 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 Contra Costa County Fire Protection District 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 demolition, 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 reasonable 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 demolition, 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 demolition, 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.

CCCYPD 2009a – Contra Costa County Fire Protection District - Phone Communications with Ted Leach, Fire Prevention Technician, March 19, 2009.

CCCYPD 2009b – Contra Costa County Fire Protection District. Record of conversation with Battalion Chief Bill Walker, February 10, 2009.

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.

URS 2008a – URS/Anne Connell (tn: 46509). Marsh Landing Generating Station, AFC 5/30/2008.

URS 2008c – URS/J Sacks (tn: 49426). MLGS Response to Data Request, Set 1 (1-54) 12/12/2008.

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 Marsh Landing Generating Station. 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 (URS 2008a, Appendices A through E). 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	Contra Costa 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

Marsh Landing Generating Station (MLGS) would be built on an approximately 27-acre site within the existing Contra Costa Power Plant property located in Contra Costa 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, Appendices A through E (URS 2008a).

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 URS 2008a, Appendices A through E, 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.

MLGS 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 (URS 2008a, Appendices A through E) 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 MLGS 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 Contra Costa 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 MLGS 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 MLGS project

Verification: Five (5) 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. These fees may be based on hourly rates or the valuation of the facilities reviewed, or may be otherwise agreed upon by the project owner and the CBO. A copy of the contract between the owner and the CBO shall be submitted to the CPM for review and approval by staff.

Verification: 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. The CBO shall inform the CPM if the project owner has not met its obligations as specified in the agreement between the project owner and the CBO for payments related to CBO services.

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
- Contra Costa 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

URS 2008a – URS/Anne Connell (tn: 46509). Marsh Landing Generating Station AFC

GEOLOGY AND PALEONTOLOGY

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

SUMMARY OF CONCLUSIONS

The proposed Marsh Landing Generating Station (MLGS) site is located in an industrial area within the annexation limits of the City of Antioch in Contra Costa County. This area of northern California is situated in the active geologic area of the northern Coast Ranges physiographic province. Potential geologic hazards include strong earthquake-related ground shaking due to the site's geologic setting; liquefaction and associated lateral spreading of loose and submerged granular soils; and dynamic compaction. 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 Condition of Certification **GEO-1**, in addition to the proposed **Facility Design** Conditions 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.

Although geologic and mineralogic resources are known to exist in the area, there are no known viable geologic or mineralogic resources within one mile of the proposed MLGS site. Paleontological resources have been documented in older Quaternary sediments within 3 miles of the site, and could be impacted by excavation activities at the plant site and along project linears that encounter this geologic unit. Potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by proposed 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 MLGS 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 MLGS project as well as the MLGS project's impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there would be no consequential adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and that operation of the plant would 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 paleontologic 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

Applicable laws, ordinances, regulations, and standards (LORS) are listed in the application for certification (AFC) (URS 2008a). 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)

<u>Applicable Law</u>	<u>Description</u>
<u>Federal</u>	The proposed MLGS is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
<u>State</u>	
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 (International Code Council [ICC] 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), sections 2621–2630	The act 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 Fault Zone.
The Seismic Hazards Mapping Act, PRC sections 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	The code 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.

<u>Applicable Law</u>	<u>Description</u>
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	The act 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.
<u>Local</u>	
2007 California Building Code	These codes address the excavation, grading, and earthwork construction, not limited to construction relating to earthquake safety and seismic activity hazards.
Contra Costa County General Plan (2005), section VI	The section requires a general plan for long-term development. Under this plan, paleontological resources shall be protected and preserved.
City of Antioch General Plan (2003), section 10.9	The plan indicates that City staff shall require property owners/developers to provide studies to document the presence/absence of archaeological and/or paleontological resources for areas with documented or inferred resource presence. On properties where resources are identified, a detailed mitigation plan shall ensue, including a monitoring program and recovery and/or in situ preservation plan, based on the recommendations of a qualified specialist.

SETTING

The proposed MLGS project would involve the construction and operation of a nominal 760-megawatt (MW) natural-gas-fired generating facility within the boundaries of the existing Contra Costa Power Plant (CCPP) in Contra Costa County, California. The MLGS project would occupy approximately 27 acres on the western portion of the CCPP property within the northeastern planning area of City of Antioch, California. The MLGS would generally be within the footprint of area occupied by five fuel storage tanks which are no longer used to support CCPP plant operations, and an area east of the tanks. The Gateway Generating Station (GGS) is operated by Pacific Gas & Electric (PG&E) just east of the MLGS site. Natural gas would be supplied to the MLGS via a new 2,100-foot-long pipeline that would connect to PG&E’s natural gas transmission Line 400, which runs along the eastern boundary of the GGS property. The proposed pipeline would extend across the CCPP and GGS properties to the MLGS site. The power generated by the MLGS generators would be transmitted to the PG&E switchyard immediately south and east of the project site by new single-circuit 230-kilovolt (kV) transmission lines. The MLGS would consist of four power blocks utilizing Siemens 5000F simple cycle units. In addition, the MLGS project would involve the

construction of two 20,000-gallon aqueous ammonia storage tanks and associated components; four 150-foot-tall stacks with continuous monitoring systems; a water treatment system building and associated water storage tanks; a control building; a 100-foot-long potable water line from City of Antioch water main supply line; a storm water runoff system with proposed discharge to the San Joaquin River; and an underground fire loop system. A combined 14-acre area northeast and immediately east of MLGS project site, within CCPP property, would be used for construction laydown, offices, and parking.

REGIONAL SETTING

The MLGS site is located in Contra Costa County, California at the northern end of Diablo Ranges within the Coast Ranges physiographic province in the proximity of the interface of the Great Valley (Central Valley) and Coast Ranges physiographic provinces. More specifically, it is at the western end of the Sacramento-San Joaquin River delta which is a unique, valuable and integral part of California's water system. The Coast Range physiographic province is characterized by elongated topographic and lithologic strips underlain by discrete basement rocks separated by profound structural discontinuities (Norris and Webb, 1990). The Coast Ranges stretch about 600 miles from the Oregon border to the Santa Ynez River with northwest-trending mountain ranges, and valleys. The northern and southern Coast Ranges are separated by a depression containing San Francisco Bay. The Coast Ranges are composed of thick Mesozoic and Cenozoic sedimentary strata and are subparallel to the active San Andreas fault (CGS 2002). The Diablo Range is located southwest of the MLGS site and extends south of the Sacramento Delta in the western side of the San Joaquin Valley. The Diablo Range comprises a series of large en echelon anticlines composed of Franciscan Complex rocks and intervening synclines containing younger rocks (URS 2008a).

PROJECT SITE DESCRIPTION

The MLGS project site is located in Section 16, Township 2 North, Range 2 East of Mount Diablo Meridian at approximately 38.02 degrees north latitude by 121.76 degrees west longitude. The site is situated within a designated general industrial zone in the northeast portion of the City of Antioch planning area (City of Antioch 2003) and designated urban area of Contra Costa County (Contra Costa County 2005). The site is generally flat with existing ground elevations at 10 to 11 feet above mean sea level (msl), with topographic relief limited to slope faces along the San Joaquin River shoreline, and around buildings, tanks, or other developed features (URS 2008a). In particular, there are isolated areas along the San Joaquin River shoreline and the southwestern portion of the fuel tank location that exhibit existing ground elevations as low as 5 feet above msl to as high as 23 feet above msl.

The surficial geology of the site has been described as containing Quaternary age dune sand deposits of northeastern Contra Costa County (USGS 2006). These fine-grained, very well-sorted, well-drained surficial soils are eolian deposits of the San Joaquin River (USGS 1997a) which originated from igneous and sedimentary rocks (USDA 2008). The thickness of these deposits can be as much as 40 feet and are overlapped by peat in some areas leaving isolated dune ridges (USGS 1993). The dune sand deposit is generally underlain by alluvial deposits of the San Joaquin River. The geology of the

site is influenced by the San Joaquin River just north of the site as the course of the river is being shifted laterally within the recent geologic periods, and various materials at the site were alternatively deposited depending on the location of the river.

The geotechnical report for the CCPP site (URS 2008b) was reviewed to identify the soil conditions at the MLGS site. This report includes the exploration for five fuel storage tanks which are located within the boundaries of the proposed MLGS site (URS 2008a). The information contained in this report indicates the MLGS project site is generally underlain by fine to coarse sand with varying amounts of silt and gravel to 125 feet or more below existing grade. The sand soils are underlain at depth by clay soils. A historic sand dune ridge up to 40 feet in height was reportedly located near the northwestern fuel tank. The topography prior to the construction of the CCPP and the existing topography at the MLGS site indicate an extensive amount of mass grading was performed during construction of the CCPP, with cuts up to approximately 28 feet. It is reasonable to assume that the area within the footprint of the fuel storage tanks is most likely underlain by a few feet of compacted fill material and native sand soils below the surficial fill; however, no current or detailed geotechnical data is available for the MLGS site.

Since the site is situated immediately adjacent to the San Joaquin River, the depth to the ground water is expected to be within 1 to 2 feet of msl. This corresponds to ground water levels previously recorded at the site (URS 2008b).

Several active and potentially active faults related to regional strike-slip faulting and compressional tectonics are present within 50 miles of the MLGS site. EQFAULT™ Version 3.00 was used to model these potential seismic sources (Blake 2006). The various faults modeled are listed in **Geology and Paleontology Table 2**, along with the type, orientation (strike), maximum earthquake magnitude, and distance from the project site. The peak acceleration, fault type, and fault class for each fault is also given. The fault locations can be found on the California Division of Mines and Geology Fault Activity Map of California (CDMG 1994) and United States Geological Survey Fault Maps (USGS 2008b). The sense of movement and fault class were derived from the California Department of Conservation Fault Parameters (CDC 2002).

Geology and Paleontology Table 2
Active Faults Relative to the Proposed MLGS Site

<u>Fault Name</u>	<u>Distance from Site (miles)</u>	<u>Maximum Earthquake Magnitude (Mw)</u>	<u>Estimated Peak Site Acceleration (g)</u>	<u>Fault Type and Strike</u>	<u>Fault Class</u>
GREAT VALLEY 5	3.5	6.5	0.439	Reverse (West)	B
GREENVILLE (GN)	9.9	6.7	0.217	Right lateral – Strike slip	B
MOUNT DIABLO (MTD)	10.7	6.7	0.248	Reverse (Northeast)	B
CONCORD/GV (CON)	14.6	6.3	0.133	Right lateral – Strike slip	B
CONCORD/GV (CON+GVS)	14.6	6.6	0.158	Right lateral – Strike slip	B

<u>Fault Name</u>	<u>Distance from Site (miles)</u>	<u>Maximum Earthquake Magnitude (Mw)</u>	<u>Estimated Peak Site Acceleration (g)</u>	<u>Fault Type and Strike</u>	<u>Fault Class</u>
CONCORD/GV (CON+GVS+GVN)	14.6	6.7	0.169	Right lateral – Strike slip	B
CONCORD/GV (FLOATING)	14.6	6.2	0.129	Right lateral – Strike slip	B
CONCORD/GV (GVS+GVN)	17.1	6.5	0.133	Right lateral – Strike slip	B
CONCORD/GV (GVS)	17.1	6.2	0.117	Right lateral – Strike slip	B
CALAVERAS (CS+CC+CN)	19.2	6.9	0.155	Right lateral – Strike slip	B
CALAVERAS (CC+CN)	19.2	6.2	0.107	Right lateral – Strike slip	B
CALAVERAS (FLOATING)	19.2	6.2	0.105	Right lateral – Strike slip	B
CALAVERAS (CN)	19.2	6.8	0.143	Right lateral – Strike slip	B
GREAT VALLEY 4	20.5	6.6	0.150	Reverse (West)	B
GREAT VALLEY 7	23.5	6.7	0.143	Reverse (West)	B
GREENVILLE (GS+GN)	23.5	6.9	0.133	Right lateral – Strike slip	B
GREENVILLE (FLOATING)	23.5	6.2	0.090	Right lateral – Strike slip	B
GREENVILLE (GS)	23.5	6.6	0.112	Right lateral – Strike slip	B
CONCORD/GV (GVN)	26.7	6.0	0.075	Right lateral – Strike slip	B
HAYWARD (FLOATING)	27.6	6.9	0.116	Right lateral – Strike slip	A
HAYWARD (HS+HN+RC)	27.6	7.3	0.140	Right lateral – Strike slip	A
HAYWARD (HS)	27.6	6.7	0.102	Right lateral – Strike slip	A
HAYWARD (HS+HN)	27.6	6.9	0.116	Right lateral – Strike slip	A
HAYWARD (HN+RC)	27.7	7.1	0.129	Right lateral – Strike slip	A
HAYWARD (HN)	27.7	6.5	0.093	Right lateral – Strike slip	A
WEST NAPA	28.1	6.5	0.092	Right lateral – Strike slip	B
HAYWARD (RC)	36.8	7.0	0.098	Right lateral – Strike slip	A
HUNTING CREEK – BERRYESSA	38.3	7.1	0.100	Right lateral – Strike slip	B
CALAVERAS (CC)	39.6	6.2	0.062	Right lateral – Strike slip	B
CALAVERAS (CS+CC FLOATING)	39.6	6.2	0.061	Right lateral – Strike slip	B
CALAVERAS (CS+CC)	39.6	6.4	0.066	Right lateral – Strike slip	B
SAN ANDREAS (SAP)	45.6	7.2	0.090	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP+SAN)	45.6	7.8	0.123	Right lateral – Strike slip	A
SAN ANDREAS (SAP+SAN+SAO)	45.6	7.8	0.128	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP+SAN+SAO)	45.6	7.9	0.133	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP)	45.6	7.4	0.103	Right lateral – Strike slip	A
SAN ANDREAS (SAP+SAN)	45.6	7.7	0.117	Right lateral – Strike slip	A
SAN ANDREAS (FLOATING)	45.6	6.9	0.078	Right lateral – Strike slip	A
GREAT VALLEY 3	46.5	6.9	0.094	Reverse (West)	B
SAN ANDREAS (SAN+SAO)	46.9	7.7	0.117	Right lateral – Strike slip	A
SAN ANDREAS (SAN)	46.9	7.5	0.103	Right lateral – Strike slip	A
MONTE VISTA – SHANNON	48.0	6.7	0.083	Reverse (West)	B
SAN GREGORIO (SGS+SGN)	49.5	7.4	0.098	Right lateral – Strike slip	B
SAN GREGORIO (FLOATING)	49.5	6.9	0.074	Right lateral – Strike slip	B
SAN GREGORIO (SGN)	49.5	7.2	0.088	Right lateral – Strike slip	B

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 include 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 plant operations could adversely affect any such resources.

Staff reviewed existing paleontologic information and requested records searches from the University of California Museum of Paleontology (at Berkeley) for the area surrounding the site. Site-specific information generated by the applicant for the MLGS 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 such resources are present or likely to be present, Conditions of Certification outline required procedures to mitigate impacts to potential resources and are proposed as part of the project's approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, liquefaction and associated lateral spreading, and dynamic compaction 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 geotechnical report as required by the CBC (2007) and proposed Condition of Certification **GEO-1**. 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.

No known viable geologic or mineralogic resources are known to exist at the plant site or along the project linears (URS 2008a). As a result, the information provided and the documentation reviewed indicates that the project should not impact, directly or indirectly, viable geologic or mineralogic resources.

Paleontological resources were not observed at the MLGS site during the paleontological field survey conducted for the project AFC due to the intensive modification of the area for industrial and commercial use; however, the presence of paleontological resources in the nearby Quaternary sediments suggest that there is potential for such resources to be discovered during the construction of the MLGS project (URS 2008a; Winston & Strawn [W&S] 2008a). Since the proposed MLGS site construction would include significant amounts of grading, excavation, and utility trenching, staff considers that there is a high probability of encountering paleontological resources during such activities. Proposed Conditions of Certification **PAL-1** through **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 (a paleontologic resource specialist, or 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 (URS 2008a) 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, liquefaction and associated lateral spreading, dynamic compaction, settlement due to loading of compressible soils, and expansive clay soils must be addressed in the project geotechnical report per CBC (2007) and proposed Condition of Certification **GEO-1** requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the MLGS plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), the U.S. Geological Survey (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 millimeters per year (mm/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. Sixteen Type A faults and 29 Type B faults have been identified within 50 miles of the proposed MLGS Site. The fault type, potential magnitude, and distance from the site were summarized previously in **Geology and Paleontology Table 2**.

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 MLGS site, setbacks from occupied structures would 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* (1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG 2003; CGS 2002; and Hart and Bryant 1999). No active faults are shown on published maps as crossing the boundary of new construction at the proposed MLGS site or its proposed off-site elements. The nearest major active fault is Segment 5 of the Great Valley Fault located approximately 3.5 miles north of the plant site. At least 13 other active or potentially active faults are present within 20 miles of the site and all of them are Type B faults (**Geology and Paleontology Table 2**).

Segment 5 of the Great Valley Fault is the closest major active or potentially active fault to the site and controls the seismic impact to the site. This fault has been identified as a Type B fault with reverse and 15-degree-west dipping structure and as having a slip rate of approximately 1.5 mm/year. The next closest fault to the site is the northern segment of Greenville Fault (Clayton section), which is mapped approximately 9.9 miles southwest of the site. This fault is a Type B fault with an approximate slip rate of 2.0 mm/year. The closest Type A fault to the site, the Hayward Fault, is mapped as being 27.6 miles southwest of the site and as having a slip rate of as much as 9.0 mm/year (CDC 2002). The Greenville Fault, Hayward Fault, and most of other faults listed on **Geology and Paleontology Table 2** within 50 miles of the MLGS 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.

The Antioch Fault was previously considered as a Quaternary active fault. The General Plan of Contra Costa County (2005) identifies the Antioch Fault as an inferred active fault affecting Contra Costa County. This northwest-striking right-lateral fault was mapped as starting from a bedrock fault, the Davis Fault, and ending in a slough area located near the southern bank of San Joaquin River approximately 2.2 miles west of MLGS site. Several quaternary age fault movements, right-lateral offsets and compressional buckles in walks and curbs have been documented in the north-northwestern projection of the fault in the alluvial plain of Antioch (USGS 1977). Therefore, the Antioch Fault was previously zoned under the Alquist-Priolo Act as potentially capable of surface rupture; however, a later study of the Antioch Fault (Wills, C.J. 1992) concluded that the documented evidences of fault movements in the Quaternary alluvium deposits could have been caused by tree roots, soil expansion, or

settlement and there is no evidence that an active, surface fault exists in Antioch. Based on this information, the Antioch Fault is no longer listed as an active earthquake fault.

Based on the information contained in existing geotechnical report for this site (URS 2008b) and 2007 CBC criteria (USGS 2008a), bedrock ground motions with a 2% probability of being exceeded within the next 50 years are estimated to be on the order of 0.65 times the acceleration of gravity (0.65g).

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. The MLGS site is predominantly underlain by fine to coarse sand of various density. Potentially liquefiable layers of submerged and clean sand soils that exhibit relatively low blow counts are present locally at varying depths (URS 2008a). The Contra Costa County General Plan (2005) identifies the project area and proposed off-site features as having generally high potential for liquefaction. In addition, the Quaternary geological units in the project area have moderate potential for liquefaction as mapped by USGS (USGS 2000).

Based on the above information, the site can be characterized as having a moderate potential for liquefaction during a large earthquake; however, this potential impact can be mitigated to less than significant through facility design as required by the CBC (2007); proposed Condition of Certification **GEO-1**; and **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section.

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 liquefaction potential of the MLGS site has yet to be determined, the potential for lateral spreading during seismic events cannot be estimated. The project-specific geotechnical report required by the CBC (2007) and proposed Condition of Certification **GEO-1** would evaluate site liquefaction and associated lateral spreading potential, and provide recommendations to mitigate the effects of such conditions to a less than significant level.

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 in soil density). The decrease in volume can result in settlement of overlying structural improvements. Since the plant site is underlain by loose to medium dense surficial fill material (dune sand origin) and fluvial deposits of varying density at depth, dynamic compaction of these materials during an earthquake is possible. The project-specific geotechnical report required by the CBC (2007) and proposed Condition of Certification **GEO-1** would evaluate the dynamic compaction potential of the site, and

provide recommendations to mitigate the effects of such conditions, if determined to be present, to a less than significant level.

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 flash flood. 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. Based on the nature of placement of the soils present to depth at the MLGS site (URS 2008a), the potential for hydrocompaction is minimal at this site.

Subsidence

Local subsidence or settlement may occur when areas containing loose granular soils or compressible fine grain soils are subjected to foundation loads. Regional subsidence could occur due to future changes in ground water pumping or development of hydrocarbon reserves in the Sacramento Delta; however, no known subsidence problems exist at the MLGS site (URS 2008a). Recommendations for mitigating the effects of subsidence (settlement) due to foundation loads must be provided in the 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 loose soils for lightly loaded foundations. For heavily loaded foundations, deep foundations are commonly used to support the loads.

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, waterline 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. The United States Department of Agriculture (USDA 2008) has identified the surficial materials at the plant site as generally non-plastic sand soils that possess negligible shrink-swell potential, which are underlain to depth by granular alluvial soils. Therefore, the potential impact of expansive soils on the proposed MLGS site is negligible.

Landslides

The MLGS site, including the linears alignment, is essentially flat with slope faces along the San Joaquin River shoreline, although there is minor topographic relief within the MLGS plant site in and around buildings and tanks (URS 2008a). Based on the flat-lying nature and the absence of significant topographically high ground within or immediately upgradient from the site, the potential for landslides is negligible.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the MLGS site and proposed offsite improvement locations as lying in a non-shaded Zone C, or an area subjected to minimal flooding (FEMA 1987). Therefore, the potential impact of flooding on the proposed MLGS project is negligible.

Tsunamis and Seiches

Tsunamis are large-scale seismic sea waves caused by offshore earthquakes, landslides and/or volcanic activity. The proposed MLGS site is located over 25 miles upriver from San Francisco Bay and over 45 miles from the Pacific Ocean coast line. Attenuation of seismic sea waves over these distances would result in a decrease of wave height by approximately 90% by the time it reached the Carquinez Strait, located approximately 25 miles downriver from the plant site (URS 2008a). Recent studies estimate the maximum anticipated wave height at the Golden Gate, generated by a magnitude 9.2 earthquake in the Aleutian Islands, would be approximately 18 feet but would diminish to approximately 19 inches at the Carquinez Strait (URS 2008a). Since the MLGS is over 25 miles upriver from the Carquinez Strait and the site exists approximately 10 feet above msl, the potential for a tsunami to impact the project site is considered low and would not affect operation of the facility.

No large inland, confined surface water bodies are located near the project site. As a result, there is no potential for seiches to affect the project site.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Based on mapping information developed by the CDC, the northern-most third of the MLGS site lies in Mineral Resource Zone 1 (MRZ 1), which is defined as an area where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence (CDC 1987). The southern portion of the site and other off-site project features lie in MRZ 3, which is defined by CDC as an area containing mineral deposits the significance of which cannot be evaluated from available data boundary. In addition, the project site is located within an urbanized or urbanizing zone as identified by the office of planning and research (CDC 1986). Energy Commission staff has also reviewed applicable geologic maps and reports for this area (CDC 2006; CDC 2001; CDC 2000; CDC 1999; CDC 1992; CDC 1987; CDC 1986; CDC 1982; CDC 1980; CDMG 1999; CDMG 1998; CDMG 1996; CDMG 1990; CDMG 1978; USGS 2006; USGS 2000; USGS 1997a; USGS 1994; USGS 1993; USGS 1982; USDA 2008; UCMP 2009a; UCMP 2009b; City of Antioch 2003; Contra Costa County 2005). An area with potentially significant mineralogical resources is located approximately 2.4 miles south of the project site. This area is designated by the CDC as a MRZ 2, which is defined as an area where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists (CDC 1987). This area encompasses a 56-acre asphalt concrete aggregate grade sand deposit of the Wolfskill Formation (CDC 1987). Three other areas designated as MRZ 2 with significant mineralogical resources are located approximately 10 to 11 miles from the site. The first is a non-Portland cement concrete (PCC) grade aggregate deposit located at the foothills of Mount Diablo approximately 10 miles southwest of the site; the second is an asphalt concrete

aggregate grade sandstone deposit at Mount Zion approximately 11 miles southwest of the site; and the third is a PCC grade aggregate deposit of the Domengine Formation approximately 11 miles southeast of the project. A sand or sand and gravel pit is located approximately 10 miles west of the site and 3 more crushed stone pits are located 11 to 13 miles southwest of the site (CDC 1986). A former limestone pit, the Oil Canyon deposit, is located approximately 6.5 miles southwest of MLGS site. The nearest active limestone pit, the Tolenas Springs deposit, is approximately 25 miles northwest of the plant site in the Solano County (CDMG 1978). No gold reserves were identified near the project site and the nearest gold reserve is located more than 35 miles north to northwest of the site. Two PCC aggregate deposits with minimal aggregate availability (less than 0.5 million tons/year) are located approximately 8 miles north and 12 miles south of the site (CDC 2006), respectively. As recently listed by the CDC, at least 6 active non-PCC grade sand and gravel pits, one specialty sand pit and one rock and stone pit, are located within 10 miles of MLGS site (CDC 1999).

The MLGS site is located in the Sacramento-San Joaquin sedimentary basin with viable oil, gas, or geothermal resources. At least 11 active or historic oil and gas fields are present in Contra Costa County. The River Break gas field of the Contra Costa County and the Sherman Island gas field of the Solano County are located approximately 1.8 miles southeast and 2.8 miles northeast of the site, respectively. The Rio Vista gas field with large exposure area is located approximately 5.5 miles northwest of the project site. The Brentwood oil field of Contra Costa County is located approximately 3.2 miles south of the site. Geothermal fields are present just north of the site along the bed of the San Joaquin River (CDC 1999; CDOGGR 2008). A natural gas exploration well advanced approximately one mile southeast of the project site was dry and abandoned (CDOGGR 2008). At least 5 thermal springs or wells are also present in Contra Costa County (CDOGGR 2008).

Since the site and project linears are generally mapped as lying in an MRZ 1 and MRZ-3; the site is located in a developed industrial area; previous exploration at the project site did not reveal the presence of any significant amount of potential PCC aggregate deposits (URS 2008a); natural gas exploration in the vicinity of the project site did not encounter any such resources; and given the absence of rock outcrops on or near the site surface, there is very low potential for this site to have economically viable geologic or mineralogic deposits.

Energy Commission staff has reviewed the paleontological resources assessment contained in the AFC (URS 2008a; W&S 2008a). In addition, staff has also reviewed the paleontological literature and records searches conducted by personnel at the University of California, Museum of Paleontology (UCMP 2009a), and an independent search was carried out within the on-line records database maintained by the UCMP (2009b). The results of this review indicate that at least 4 paleontological localities have been documented within 3 miles of the MLGS site in a southwesterly direction towards the Mount Diablo. The closest locality was found in Quaternary alluvium deposits just south of San Joaquin River, approximately 1 mile west to southwest of the MLGS site. This locality has at least 6 vertebrate specimens. A second locality has been documented in Quaternary alluvium deposits approximately 1.6 miles southwest of the site, and the last two localities were encountered in Tertiary age deposits approximately 2 and 2.9 miles southwest of MLGS site, respectively (UCMP 2009a; UCMP 2009b). As

Quaternary alluvium deposits are also present at the proposed plant site and along the project linears, the potential to encounter paleontological resources is high when excavation activities fully penetrate any surficial fill and encounter Quaternary alluvium deposits. The potential impacts to such resources can be effectively mitigated through the proposed Conditions of Certification **PAL-1** through **PAL-7**.

Construction Impacts and Mitigation

The design-level geotechnical investigation required for the project by the CBC (2007), proposed Condition of Certification **GEO-1**, and proposed **Facility Design** Condition of Certification **GEN-1** would evaluate and provide standard engineering design recommendations for mitigation of liquefaction and associated lateral spreading, and dynamic compaction.

Based on information presented in the AFC and Energy Commission staff's independent evaluation, no viable geologic or mineralogic resources are known to be present at the plant site or along the proposed linears. The potential to impact significant paleontological resources in Quaternary alluvial fan deposits present at depth is considered to be high. Fill materials have a negligible paleontological sensitivity. Construction of the proposed project would include grading, excavation, and utility trenching. Staff considers the probability of encountering paleontological resources to be high in excavations which penetrate through the surficial fill materials and encounter native alluvial and fluvial sediments, and the potential for encountering such resources would increase with the depth of cut or excavation.

Proposed Conditions of Certification **PAL-1** through **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less-than-significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist, or PRS). Earthwork is halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the Conditions of Certification 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 is 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 Energy Commission 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 proposed for the MLGS project, 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 site during the project 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, liquefaction and associated lateral spreading, and dynamic compaction can be effectively mitigated through facility design (see proposed Conditions of Certification **GEO-1** below and **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section) to the degree 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 withdrawal. As this project will not involve pumping of ground water, the proposed MLGS project will not contribute to any increase of this potential hazard. In addition, a significant number of large-scale ground water pumping operations would have to be constructed to have any significant impact on the proposed facility. Since heavily loaded foundations will 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.

Based on information presented in the AFC and Energy Commission staff's independent evaluation, viable geologic resources are not present at the plant site or along the project linears but are present in the vicinity of the project site. However, the viable geologic units are widespread alluvial deposits that occur in the eastern San Francisco Bay region and are therefore not unique in terms of recreational, commercial, or scientific value. As a result, the proposed MLGS project should have negligible cumulative effect on these resources.

Paleontological resources have been documented in the general area of the project and native sediments with potential paleontological resources have been identified at the project site and along the proposed linears (URS 2008a; W&S 2008a; UCMP 2009a; UCMP 2009b). 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 will be mitigated as required by proposed Conditions of Certification **PAL-1** through **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 is low and that the potential for impacts to geologic, mineralogic, and paleontologic resources is also low.

Based upon the literature and archives search, field surveys, and compliance documentation for the proposed MLGS project, 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 less than significant.

The proposed Conditions of Certification allow the Energy Commission Compliance Project Manager (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 are not expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. 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 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 will 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 in addition to **GEO-1** below. Proposed paleontological Conditions of Certification **PAL-1** through **PAL-7** follow **GEO-1**.

GEO-1 The Soils Engineering Report required by Section 1802A of the 2007 CBC should specifically include laboratory test data, associated geotechnical

engineering analyses, and a thorough discussion of the potential for liquefaction and associated lateral spread, and dynamic compaction. The report should also include recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards, if present.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the potential for liquefaction and associated lateral spread; settlement due to compressible soils, dynamic compaction; and the possible presence of expansive clay soils, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.

PAL-1 The project owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (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 Society of Vertebrate Paleontology (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 paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors (PRMs) 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 laydown 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. 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 Society of Vertebrate Paleontology (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 a CPM-approved video or in-person presentation. 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 these 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 script and final video to the CPM for approval if the project owner is planning to use a video for interim 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 video) 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) keeps 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

Marsh Landing Generating Station (08-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.

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Cultural Trainer: _____ Signature: _____ Date: ____/____/____

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

Biological Trainer: _____ Signature: _____ Date: ____/____/____

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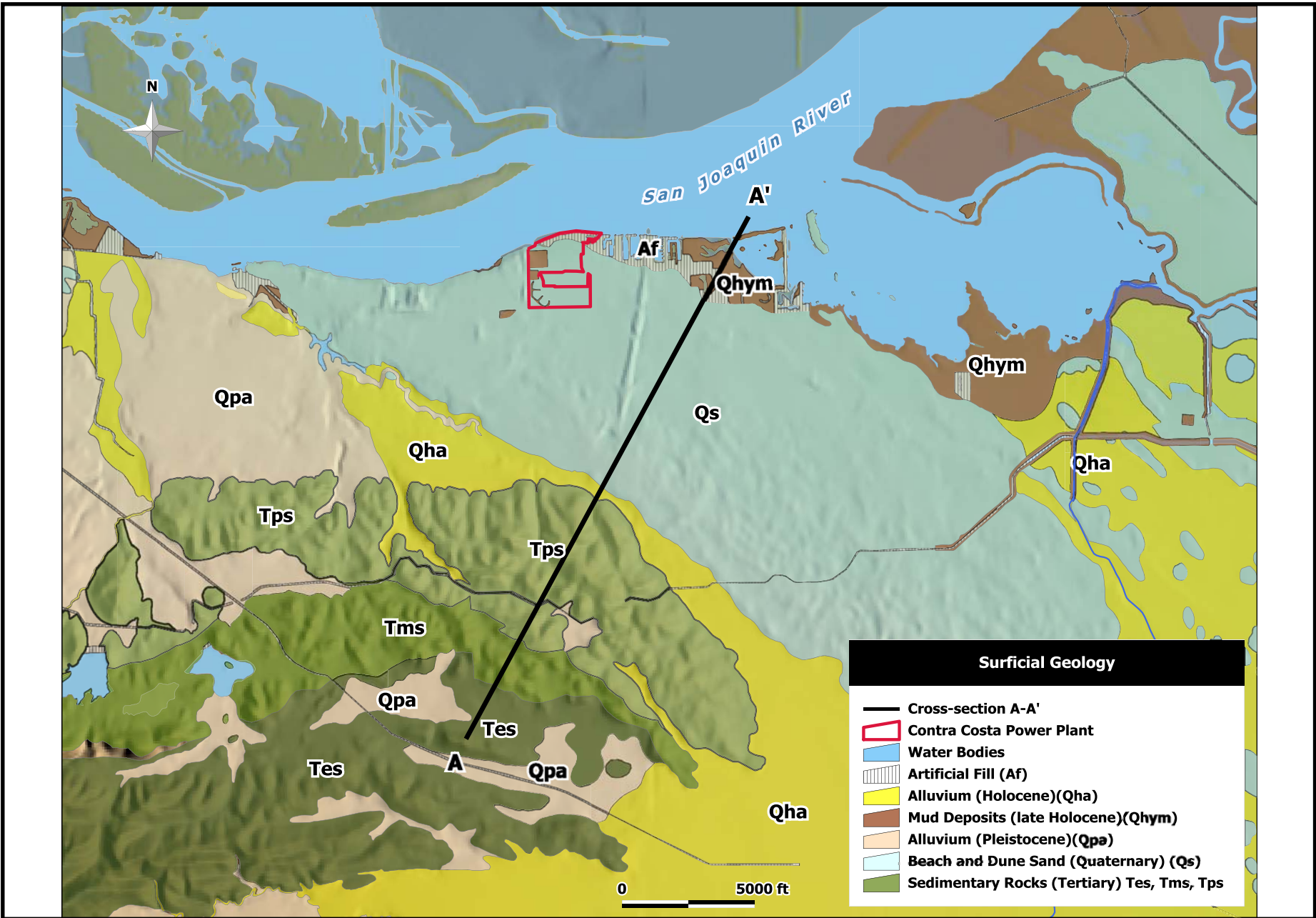
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GEOLOGY - FIGURE 1
Marsh Landing Generating Station - Surficial Geology



POWER PLANT EFFICIENCY

Testimony of: Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Marsh Landing Generating Station (MLGS), if constructed and operated as proposed, would generate 760 megawatts (MW) (net output) of electricity at an overall project fuel efficiency of 38% lower heating value (LHV) at annual average ambient conditions. 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 this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

INTRODUCTION

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed MLGS power plant, would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that MLGS's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

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

- Examine whether the facility would likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures could eliminate those 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 (LORS) apply to the efficiency of this project.

SETTING

Mirant Marsh Landing, LLC, the applicant, proposes to build and operate the MLGS, a 760 MW (net output) power plant, to serve California's energy needs (URS 2009b, §§1.0, 2.0). The project would consist of four independent power trains: four separate simple cycle power trains producing a total of 760 MW (net output).

Each simple cycle train would consist of one Siemens SCC6-5000F combustion gas turbine generator equipped with an evaporative inlet air cooling system and ultra low-NOX combustors, and an SCR unit (URS 2008a, AFC §§1.4, 2.1, 2.5).

Natural gas would be delivered to MLGS via a new 2,100-foot-long gas line that would be connected to an existing PG&E natural gas pipeline (URS 2008a, AFC §§1.1, 1.9, 2.1, 5.2; URS 2009b, Revised Figure 2.1-1).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING THE 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" (Title 14 CCR §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 the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §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

Any power plant large enough to fall under Energy Commission siting jurisdiction (50 MW or greater) will, by definition, consume large amounts of energy. Under normal conditions, MLGS would burn natural gas at a maximum rate of approximately 6,871 million British thermal units (MMBtu) per hour, LHV, during base load operation (URS 2009b, §3.6.1.2). This is a substantial rate of energy consumption that could potentially impact energy supplies. Under expected project conditions, electricity would be generated at a base load efficiency of approximately 38% LHV (URS 2009b, Revised Figure 2.5-5). This efficiency level compares favorably with the average fuel efficiency of a typical simple cycle power plant at base load.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas to operate the project (URS 2008a, AFC §§1.1, 1.9, 2.1, 5.2; URS 2009b, Revised Figure 2.1-1). Natural gas for MLGS would be supplied from a PG&E natural gas transmission line. The PG&E

system draws from extensive supplies originating in the southwest and in Canada, and is capable of delivering the gas that MLGS would require to operate. This natural gas supply is a reliable source of natural gas for this project. It therefore appears unlikely that the project would create a substantial natural gas demand increase.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel would be supplied to the project by PG&E via a new pipeline connection (URS 2009b, §§1.1, 1.9, 2.1, 5.2; URS 2009b, Revised Figure 2.1-1). There appears to be little likelihood that MLGS would require additional capacity since regional supplies are currently plentiful.

COMPLIANCE WITH ENERGY STANDARDS

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

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

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

Project Configuration

MLGS would consist of four simple cycle power trains. Electricity would be generated by four gas turbines alone (URS 2009b, §§1.0, 2.0). This configuration, with its short start-up time and fast ramping¹ capability, is well suited to providing peaking power.

The applicant proposes to install four simple cycle power trains in parallel, in which electricity is generated by four natural gas-fired turbine generators (URS 2009b, §§1.0, 2.0). The four-train combustion turbine configuration is highly efficient during unit turndown since one train can be shut down, leaving the others fully loaded. This allows the efficient operation of three trains instead of the operation of all four trains at a less than full-load efficiency.

Equipment Selection

The F-class of advanced gas turbines to be installed in MLGS represents one of the most modern and efficient machines available.

For each power train, the applicant would install one Siemens SCC6-5000F combustion gas turbine generator in a simple cycle configuration nominally rated at 202.0 MW and 38.1% net plant efficiency LHV under International Organization for Standardization (ISO) conditions (GTW 2007).

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

One possible alternative is the General Electric (GE) Frame 7FA, nominally rated in a simple cycle configuration at 255.6 MW and 36.9% efficiency LHV at ISO conditions (GTW 2007).

Another alternative is the Alstom Power GT24, nominally rated at 188.8 MW with an efficiency rating of 38.1% LHV at ISO conditions (GTW 2007).

Any differences among the SCC6-5000F, GE 7FA, and Alstom GT24 in actual operating efficiency would be insignificant. Selecting among these machines is thus based on other factors such as generating capacity, cost, commercial availability, and the ability to meet air pollution limitations.

Efficiency of Alternatives to the Project

MLGS's objectives include the generation of electricity and ancillary services to serve energy needs throughout California, including producing power quickly and meeting fluctuating load requirements (URS 2009b, §1.2).

Alternative Generating Technologies

Alternative generating technologies for MLGS are considered in the (URS 2009b, §8.10). For purposes of this analysis, other fossil fuels, nuclear, biomass, hydroelectric, solar, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and the commercial availability of the above technologies, 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 fuel-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 strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important when selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing, has produced machines that both offer the lowest available fuel cost and sell at the lowest per-kilowatt capital cost.

Inlet Air Cooling

Other alternatives include gas turbine inlet air cooling methods. The two most common techniques are evaporative coolers or foggers, and chillers. Both increase power output by cooling gas turbine inlet air. A mechanical chiller offers greater power output than the evaporative cooler on hot, humid days; however, it consumes electric power to operate its refrigeration process, slightly reducing its overall net power output and overall efficiency. An absorption chiller uses less electricity but necessitates the use of a substantial amount of ammonia. An evaporative cooler or fogger boosts power output

most efficiently on dry days; it uses less electricity than a mechanical chiller, possibly producing a slightly higher operating efficiency. Efficiency differences between these alternatives are relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over another, staff agrees that the applicant's choice of an evaporative gas turbine inlet air cooling system would have no significant adverse energy impacts.

Staff, therefore, believes that MLGS would not constitute a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the MLGS to create cumulative impacts on natural gas resources. The PG&E natural gas supply system is adequate to supply the MLGS without adversely impacting its other customers.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption), that would not have otherwise occurred without this project. Older, less efficient power plants consume more natural gas than new, more efficient plants such as the MLGS. Natural gas is burned by the most competitive power plants on the spot market, and the most efficient plants run the most frequently. The high efficiency of the proposed MLGS should allow it to compete favorably, run at high capacity, and replace less efficient power generating plants. The project would therefore not adversely impact the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant expects to increase power supply reliability in the California electricity market by both meeting the state's energy needs and contributing to regional electricity reserves. By doing so in a fuel-efficient manner, through installing the most modern F-class gas turbine generator available, MLGS would benefit electric consumers of California.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 760 MW (net output) of electricity at an overall project fuel efficiency of 38% LHV at annual average ambient conditions. 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. Facility closure would not likely present significant impacts on electric system efficiency.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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POWER PLANT RELIABILITY

Testimony of: Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Mirant Marsh Landing, LLC, the applicant, predicts an equivalent availability factor of 92% to 98%, which staff believes is achievable. Based on a review of the proposal, staff concludes that Marsh Landing Generating Station (MLGS) would be built and would operate 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, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the **Setting** section, 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 typical industry norms for reliable power generation. While the applicant has predicted an equivalent availability factor of 92% to 98% for MLGS (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

No federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to the reliability of this project.

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), which purchase, dispatch, and sell electricity throughout the state. How the California ISO and other control area operators ensure system reliability is an ongoing process; protocols are still being developed and put in place to provide sufficient reliability in the competitive market system. "Must-run"

power purchase agreements and “participating generator” agreements are two mechanisms that ensure an adequate supply of reliable power.

The California ISO also requires that power plants selling ancillary services, as well as those holding reliability must-run contracts, fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the California ISO.

The California ISO’s mechanisms to ensure adequate power plant reliability have apparently been developed with the assumption that individual power plants competing to sell power into the system will exhibit reliability levels similar to those of power plants of past decades. However, there is reason to believe that, with free market competition, financial pressures on power plant owners to minimize their capital outlays and maintenance expenditures may ultimately reduce the reliability of many existing and newly constructed power plants (McGraw-Hill, 1994). It is possible that, if enough power plants exhibit reliability levels sufficiently lower than historical levels, the assumptions used by the California ISO to ensure system reliability could be invalid, causing serious repercussions. Until the state’s restructured competitive electricity market has undergone a shakeout period and the effects of varying power plant reliability are thoroughly understood and compensated for, staff recommends that power plant owners continue to build and operate their projects to the industry’s current level of reliability.

As part of its plan to provide needed reliability, the applicant proposes to operate the 930 megawatt (MW) (average net output) MLGS, consisting of two combined cycle power trains and two simple cycle power trains, with operating flexibility (that is, ability to start up, shut down, turn down, and provide peaking power) so that its operation can be readily adapted to changing conditions in the energy and ancillary services markets. MLGS would generate power at a location near the electric load, increasing reliability of the regional electricity grid and reducing dependence on imported power (URS 2008a, AFC §1.2).

The project is expected to achieve an equivalent availability factor in the range of 92% to 98% (URS 2008a, AFC §§1.5.1, 2.9.2.1). The project’s combined cycle units would be expected to operate at a range of 40%-50% capacity factor, and the project’s simple cycle units would be expected to operate at less than 10% capacity factor (URS 2008a, AFC §§1.1, 2.1).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how the project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §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 a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available, and upon 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 30-year life, MLGS is expected to operate reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires 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 a project and compares them to industry norms. If they compare favorably for this project, staff will then conclude that MLGS would be as reliable as other power plants on the electric system and would not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by adopting appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant, and by providing for the adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

The applicant describes a QA/QC program (URS 2008a, AFC §2.9.2.11) that is typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in standard reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility operating in base-load mode for long periods of time must be capable of being maintained while operating. A typical approach to this is to provide redundant examples of those pieces of equipment that are most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (URS 2008a, AFC §§2.9.2.2, 2.9.2.3, 2.5.4.4, Tables 2.9-1, 2.9-2). Because the project consists of four combustion turbine generators, operating in parallel as independent equipment trains, it is inherently reliable. A single equipment failure cannot disable more

than one train, allowing the plant to continue to generate, but at reduced output. All plant ancillary systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. For example, the plant's distributed control system would be built with typical redundancy. Also, emergency direct current and alternating current power systems would be supplied by redundant batteries, chargers, and inverters. Examples of other redundant systems for the balance of plant equipment include:

- two 100% capacity feedwater pumps;
- two 100% capacity condensate pumps; and
- two 100% capacity air compressors.

Staff believes that the project's proposed equipment redundancy would be sufficient for its reliable operation.

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

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

MLGS would burn natural gas which would be delivered through a new 2,100-foot-long natural gas pipeline that would be connected to an existing PG&E natural gas transmission pipeline (URS 2008a, AFC §§1.1, 1.9, 2.1, 2.9.2.8, 5.2). PG&E's natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Southwest, the Rocky Mountains, and Canada. Staff agrees with the applicant's claim that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The project would use dry cooling technology, which would eliminate the large amount of water supply required by wet-cooled power generation projects. MLGS would use water delivered from the Delta Diablo Sanitation District (DDSD) recycled water system for the project's process and inlet evaporative cooling uses (URS 2008a, AFC §§1.1, 1.8, 2.1, 2.9.2.9). Two approximately one-mile-long offsite water pipelines would be constructed to bring recycled water from and return wastewater to DDSD's Bridgehead Lift Station. Potable water would be supplied by the City of Antioch. Staff

believes these sources represent a reliable supply of water for the project. 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) are not likely to present hazards for this project, but seismic shaking (earthquakes) and flooding could present credible threats to the project's reliable operation.

Seismic Shaking

The site lies within Seismic Zone 4 (URS 2008a, AFC §§2.9.1.1, 7.15; Appendix B); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project would be designed and constructed to the latest appropriate LORS (URS 2008a, AFC Appendix B). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been periodically and 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 seismic events.

Flooding

The project site elevation is approximately 5-23 feet above mean sea level. This site is not within the 100-year floodplain (URS 2008a, AFC §7.14.1.6, 7.14.2.3, 7.15.1).

The plant site would be graded to promote drainage to prevent onsite flooding and minimize the potential for flooding to neighboring areas. Grading and project construction would be performed in accordance with the applicable grading standards and codes (see the section of this document entitled **Facility Design**).

Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources**, and **Geology and Paleontology**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as other related reliability data) are maintained by the North American Electric Reliability Corporation (NERC). NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System, and periodically summarizes and publishes those statistics on the Internet [<http://www.nerc.com>]. The NERC reported the following generating unit statistics for the years 2002 through 2006 (NERC 2007):

For combined-cycle units (all MW sizes):

- Equivalent Availability Factor = 86.52%

For gas turbine units only (simple cycle) (50 MW and larger):

- Equivalent Availability Factor = 91.82%

The project's gas turbines have been on the market for several years now and are expected to exhibit typically high availability. The applicant's expectation of an annual availability factor of 92% to 98% (URS 2008a, AFC §§1.5.1, 2.9.2.1) appears reasonable when compared with NERC figures for similar plants throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up NERC statistics. Additionally, because the plant would consist of four parallel gas turbine generating trains, maintenance can be scheduled during times of the year when the full plant output is not required to meet market demand, which is typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears to be realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant appear to be consistent with industry norms, and staff believes they are likely to ultimately produce an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

This project would enhance power supply reliability in the California electricity market by meeting the state's growing energy demand, contributing to electricity reserves in the region, and providing operating flexibility (that is, the ability to start up, shut down, turn down, and provide load following and spinning reserve). 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, thereby allowing the plant to continue to generate, though at reduced output.

CONCLUSION

The applicant predicts an equivalent availability factor of 92% to 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.

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed interconnection facilities including the Marsh Landing Generating Station (MLGS) 230 kV switchyard, two 230 kV overhead generator tie-lines, and termination to the proposed Pacific Gas and Electric Company (PG&E) Contra Costa Substation are adequate and 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 I Interconnection Study does not provide a meaningful forecast of the transmission reliability impacts of the MLGS. The Phase I Interconnection Study analyzed the impacts of 4,707 MW of generation in the MLGS cluster; however, after a December 2009 milestone most of the generation dropped out of the interconnection process and only 1,409 MW remained. Staff expects that the reliability impacts of 1,409 MW would be significantly smaller than the impacts of 4,707 MW. The California Independent System Operator (California ISO) Phase II Interconnection Study will be performed based on the 1,409 MW in the Group 1 cluster, which includes the MLGS. The Phase II Interconnection Study will not be available until Fall 2010 and thus not incorporated into staff's analysis of the MLGS. Condition of Certification (COC) TSE-5 requires that the Phase II Interconnection Study be provided to the California Energy Commission before the start of transmission facility construction.

Because the Phase I Interconnection Study does not provide a meaningful analysis of the reliability impacts of interconnecting the MLGS, at this time staff is unable to determine the project's compliance with reliability LORS. However, staff expects the MLGS would conform to reliability LORS after completion of the Phase II Study and execution of the Large Generator Interconnection Agreement (LGIA). Staff's proposed Condition of Certification TSE -5 requires the submittal of the Phase 2 Study, the executed LGIA and the design, construction, and operation of the proposed transmission facilities conform to all applicable LORS prior to the start of construction of transmission facilities.

INTRODUCTION

STAFF ANALYSIS

This Transmission System Engineering (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. 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 (Cal Code Regs, tit 14, §15378). 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 that represent the “whole of the action.”

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 MLGS would connect to the PG&E transmission network and requires analysis by PG&E and approval of the California ISO.

ROLE OF PACIFIC GAS AND ELECTRIC

PG&E is responsible for ensuring electric system reliability on its transmission system with the addition of the proposed transmission modifications, and determines both the standards necessary to ensure reliability and whether the proposed transmission modifications conform to existing standards. The California ISO will provide analysis in its Phase I and Phase II Interconnection Studies, and its approval for the facilities and changes required in its system for addition of the proposed transmission modifications.

ROLE OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR

The California ISO is responsible for dispatching generating units in California, ensuring electric system reliability for all participating transmission owners and for developing the standards and procedures necessary to maintain system reliability. The California ISO will review PG&E's studies to ensure the adequacy of the proposed MLGS 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, it 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, perform the Phase I Interconnection Study and provide its analysis, conclusions, and recommendations. On completion of the Phase II Interconnection Study, the California ISO will provide its conclusions and recommendations, and issue a final approval/disapproval for the interconnection of the proposed generation project. If necessary, the California ISO will provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission General Order 95, *Rules for Overhead Electric Line Construction*, formulates uniform requirements for construction of overhead transmission 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 General Order 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.
- The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Corporation (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, entitled *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table*, and on section I. D., entitled *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, its uncontrolled loss is not permitted (WECC 2002).
- 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. 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 with regard to power flow and stability simulations 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 adequacy, security, and reliability in the planning of the California ISO transmission grid facilities. The California ISO Standards incorporate the NERC/WECC and NERC standards. With regard to power flow and stability simulations, these standards are similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards also

provide some additional requirements that are not found in the NERC/WECC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the grid controlled by California ISO. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent grids not operated by California ISO (California ISO 2002a).

- The California ISO/FERC (Federal Energy Regulatory Commission) Electric Tariff provides guidelines for construction of all transmission additions/upgrades within the grid controlled by California ISO. 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 2003a).

PROJECT DESCRIPTION AND INTERCONNECTION FACILITIES

The MLGS is a simple-cycle power generating facility that would be located in Contra Costa County near the City of Antioch. A total of four generators would generate 760 MW at 75°F and 54% relative humidity. The MLGS would be interconnected to the PG&E Contra Costa Substation. The proposed commercial operation date of the MLGS is May 2013.

Each combustion turbine generator (CTG) is rated at 230 MVA with a power factor of 0.90. CTG unit 1 and unit 4 would be connected through a short isolated phase bus duct to the low sides of their dedicated 144/192/240 MVA generator step-up (16.5/230 kV) transformers. CTG unit 2 and unit 3, each would be connected through 16.5 kV, 10,000-ampere generator circuit breaker to the low side of its dedicated 144/192/240 MVA generator step-up (16.5/230 kV) transformer. The auxiliary power to the MLGS would be provided by unit 2 and unit 3 through their dedicated back-fed step-down (16.5/4.169 kV) transformers.

The high side of unit 1 and unit 2 transformers would each be connected through a 1,200-ampere SF6 breaker and a 1,200-ampere disconnect switch to the common generator tie bus and would terminate at breaker position 473 in the existing PG&E Contra Costa 230kV Substation. The high side of unit 3 and unit 4 transformers would each be connected through a 1,200-ampere SF6 breaker and a 1,200-ampere disconnect switch to a common generator tie bus and would terminate at breaker position 483 in the existing PG&E Contra Costa 230kV Substation.

Two 230 kV generator tie-lines would connect the MLGS to the PG&E Contra Costa Substation. The 900-foot long generation tie-lines would be built with 1590 kcmil ACSR bundle conductors and would be supported by six steel pole structures.

The existing Contra Costa Substation would require modification to accommodate the MLGS. Protection requirements would consist of SF6 230 kV, 1200 Amps circuit breakers and a fully redundant, two-terminal, double-pilot current differential schemes as proposed in Figure 2.5-7b. Power would be distributed to the grid via existing

transmission lines from the Contra Costa Substation (URS 2008a Section 1.0, URS 2009b section 2.0, Revised Figure 2.5-7a, Revised Figures 2.5-7b).

Conditions of Certification TSE-1 through 7 ensure these facilities comply with LORS.

ASSESSMENT OF IMPACTS AND DISCUSSION OF 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 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. The Phase I and Phase II Interconnection Studies are used to determine the impacts of the proposed project on the transmission grid. Staff relies on these studies and any review conducted by the California ISO 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 I and Phase II Interconnection Studies analyze the grid with and without 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, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit duties.

If the Phase I and Phase II Interconnection Studies show that the interconnection of the project 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. When a project connects to the grid controlled by California ISO, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If the mitigation identified by California ISO or interconnecting utility includes transmission modifications or additions that require CEQA review as part of the "whole of the action," the Energy Commission must analyze the environmental impacts of these modifications or additions.

CALIFORNIA INDEPENDENT SYSTEM OPERATOR STUDY

The California ISO completed the Transition Cluster Group 1 Phase I Interconnection Study and the Phase II Interconnection Study is expected to be completed by Fall 2010. The interconnection of the MLGS will be based on the Phase II Interconnection Study.

Scope of the Transition Cluster Group 1 Phase I Interconnection Study

The July 28, 2009, Transition Cluster Group 1 Phase I Interconnection Study was prepared by the California ISO in coordination with PG&E. There were 12 projects, 4,707 MW in the Group 1 (Greater Bay Area) cluster including the proposed MLGS project. The California ISO used a net output of 476 MW for the MLGS in its Phase I Interconnection Study. As of December 2009 only six projects (1,409 MW) of the original 12 projects in the Group 1 cluster remain in the interconnection queue. It should be noted for the Phase II Interconnection Study, the net output for the MLGS will be 214 MW based on the announcement by Mirant Delta, LLC that it has conditionally agreed to retire the existing units at the Contra Costa Power Plant after April 30, 2013, subject to regulatory approvals (URS 2009b page 2-3). Reducing the size of the cluster by 6 projects and 3,298 MW means the study results for the cluster are not a reasonable forecast of the reliability impacts of the proposed project or the other projects remaining in the cluster. Since the Transition Cluster Group 1 Phase I Interconnection Study does not provide an accurate forecast of the reliability impacts of the cluster or the proposed MLGS, staff cannot rely on the study results to show project compliance with LORS or to identify the transmission facilities required to reliably interconnect a generator to the existing transmission grid.

CEQA requires the analysis of reasonably foreseeable consequences of proposed projects based on the best available information. The California ISO is the reliability authority for generator interconnections and its Phase I Interconnection Study for the MLGS provides the best available information on the reliability impacts of the proposed project. However, the significant reduction in the number of generators studied in the cluster with the MLGS reduces the study results to idle speculation. It is not possible to determine the impacts of the proposed project or even the cluster of generators because the size of the cluster has decreased so dramatically. The revised 1,409 MW cluster will be analyzed in the Phase II Interconnection Study and will provide a much better forecast of the reliability impacts of the MLGS and its associated cluster of generators.

The Phase I Interconnection Study included Power Flow analyses, Short Circuit Current Calculation, Reactive Power Deficiency analysis, Dynamic Stability Evaluation, an analysis of system protection requirements, and substation evaluations.

The Power Flow analyses were conducted with and without the whole Group 1 Transition Cluster connected to the PG&E grid using full loop-base cases modeling projected 2013 summer peak and 2013 summer off peak conditions. The Power Flow analyses assessed the project's impact on thermal loading of the transmission lines and equipment. Dynamic Stability Evaluation was conducted with the Group 1 Transition Cluster using projected 2013 summer peak full loop base case to determine whether the Group 1 Transition Cluster would create instability in the system following certain selected outages. Short Circuit Current Calculation was conducted with and without the Group 1 Transition Cluster to determine if the projects in the Group 1 Transition Cluster would result in overstressing existing substation facilities. A Reactive Power Deficiency analysis was conducted to study the transmission line voltage drops caused by selected outages (URS 2009b Section 2, URS 2009c).

Power Flow Study Results and Mitigation Measures

The Phase I Interconnection Study identified overloads in the transmission system after the addition of the Group 1 Transition Cluster generation. The overloading problems affect transmission line facilities under normal conditions (N-0), single-contingency conditions (N-1), and double-contingency (N-2) conditions (see **DEFINITION OF TERMS** below). The Phase I Interconnection Study identified required mitigation for the connection of and power delivery from generation projects in the Group 1 Transition Cluster to PG&E's transmission system. The proposed mitigation measures for the post-project conditions involve reconductoring, special protection systems (SPS) to drop generation, constructing new switching stations, and reconfiguring existing transmission line interconnection locations (URS 2009c Section 6).

Normal Conditions:

- The Phase I Interconnection Study identified 17 transmission line overloads under normal conditions using 2013 summer peak and 2013 summer off-peak base cases. **Table 6-2-1** of the Phase I Interconnection Study lists base case power flow study results.
 - o Mitigation of transmission line overloads that occur under normal operating conditions include line reconductoring, construction of a new switching station, and congestion management. **Table 6-2-1** and Section 1.1 list detailed information including the names of the overloaded transmission lines, line ratings before and after the addition of the Group 1 generation projects, length of the overloaded segments which would require reconductoring, and the proposed conductor types and sizes of new conductors.

Category B (N-1) Contingency Condition:

- **Table 6-2-2** of the Phase I Interconnection Study lists 34 new transmission line overloads under Category B (N-1) contingency conditions using 2013 summer peak and 2013 summer off-peak conditions.
 - o Mitigation of transmission line overloads that occur under Category B (N-1) contingency conditions include line reconductoring, construction of a new switching station, upgrading switches, reconfiguring existing transmission line interconnection locations, and congestion management. **Table 6-2-2** and Section 1.1 list detailed information including the names of the overloaded transmission lines, line ratings before and after the addition of the Group 1 generation projects, length of the overloaded segments which would require reconductoring, and the proposed conductor types and sizes of the new conductors, as well as the specific information for switch replacement and transmission line relocation.

Category C (N-2) Contingency Condition:

- **Table 6-2-3** of the Phase I Interconnection Study lists 40 new transmission line overloads under Category C (N-2) contingency conditions using the 2013 summer peak and 2013 off-peak conditions.

- o Mitigation of the transmission line overloads that occur under Category C (N-2) contingency conditions include installation of SPS to drop generation, rerating lines to a 4 feet per second wind speed rating, and congestion management in addition to the mitigation proposed for solving the transmission line overloads under normal operation and Category B contingency conditions. **Table 6-2-3** and Section 1.1 list detailed proposed mitigation measure for each overloaded line.

The Phase I Interconnection Study identified 14 transmission line segments that were overloaded and would require upgrades to interconnect all the generation projects in the Group 1 Cluster. After December 2009, six of the twelve generation projects dropped out of the Group 1 Cluster. MLGS and one other project (together 734 MW) remaining in the Group 1 cluster would interconnect to the Contra Costa Substation. These two projects may cause overloads and require upgrades to the same transmission lines identified in the Phase I Interconnection Study:

- Contra Costa –Brentwood 230 kV line
- Contra Costa – Wind Master 230 kV line
- Wind Master - Delta Pump 230 kV line
- Las Posita – Newark D 230 kV line

The Phase II Interconnection Study for the Transition Cluster is currently scheduled to be completed by Fall of 2010 and would not be available in time to be incorporated in staff's analysis of the MLGS. If the Phase II Interconnection Study finds that the MLGS and the remaining projects in its cluster would require the construction or upgrade of transmission facilities in order to maintain grid reliability, those transmission facilities would require a license from the California Public Utilities Commission or other permitting authority. Staff anticipates that future clusters will likely include fewer generators and the Phase I Interconnection Studies, which are not part of the Transition Cluster, will provide less speculative study results and a better forecast of the reasonably foreseeable transmission impacts of a specific generator.

Generally staff relies on the California ISO Phase I/SIS to determine whether or not the proposed generation project will likely comply with reliability and to identify the transmission facilities required for reliable interconnection. For the Transition Cluster projects, the Phase I Interconnection Study does not provide an accurate forecast of impacts of the MLGS on the PG&E transmission grid. The transmission upgrades identified in the Phase I Interconnection Study are not reasonably foreseeable consequences of the proposed generating project. Relying on available information, staff is unable to identify any likely indirect project transmission impacts. Upon completion of the Phase II Interconnection Study and the execution of the Large Generator Interconnection Agreement (LGIA) the impacts of the MLGS on grid reliability will be identified. In order to ensure compliance with reliability LORS, Condition of Certification TSE-5 requires the submittal of the Phase II Interconnection Study and the executed LGIA at least 30 days prior to the start of construction of transmission facilities.

Dynamic Stability Evaluation Results and Mitigation Measures

Dynamic Stability Evaluation for Phase I Interconnection Study including the MLGS was conducted using projected 2013 summer peak full-loop base case to determine if the generation projects in the Group 1 Transition Cluster including the MLGS would create any adverse impact on the stable operation of the transmission grid following selected N-1 and N-2 outages. The results indicate there are no adverse impacts on the stable operation of the transmission system following the selected disturbances, as outlined in the Phase I Interconnection Study for integration of the all the generation projects. However, the revised 1,409 MW Group 1 cluster that will be analyzed in the Phase II Interconnection Study will provide a better forecast of the reliability impacts of the MLGS and its associated cluster of generators (URS 2009c Section 9).

Short Circuit Study Results, Mitigation Measures, and Substation Evaluation

Short Circuit studies were performed to determine the degree to which the addition of the generation projects in the Group 1 Transition Cluster including the MLGS increases fault duties at PG&E's substations busses within the study area. The busses at which faults were simulated, the single line-to-ground fault and the maximum three-phase currents at these busses, both without and with all the generation projects in the Group 1 Transition Cluster (including the MLGS), and information on the single line-to-ground fault and the three phase fault currents at each location are summarized in Appendix H of the Phase I Interconnection Study. The Short Circuit Study indicates that the addition of the generation projects in the Group 1 Transition Cluster including the MLGS would overstressed the following Greater Bay Area substation buses:

- Seven 230 kV breakers (breaker numbers: 630, 640, 650, 660, 670, 680, 690) in the Contra Costa Substation
- Four 230 kV breakers (breaker numbers: 452, 472, 492, 672) in the Pittsburg Substation
- One 115 kV breaker (breaker number: 132) in San Jose "B" Substation
- Three 500 kV breakers (breaker numbers: 542, 612, 642) in the Tesla Substation
- Four 230 kV breakers (breaker number: 442, 452, 462, 492) in the Vaca Dixon Substation

Due to the number of generation projects dropping out of the Phase I Interconnection Study, some of the overstressed breakers listed above may not require replacement. Some of the seven 230 kV breakers in the Contra Costa Substation may still need to be upgraded in order to accommodate 734 MW still in the cluster and connecting to the Contra Costa substation. The revised 1,409 MW Group 1 cluster that will be analyzed in the Phase II Interconnection Study will provide a better forecast of the reliability impacts of the MLGS and its associated cluster of generators (URS 2009c Section7, URS 2009c Appendix H).

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 can study the cluster of projects in order to identify the most efficient means to interconnect all the proposed projects.

COMPLIANCE WITH LORS

The proposed interconnecting facilities including the MLGS 230 kV switchyard, two 230 kV overhead generator tie-lines, and termination to the proposed PG&E Contra Costa Substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

The Phase I Interconnection study results were found very speculative and inaccurate due to inclusion of 4,707 MW cluster generation projects. The Phase II Interconnection study would be performed with only 1,409 MW active cluster generation projects including the MLGS. Consequently after execution of the LGIA with 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 MLGS, staff is unable to determine whether or not the project will comply with reliability LORS.

CONCLUSIONS AND RECOMMENDATIONS

The proposed interconnecting facilities including the MLGS 230 kV switchyard, two 230 kV overhead generator tie-lines, and termination to the proposed PG&E Contra Costa Substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

The Phase I Interconnection Study does not provide a meaningful forecast of the transmission reliability impacts of the MLGS. The Phase I Interconnection Study analyzed the impacts of 4,707 MW of generation in the MLGS cluster; however, after a December 2009 milestone most of the generation dropped out of the interconnection process and only 1,409 MW remained. Staff expects that the reliability impacts of 1,409 MW would be significantly smaller than the impacts of 4,707 MW. The California ISO Phase II Interconnection Study will be performed based on the 1,409 MW in the Group 1 cluster, which includes the MLGS. The Phase II Interconnection Study will not be available until Fall 2010 and thus not incorporated into staff's analysis of the MLGS. Condition of Certification TSE-5 requires that the Phase II Interconnection Study be

provided to the California Energy Commission before the start of transmission facility construction.

Because the Phase I Interconnection Study does not provide a meaningful analysis of the reliability impacts of interconnecting the MLGS, at this time staff is unable to determine the project's compliance with reliability LORS. However, staff expects the MLGS would conform to reliability LORS after completion of the Phase II Study and execution of the LGIA. Staff's proposed Condition of Certification TSE -5 requires the submittal of the Phase II Study, the executed LGIA and the design, construction, and operation of the proposed transmission facilities conform to all applicable LORS prior to the start of construction of transmission facilities.

PROPOSED CONDITIONS OF CERTIFICATION

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: 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
Take-off facilities
Electrical control building
Switchyard control building
Transmission pole/tower
Grounding system

TSE-2 Before the start of construction, the project owner shall assign to the project an electrical engineer and at least one of each of the following:

- 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 and 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 either a civil engineer or a 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, or 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 as required by 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 earth work and require changes; if site conditions are unsafe or do not conform with the predicted conditions used as the basis for design of earth work 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: 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 (2001 California Building Code, 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 refer to 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 the disapproval, along with 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 construction until plans for that increment of construction 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: 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, and outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer verifying compliance with all 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 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, operational mitigation measures, and/or special protection system sequencing and timing if applicable; and
 - iv) A copy of the executed LGIA signed by the California ISO and the project owner.

Verification: Prior to the start of construction or start of modification of transmission facilities, the project owner shall submit to the CBO for approval:

- a) Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, CA ISO standards, National Electric Code (NEC) and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment;
- b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"¹ and a statement signed and sealed by the registered engineer in

¹ Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

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, operational mitigation measures, and/or special protection system sequencing and timing if applicable, and
- g) A copy of the executed LGIA signed by the California ISO and the project owner.

Prior to the start of construction of or 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.
- 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”.

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.

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DEFINITION OF TERMS

AAC	All aluminum conductor.
ACSR	Aluminum conductor steel-reinforced.
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.
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	A scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.
Double–contingency condition	Also known as emergency or N-2 condition, a forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.
Emergency overload	See single–contingency condition. This is also called an N-1 condition.
kcmil	One-thousand circular mil. A unit of the conductor's cross-sectional area divided by 1,273 to obtain the area in square inches.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

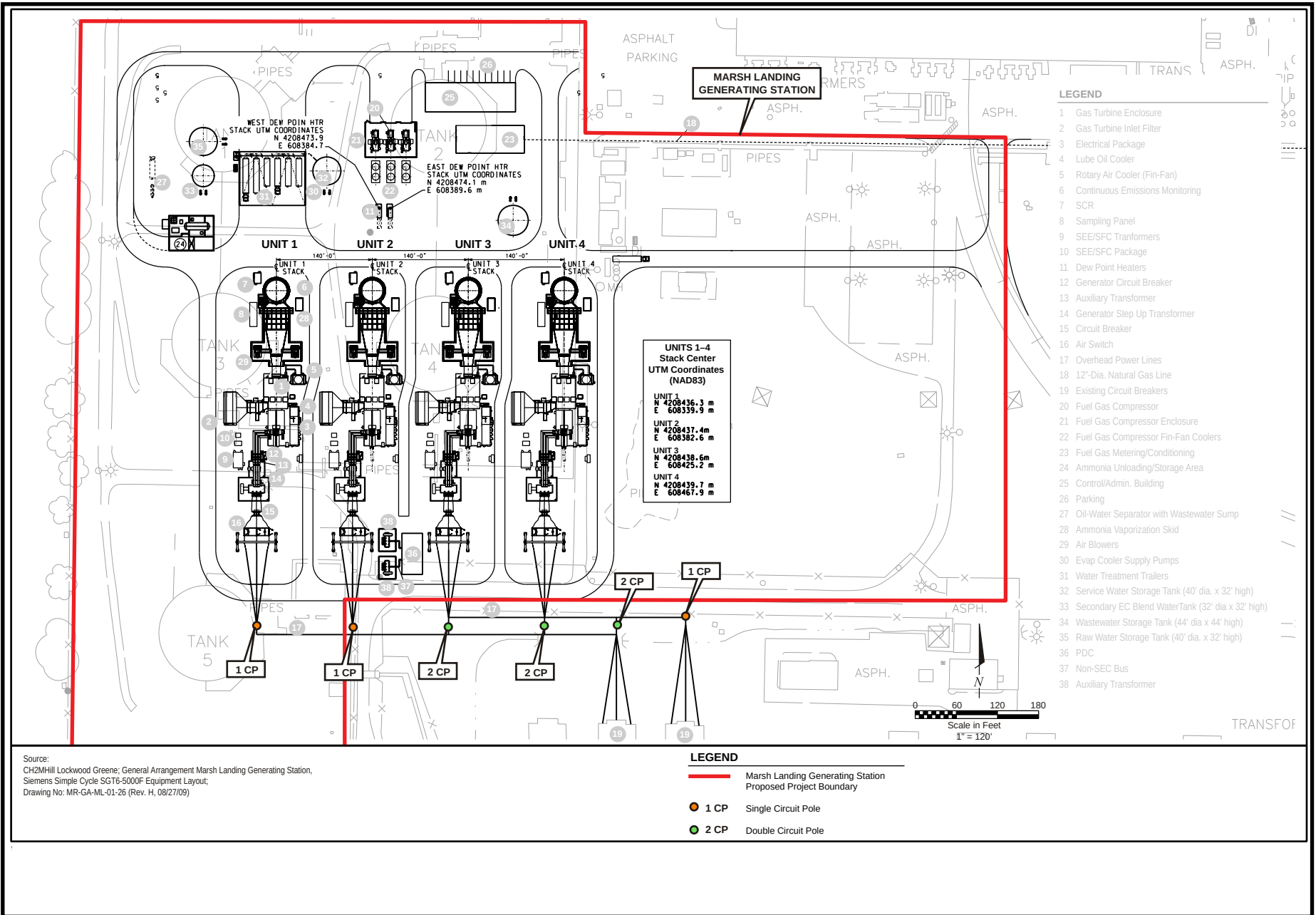
Loop	An electrical cul-de-sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul-de-sac.
Megavar	One megavolt ampere reactive.
Megavars	Mega-volt-ampere-reactive. One million volt-ampere-reactive. 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 equal to 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.
N-0 condition	See normal operation/normal overload.
Normal operation/normal overload (N-0)	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 condition.
N-2 condition	See double–contingency condition.
Outlet	Transmission facilities (e.g., circuit, transformer, circuit breaker) 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 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, will trip a selected generating unit upon a circuit overload.
SF6	Sulfur hexafluoride is an insulating medium.
Single–contingency condition	Also known as emergency or N-1 condition, occurs when one major transmission element (e.g., circuit, transformer, circuit breaker) 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.
Special protection scheme/system (SPS)	An SPS detects a transmission outage (either a single or credible multiple contingency) or an overloaded transmission facility and

	then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations.
Switchyard	A power plant 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.
Tap	A transmission configuration creating an interconnection through a sort single circuit to a small- or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by using 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.

APRIL 2010

TRANSMISSION SYSTEM ENGINEERING

TRANSMISSION SYSTEM ENGINEERING - FIGURE 1 Marsh Landing Generating Station - Electrical Interconnection to the PG&E Switchyard



ALTERNATIVES

Suzanne Phinney, D.Env.

SUMMARY OF CONCLUSIONS

In the analysis of the Marsh Landing Generating Station (MLGS), no significant environmental issues were identified. To avoid potential environmental concerns and for full consideration of a reasonable range of alternatives, five alternative project sites were examined. Several alternative configurations and generation technologies were also evaluated. While some of the alternative sites and configurations could achieve project objectives, they did not have any environmental advantages over the proposed site. The alternative technologies would either not be feasible in the project area or would not generate the power equivalent of the proposed project.

As the MLGS would be sited within the Contra Costa Power Plant (CCPP) on industrial land (brownfield site) and would capitalize on existing power infrastructure, an analysis of alternative sites is not required under the Warren-Alquist Act. Due to community concerns, however, staff reviewed alternative sites in the north San Francisco Bay Area. Four of the sites (Mirant Marsh Landing Alternative Sites 2, 3, and 4 and the Western Contra Costa County Alternative Site) were not considered suitable. They have insufficient space, contain sensitive biological habitats, require zoning changes, or would lead to other impacts (e.g. greater visual presence, longer linear connections). Staff retained a fifth site (Mirant Marsh Landing Alternative Site 1), which is heavily disturbed and adjacent to the CCPP. The site does not have any significant disadvantages but offers no environmental advantages over the MLGS.

Renewable generation technologies were also considered. Solar thermal technologies (including parabolic trough, Stirling dish, and distributed tower power) would have substantially (110 to 280 times) greater acreage requirements than the MLGS for equivalent output. Solar photovoltaic would likewise require extensive acreage, although rooftop PV could minimize land requirements. Rooftop PV may be technically feasible in Contra Costa County, but generation of power equivalent to 760 MW is highly unlikely. Other generation technologies, such as geothermal, tidal, and wave alternatives are not applicable to the eastern Contra Costa County area under consideration. Wind power in the project region is not considered a feasible alternative, as Contra Costa County restricts commercial wind farms to its Wind Energy Resource Area in the south Byron Hills. Biomass would not be practical due to the need to transport biomass fuels from outside the area, which would create significant and long-term traffic impacts. Thus various alternative technologies could reduce environmental impacts (such as water consumption or air pollution), but operational constraints limit their effectiveness in the project area.

Alternative configurations were evaluated, but not retained. Repowering of retired units one through five would be less efficient and economical; demolition of retired units and replacement would be less economical; replacement of units six and seven would result in loss of generation capacity; and a conventional combined-cycle plant would be less dispatchable and operationally flexible.

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 undeveloped (greenfield) 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 MLGS.

Therefore, as the MLGS would not have any significant impacts, staff does not recommend an alternative site, generation technology, or configuration over the project proposed by Mirant Marsh Landing, LLC.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed Marsh Landing Generating Station (MLGS). The purpose of this alternatives analysis is to provide an analysis of a reasonable range of feasible alternatives 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). Although staff has not identified any potentially significant impacts of the proposed project, this section analyzes different technologies and alternative sites that may reduce or avoid concerns raised by interested parties during the siting process. 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 approve an alternative or require Mirant Marsh Landing, 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. Implementation of 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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Mirant Marsh Landing, LLC proposes to site the MLGS in the existing Contra Costa Power Plant. The proposed project falls under the jurisdiction of the California Energy Commission’s laws, ordinances, regulations, and standards (LORS) as specified under the Warren-Alquist Act. In addition, the Energy Commission is the Lead Agency under the California Environmental Quality Act (CEQA).

CEQA

Energy Commission staff is required by agency regulations to examine the “feasibility of available site and facility alternatives to the applicant’s proposal which substantially lessen the significant adverse impacts of the proposal on the environment” (Cal. Code Regs., tit. 20, §1765).

The “Guidelines for Implementation of the California Environmental Quality Act,” Title 14, California Code of Regulations Section 15126.6(a), requires 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 analysis should identify and compare the impacts of the various alternatives, but analysis of alternatives need not be in as much detail as the analysis of the proposed project.

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 if its effect cannot be reasonably ascertained and if its implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6[f][3]). However, if the range of alternatives is defined too narrowly, the analysis may be inadequate (City of Santee v. County of San Diego [4th District, 1989] 214 Cal. App. 3d 1438).

WARREN-ALQUIST ACT

The Warren–Alquist Act provides clarification as to when it may not be reasonable to require an applicant to analyze alternative sites for a project. An alternative site analysis is not required as part of an AFC when a natural gas-fired thermal power plant is (1) proposed for development at an existing industrial site, and (2) “the project has a strong relationship to the existing industrial site and therefore it is reasonable not to analyze alternative sites for the project (Public Resources Code 25540.6 [b]).” The MLGS site – currently occupied by five fuel storage tanks, with adjacent transmission and gas infrastructure – satisfies both criteria. While analysis of alternative sites outside of the CCPP boundaries is not legally required, staff determined that an evaluation of alternative sites would respond to concerns of local residents.

PROJECT DESCRIPTION AND SETTING

Mirant Marsh Landing, LLC, an indirect wholly owned subsidiary of Mirant Corporation, proposes a 760 MW natural gas-fired generating facility in Contra Costa County. The MLGS would consist of Air-cooled heat exchange technology would reduce consumptive water use. The Simple Cycle units – operating at a maximum 20% capacity factor – would provide peaking power. Each of the four units would interconnect to the adjacent PG&E switchyard.

The MLGS would be situated on a 27-acre parcel within the boundaries of the Contra Costa Power Plant (CCPP). The five fuel storage tanks, temporary buildings, and other ancillary facilities currently occupying the site would be demolished. The site is surrounded by industrial facilities, and PG&E’s Gateway Generation Station (a 530 MW natural gas-fired power plant) is under construction to the east. The San Joaquin River

is to the north. The site is located 1/10 mile from City of Antioch limits, and 2,000 feet to the northeast of the nearest residential area.

A new 12-inch diameter, 2,100-foot-long pipeline would deliver natural gas from Line 400 (adjacent to the Gateway Generating Station) to the site's new gas compression station. The MLGS would require an average of 50 acre-feet of water per year (AFY) to be supplied by two groundwater wells located within the existing CCPP. A new 2,200-foot pipeline would be constructed from the wells to the MLGS raw water storage tank. The groundwater is considered brackish and would undergo treatment (filtration, ion exchange) using a trailer-type system. Project wastewater would be stored prior to discharge to the City of Antioch sewer line along Wilbur Avenue via a new 6-inch-diameter wastewater pipeline approximately 3,000 feet long. Potable water would be supplied by the City of Antioch (URS 2009b, pg. 2-5).

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternative analysis is to determine the potential significant impacts of the MLGS and then focus on alternatives that are capable of reducing or avoiding these impacts.

To prepare this alternative analysis, 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.

In considering site alternatives, staff determined a reasonable geographical area. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for site alternatives in and adjacent to Contra Costa County because of the significant transmission infrastructure within the region. These location alternatives are generally consistent with MLGS' objectives and siting criteria:

- Location in an area appropriate for industrial development and compatible with general plans and zoning ordinances;
- Proximity to water service, transmission, and gas connections; and
- Ability to have no significant impact on the environment.

Alternative generation technologies, as discussed in this analysis, include both methods to reduce the demand for electricity and alternative methods to generate electricity. There may also be configuration alternatives that could be applied to the MLGS that would reduce impacts of the project.

BASIC OBJECTIVES OF THE PROJECT

After studying Mirant Marsh Landing's AFC (URS 2008a, p. 8-1), Energy Commission staff has determined the MLGS' objectives to be:

- Providing new dispatchable, operationally flexible resources to meet the electric needs of the State of California.
- Installing new generating capacity at an existing brownfield site owned by Mirant and avoiding the need for significant new electricity or gas infrastructure or rights-of-way.
- Generating electric power at a location near the electric load center, to increase reliability of the regional electricity grid, while satisfying local capacity requirements and reducing regional dependence on imported power.
- Producing quick-start electricity during times when renewable (e.g., wind) generation is not available (i.e., as backup generation for renewables).
- Safely producing electricity without creating significant environmental impacts.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

Staff has not identified any potential significant environmental impacts associated with the construction of the MLGS. Potential issue areas, including transmission system engineering (transmission line overloads requiring reconductoring), waste management (contamination/remediation associated with above ground storage fuel oil tanks), socioeconomics/air quality (concentration of power plants in eastern Contra Costa County), and hazardous material management (ammonia storage) have been addressed such that no significant impacts would occur.

SITE ALTERNATIVES TO THE PROJECT

This section evaluates the alternatives sites identified by Mirant Marsh Landing and other site possibilities identified by staff.

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. Site suitability. Approximately 27 acres are required for the site. The shape of the site also affects its usability.
 - b. Availability of infrastructure. The site should be within a reasonable distance of transmission, natural gas, and water connections. Lengthy infrastructure would increase the potential for environmental impacts.
 - c. Brownfield or already developed site.
 - d. Compliance with general plan designation and zoning district.

- e. Availability of the site.

SITES INITIALLY IDENTIFIED FOR FURTHER EVALUATION

In the AFC (URS 2008a, p. 8-3 to 8-5), the Applicant identified four sites in the vicinity of the Contra Costa Power Plant. Staff identified an additional “site” outside of eastern Contra Costa County. For all sites, acquisition would be required, as Mirant entities do not have ownership. Staff used aerial imagery, property information (Contra Costa 2009), and the AFC (URS 2008a, Section 8.4.3) and conducted a drive-by of parcels on December 12, 2008 to develop the following descriptions:

- **Mirant Marsh Landing Alternative Site 1.** This 80-acre site (APN 051031005) immediately west of the CCPP and north of Wilbur Avenue is currently undeveloped. It is zoned for heavy industry and bordered by industrial uses to the west (Gaylord Container Facility) and east (CCPP). The San Joaquin River borders the property to the north. Weeds, scattered trash, and broken pavement characterize the site. Four drums are visible from the road. The nearest residential area is 530 feet to the south, opposite the BNSF railroad.
- **Mirant Marsh Landing Alternative Site 2.** This 29-acre site immediately south of the CCPP between Wilbur Ave and the BNSF Railroad is owned by PG&E. The fenced site currently consists of row crops, but is zoned for heavy industry. It is traversed by a transmission line, and is adjacent to a Budweiser facility to the east. Agriculture borders the site to the south and west. The nearest residential area is 1,200 feet to the southwest.
- **Mirant Marsh Landing Alternative Site 3.** This 58-acre site south of the BNSF railroad and north of East 18th Street comprises four properties: APNs 051052110, 051052111, 051052112, and 051052056. The industrial parcels are currently used for agriculture, and the remaining area is undeveloped or vacant. The site is adjacent to commercial and agricultural land, and a residential area is located 100 feet to the south of East 18th Street.
- **Mirant Marsh Landing Alternative Site 4.** This 210-acre site (within APN 037020012) is due east of the CCPP, to the east of Bridgehead Road. It is zoned for industrial use but is currently undeveloped. The site is adjacent to designated open space/marshlands on the north and east and contains marshlands in the eastern part of the site. There may be sufficient space to site a power plant to the west of the marshland area.
- **Western Contra Costa County Alternative Site.** In response to public concerns about the concentration of power plants in the Pittsburg/Antioch area, staff reviewed industrial parcels in Richmond, Pinole, and Martinez in major transmission corridor areas.

Sites not Meeting Screening Criteria

Staff conducted an independent analysis and rejected four of the five alternative site locations referred to above for a variety of reasons. All distance calculations for linear connections are approximate, and the feasibility of new routes has not been evaluated. The sites and reasons for rejection are as follows:

- **Mirant Marsh Landing Alternative Site 2.** Just south of the CCPP boundaries, a plant at this site would be more visible from the south. Although zoned for heavy industry, the site would develop land that is now used for agriculture. The elongate parcel shape and bisecting transmission line ROW could limit feasibility of use of the site. Transmission and gas connections would be 0.25 miles longer.
- **Mirant Marsh Landing Alternative Site 3.** Since this site is located further from the heavy industrial/power generation area to the north, it would have a greater visual presence and is closer to residential areas. It would also require zoning changes and would result in the development of a greenfield site. Gas and transmission lines would be 0.5 miles longer, and would require offsite connections.
- **Mirant Marsh Landing Alternative Site 4.** Adjacent to and containing marshland, this site would have a greater impact on sensitive habitat and associated species. It would require longer (by 1 to 1.5 miles) gas and transmission interconnections. It would likewise industrialize a previously undeveloped site.
- **Western Contra Costa County Alternative Site.** Staff found that the few vacant industrial sites in proximity to transmission lines are generally of insufficient acreage. Freethy Blvd. in Richmond is one such area; combining all of the 0.5-acre to 3-acre contiguous parcels would be significantly less than the 27 acres required for the project. Meanwhile, the larger brownfield sites in the region are primarily in use as oil refineries, and unavailable for siting of the MLGS project.

Sites Meeting Screening Criteria

Staff is retaining the following alternative site:

- **Mirant Marsh Landing Alternative Site 1.** The site is zoned for heavy industry. Already disturbed and paved, impacts to biological resources would be minimized. Visual presence would likely be similar to that of the proposed site, and without fuel tanks to remove, waste management would be less of a concern. The transmission and gas connections would be 0.25 miles and 0.75-1.0 mile longer, respectively. The site is closer to the nearest residential area (530 feet) than the proposed site (2,000 feet).

While the site would not have greater environmental impacts than the proposed MLGS site, the elimination of waste management concerns would be offset by the longer linear connections and the closer proximity to residential areas. Overall, the site does not have any environmental advantages.

GENERATION TECHNOLOGY ALTERNATIVES

CONSERVATION AND DEMAND SIDE MANAGEMENT

Conservation and demand-side management consist of a variety of approaches to reduction of electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. In 2005 the Energy Commission and the California Public Utilities Commission's (CPUC) Energy Action Plan II declared cost effective energy efficiency as the resource of first choice for meeting California's energy needs. The Energy Commission noted that energy

efficiency helped flatten the state's per capita electricity use and saved consumers more than \$56 billion since 1978 (CPUC 2008). The investor-owned utilities' 2006-2008 efficiency portfolio marks the single-largest energy efficiency campaign in U.S. history, with a \$2 billion investment by California's energy ratepayers (CPUC 2008). However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is an even greater need for energy efficiency.

The CPUC, with support from the Governor's Office, the Energy Commission, and the California Air Resources Board, among others, adopted the California Long-Term Energy Efficiency Strategy Plan for 2009 to 2020 in September 2008 (CPUC 2008). The plan is a framework for all sectors in California including industry, agriculture, large and small businesses, and households. Major goals of the plan include:

- All new residential construction will be zero net energy by 2020;
- All new commercial construction will be zero net energy by 2030;
- Heating, ventilation, and air conditioning industries will be re-shaped to deliver maximum performance systems;
- Eligible low-income customers will be able to participate in the Low Income Energy Efficiency program and will be provided with cost-effective energy efficiency measures in their residences by 2020.

Conservation and demand-side management is important for California's energy future and cost effective energy efficiency is considered as the resource of first choice for meeting California's energy needs. However, with population growth and increasing demand for energy, conservation and demand-management alone is not sufficient to address all of California's energy needs.

RENEWABLE ENERGY ALTERNATIVES

Staff also considered renewable energy sources. Although viable, these technologies do not have the quick start-up and shut-down capabilities for peaking power needs as does the MLGS. They would not be able to generate equivalent power at the proposed site and operational constraints at other locations limit their effectiveness as alternatives to the MLGS.

- **Solar Thermal.** Solar thermal technology – including parabolic trough, power tower, and Stirling engine – converts the sun's energy to heat for utilization by conventional generator equipment. Land requirements can be extensive, and range from 4-5 acres/MW for solar trough to 5-10 acres/MW for power tower. Solar thermal plants also require water for steam generation (to power turbines), washing, and cooling. Examples of water requirements include 12.3 acre-feet per year (AFY) per 100 MW for the Carrizo Energy Solar Farm (Compact Linear Fresnel Reflector technology), 18 AFY/100 MW for Ivanpah (power tower), and 600 AFY/100 MW for Nevada Solar One (solar trough) (NRDC and Sierra Club 2008). Although large-scale solar plants are proposed in remote regions, Eastern Contra Costa County has insufficient solar resources (under 6.0 kWh/m²/day) for utility-scale solar thermal generation (NREL 2007).

- **Solar Photovoltaic.** With photovoltaic (PV) technology, semiconductors directly convert sunlight to electricity. Unlike solar thermal, PV does not require water for electricity generation, although some water (2-10 AFY/100 MW) is required to clean panels. Utility-scale PV requires level land on the order of approximately 4 acres/MW of capacity for crystalline silicon, and more acreage for thin film and tracking technologies (NRDC and Sierra Club 2008). Rooftop photovoltaic is an option to minimize land requirements. For example, in Southern California, Southern California Edison has plans to install 250 MW of solar panels on 2 square miles of commercial rooftop (in 150 installations) in the next five years (SCE 2008). NCI (2007) calculated Contra Costa County's economic potential for retrofitting¹ commercial and residential buildings using state subsidies and new business models favoring PV development. The report identified a total of 6 MW potential by 2010 and 43 MW potential by 2016. These values are in contrast to 61 MW in 2010 and 253 MW in 2016 identified for Los Angeles. Rooftop PV development in the near future in Contra Costa County, even with economic incentives, would be significantly less than the 760 MW generation capacity of the proposed project.
- **Wind.** Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current (AC) into the utility grid. Wind turbines currently being manufactured have power ratings ranging from 250 watts to 1.8 MW (AWEA 2004). Land use requirements average 5.4 acres/MW (CEC 2008), although the turbine footprints only occupy 5% of the area (AWEA 2004). Environmental impacts include bird and bat collisions and visual pollution. The Pittsburg region is not located within Contra Costa County's Wind Energy Resource Area. The county restricts commercial wind farms to the south Byron Hills portion of the County (Contra Costa 2005).
- **Geothermal.** Steam or high-temperature water from geothermal reservoirs is harnessed to drive steam turbine/generators. Geothermal plants range in size from under 1 MW to 110 MW, and require 0.2 to 0.5 acre/MW. Geothermal plants provide highly reliable base-load power, with capacity factors from 90 to 98%. Plants, however, must be built near geothermal reservoir sites, as steam and hot water cannot be transported long distances without significant thermal energy loss. There are no known geothermal resources in Contra Costa County (CEC 2005).
- **Biomass.** Electricity is generated by burning organic fuels in a boiler to produce steam, which then turns a turbine. Biomass can also be converted into a fuel gas such as methane and burned. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Biomass facilities do not require an extensive amount of land, but only produce small amounts of electricity (in the range of 3 to 10 MW). Furthermore, there is no large fuel source in the area of the proposed project, and ongoing truck deliveries would be required to supply the plant with the biomass fuel.
- **Tidal and Wave.** Tidal generation of electricity involves building a dam, known as a barrage, across a bay or estuary. Water retained behind a dam at high tide produces

¹ Economic potential of new construction was essentially zero.

a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines. A dam across the San Joaquin River would be damaging to fish populations and have other significant environmental impacts. Meanwhile, wave energy technologies -- which include terminator devices, point absorbers, attenuators, and overtopping devices -- extract energy from surface wave motion or subsurface pressure fluctuations (MMS 2007). Wave energy is applicable to portions of the California coast, but is not suited for the Suisun Bay/San Joaquin River area under consideration.

ALTERNATIVE CONFIGURATIONS

The MLGS would consist of four Siemens 5000F Simple Cycle units providing peaking power. The proposed project would be located on a 27-acre site, on which five existing fuel storage tanks would be demolished. The site is a developed area adjacent to the PG&E switchyard, and the Applicant indicated that its location within the CCPP was determined by space requirements (URS 2008a, p. 8-3). The CCPP contains seven existing units; Units one through five have been retired, and Units six and seven are gas-fired boiler units producing wholesale electricity (URS 2008a, p. 2-2). In the AFC, the Applicant evaluated and rejected four alternative configurations (URS 2008a, p. 8-3). As the configurations do not present an environmental advantage over the proposed configuration, staff is likewise not retaining the following for further consideration:

- **Repower Retired Units one through five.** The retired units have exceeded their design life and are not suitable for repowering. The Applicant also considers restoration less efficient and less economical than the proposed configuration.
- **Demolition of Retired Units and Replacement.** Constructing a new facility in the location currently occupied by Units one through five would place the new facility closer to the river and marina. While feasible, the Applicant considers this option less economical than the proposed configuration. In the staff assessment of the Gateway Generating Station, staff had concluded this option would decrease visual impact of a new project, but that the improvement may not be enough to offset the additional costs (CEC 2001, p. 514-515).
- **Replacement of Units six and seven.** Units six and seven have an existing capacity of 674 MW (net) and are contracted to PG&E under a Tolling Agreement. The loss of capacity during construction of a replacement project would result in a loss of generation. It would also “result in a net loss in value of the existing assets.”
- **Conventional Combined-Cycle.** A conventional combined-cycle plant of comparable output would be less dispatchable and operationally flexible than the proposed project. The Applicant also evaluated wet and dry cooling for this option and found that either would exceed available space.

ALTERNATIVE LINEAR ROUTES AND WATER SUPPLY OPTIONS

The proposed natural gas pipeline would travel west from Line 400 (to the east of the Gateway Generating Station property) to the site's compressor station. The 2,100-foot route would follow the northern boundaries of the Gateway Generating Station (GGS) and the MLGS's central construction laydown area. The transmission interconnection would connect directly into the PG&E switchyard, which is adjacent to the south of the

site. Process water would be supplied by two new groundwater wells located within the CCpp. Potable water would tie into an existing supply line on the CCpp property. As the proposed wells and routes remain in developed power generation areas, staff did not consider alternative routes for natural gas transmission, or water supply. Plant

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. 14 §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 is compared to the effects of constructing the proposed project. 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, grading of the site or installation of new foundations, piping, or utility connections. Transmission line overload and fuel tank concerns would be avoided; ammonia storage would not take place. Community concerns about the number of power plants in the vicinity would be addressed.

If the project were not built, the region would not benefit from the local and efficient source of 760 MW of new generation that this facility would provide nor would jobs be created in support of project construction and operation. The primary advantages of the MLGS project are that it would utilize a previously developed site and would capitalize on existing infrastructure. As noted above, the MLGS project would also have ability to compensate for the intermittency of renewable energy sources.

In the absence of the MLGS project, however, other power plants could likely be constructed in the project area or in California to serve the demand that could have been met with the MLGS project. New plants constructed in the area could utilize undeveloped land (greenfield sites). If no new natural gas plants were constructed, PG&E may have to rely on older power plants. These plants could 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, could operate more than they do now. The “no project” alternative does not appear to be environmentally superior to the MLGS project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments pertaining to Alternatives have been received.

CONCLUSIONS AND RECOMMENDATION

As determined by Energy Commission staff in the PSA, the MLGS is not likely to cause potentially significant impacts. Located within the Contra Costa Power Plant and capitalizing on existing infrastructure, the proposed site is suitable for the project. The alternative sites in the vicinity have disadvantages (e.g. longer gas and transmission interconnections, non-brownfield location, greater visual presence) or no advantages over the proposed site. Furthermore, parcel size, availability, and transmission access limit siting options in the other parts of the north San Francisco Bay Area.

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 configurations, meanwhile, 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.

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GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Prepared by: Mary Dyas

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:

**Mary Dyas
Compliance Project Manager
(08-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 CORECTIVE 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

MARSH LANDING GENERATING STATION

08-AFC-3

PREPARATION TEAM

Executive Summary	Mike Monasmith
Introduction	Mike Monasmith
Project Description	Mike Monasmith
Air Quality.....	Brewster Birdsall
Biological Resources.....	Heather Blair
Cultural Resources.....	Amanda Blooser, Michael McGuirt
Hazardous Materials Management.....	Alvin J. Greenberg, Ph.D., Rick Tyler
Land Use.....	Negar Vahidi
Noise and Vibration	Erin Bright
Public Health	Obed Odoemelam, Ph.D.
Socioeconomic Resources	Kristin Ford
Soils and Water Resources.....	Vince Geronimo
Traffic and Transportation	James Adams
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Visual Resources	David Flores
Waste Management	Alvin J. Greenberg, Ph.D.
Worker Safety and Fire Protection	Alvin J. Greenberg, Ph.D., Rick Tyler
Facility Design	Shahab Khoshmashrab
Geology and Paleontology	Patrick Pilling
Power Plant Efficiency.....	Shahab Khoshmashrab
Power Plant Reliability.....	Shahab Khoshmashrab
Transmission System Engineering	Laiping Ng and Mark Hesters
Alternatives	Suzanne Phinney
General Conditions.....	Mary Dyas
Project Assistant	Teraja Golston
Staff Counsel.....	Kerry Willis

DECLARATION OF Mike Monasmith

I, Mike Monasmith, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Senior 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 **Project Description, Introduction** and **Executive Summary** for Marsh Landing Generation Station project 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: April 15, 2010 Signed: _____

At: Sacramento, California

J. MIKE MONASMITH

6951 Pocket Road
Sacramento, CA 95831
916-412-8589

OVERVIEW:

Eighteen years of experience in project management and planning, public and governmental affairs, media relations, community outreach and issue advocacy for energy, water, agriculture, forestry and telecommunications for public and private concerns at the local, state and federal level.

WORK HISTORY:

CALIFORNIA ENERGY COMMISSION, Sacramento
Siting, Transmission & Environmental Protection Division

Senior Project Manager (2009-present) --

Project Manager (2007-2009) --

CALIFORNIA ENERGY COMMISSION, Sacramento
Public Adviser's Office

Associate Public Adviser (2003 - 2007) --

CALIFORNIA RESOURCES AGENCY, Sacramento

Special Assistant, Secretary Mary D. Nichols (2003) --

CALIFORNIA DEMOCRATIC PARTY, Los Angeles

Director of Communications (2002) --

Coordinated Campaign, Gore/Lieberman Deputy Director (2000) --

Press Secretary, Coordinated Campaign, Californians for Feinstein (1994) --

U.S. CONGRESSWOMAN JANE HARMAN, Washington DC

Chief of Staff (1997 - 1998) --

Deputy Campaign Manager, Harman for Governor (1998) --

Political Director (2001) --

STATE CONTROLLER KATHLEEN CONNELL, Los Angeles

Chief Deputy Controller (2000 - 2001) --

Assistant Deputy Controller, External Affairs (1995 - 1996) --

VERIZON COMMUNICATIONS, Thousand Oaks, CA

Director, Los Angeles Government Affairs (1999 - 2000) --

U.S. DEPARTMENT OF THE INTERIOR, Washington DC

Special Assistant, Assistant Secretary Patricia Beneke, (1997) --

McCOY & ASSOCIATES, Los Angeles

LA Convention 2000 (1999) – Host Commette, 2002 Democratic National Convention

Interim Communications Director

“Yes on Proposition 1” (1999) – \$1.2 Billion Pubic Safety Bond for the City of Los Angeles

Campaign Manager

DWP Festival of Lights (1998) – Griffin Park Holiday Lights event

Project Manager

“Yes on Proposition DD” (1998) – \$700 Million Library Bond for the City of Los Angeles

Campaign Manager

CLINTON/GORE ‘96 GENERAL COMMITTEE, Los Angeles

California Deputy State Director (Southern California Political Lead) (1996)

California Desk Co-Director, Presidential Inaugural Committee (1997)

SHEILA JAMES KUEHL FOR ASSEMBLY, Los Angeles

Campaign Manager (1994)

LOS ANGELES MAYOR RICHARD RIORDAN, Los Angeles

Deputy Press Secretary / Mayoral Assistant / Advance Co-Lead (1993-94)

Deputy Field Director / Deputy Director, Advance (**Riordan for Mayor** 1993)

DEMOCRATIC PARTY OF ORANGE COUNTY, Santa Ana

Office Manager / Chief Assistant, Chairman Adler (1991-92)

UNIVERSITY OF CALIFORNIA, Santa Cruz

Federal Work-study Program Manager, UCSC Student Employment (1990 – 1991)

ICICLE SEAFOODS, Inc., Seward, AK

Production Supervisor, Towa Eggroom (Summers, 1988-1991)

EDUCATION:

University of California at Santa Cruz (College VIII)

B.A., Environmental Studies/Politics (Policy & Planning), 1990

(Thesis Honors: Resource Management, Tongass National Forest, Alaska)

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 Marsh Landing Generating Station Project 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: April 20, 2010 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

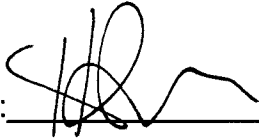
Heather Blair

I, Heather Blair, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Biological Resources Unit of the Siting, Transmission and Environmental Protection Division.
2. I prepared staff testimony on Biological Resources for the Marsh Landing Generating Station Project 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.
3. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
4. 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: 4/19/10

Signed: _____

At: Sacramento, California



HEATHER BLAIR
Environmental Scientist

ACADEMIC BACKGROUND

M.S., Conservation Biology, Sacramento State University, In Progress
B.S., Ecology, San Diego State University, 2004

PROFESSIONAL EXPERIENCE

Heather Blair is an Environmental Scientist experienced in a range of natural resource investigations and environmental impact analysis including botanical and wildlife research, inventory, and survey techniques; technical writing; and data analysis. She has experience preparing environmental documents pursuant to applicable federal, state and local environmental regulations, including the California Environmental Quality Act, National Environmental Policy Act, and the California and federal Endangered Species Acts.

Aspen Environmental Group

2004 to present

Selected project experience at Aspen includes the following:

Power Generation and Transmission Interconnection Projects

- **California Energy Commission.** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contract Ms. Blair has participated in the following projects:
 - **Biological Resources Assessment for the Abengoa Mojave Solar Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 250 MW power plant in the Mojave Desert. Important biological issues include impacts to Harper Dry Lake from potentially decreased water availability, desert tortoise, and Mojave ground squirrel.
 - **Biological Resources Assessment for the San Joaquin Solar 1&2 Hybrid Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 107 MW solar thermal/biomass hybrid power plant. Important biological issues include potential impacts to San Joaquin kit fox habitat and movement corridor connectivity.
 - **Biological Resources Assessment for the Genesis Solar Energy Project.** Ms. Blair is currently serving as the assistant technical staff for the analysis of impacts to biological resources from the 250 MW power plant in an undeveloped area of the Sonoran Desert. Important biological issues include direct and indirect (downstream) impacts to ephemeral drainages from site development and indirect impacts to sand dune dependent vegetation and wildlife communities from disruption of Aeolian processes.
 - **Biological Resources Assessment for the Carlsbad Energy Center.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 540 MW CECF. Important biological issues include potential impacts to Agua Hedionda Lagoon and consistency with the Carlsbad Habitat Management Plan. Ms. Blair recently testified as an expert witness in biological resources during Evidentiary Hearings before the Commission.
 - **Biological Resources Assessment for the CPV Sentinel Project.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 850 MW CPV Sentinel project. Important biological issues include potential impacts from groundwater drawdown to the mesquite hummock plant community and the special-status species it supports.
 - **Biological Resources Assessment for the CPV Vaca Station Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 660 MW CPVVS.

Important biological issues include potential impacts to giant garter snake from reduced flows in Old Alamo Creek and loss of Swainson's hawk foraging habitat.

- **Biological Resources Assessments for the Marsh Landing and Willow Pass Generating Stations.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 930 MW MLGS and 550 MW WPGS. Important biological issues include potential indirect impacts to listed plant species in the Antioch Dunes National Wildlife Refuge from nitrogen deposition.
- **Biological Resources Assessments for the Panoche and Starwood Energy Centers.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 400 MW Panoche Energy Center and 120 MW Starwood Project. These projects required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.
- **Northern California CO₂ Storage Pilot, Confidential Client, CEQA and NEPA compliance, (2008).** Contributed to the preparation of Department of Energy NEPA environmental questionnaire to comply with Category Exclusion requirements and preparation of the Initial Statement under CEQA for the proposed CO₂ sequestration pilot test site in Montezuma Hills, California. Ms. Blair conducted focused nesting surveys of the State-threatened Swainson's hawk (*Buteo swainsonii*).
- **Arizona Utilities CO₂ Storage Pilot, CEC and University of California, NEPA compliance, (2007).** Contributed to the preparation of Department of Energy NEPA environmental questionnaire to comply with Category Exclusion requirements for the proposed CO₂ sequestration pilot test site near Joseph City, Arizona. Ms. Blair conducted focused surveys of the federally endangered Peebles Navajo cactus (*Pediocactus peeblesianus* var. *peeblesianus*).
- **Environmental Screening Tool for Out-of-State Renewables, KEMA and CEC, Staff (2009).** Assessed the potential for California laws, ordinance, regulations and standards to be impacted by out-of-state renewable facilities seeking RPS certification. Ms. Blair prepared the assessment of impacts associated with geothermal projects.
- **Nuclear Power Plant Assessment (Assembly Bill 1632).** Ms. Blair managed the preparation of and was a contributing author for a major Appendix to the Nuclear Power Plant Assessment Report for the Energy Commission. This report evaluated nuclear power issues in the state in response to recent legislation (AB 1632), including environmental issues associated with alternatives (including renewable) to the state's two nuclear facilities.
- **Diablo Canyon Power Plant Steam Generator Replacement Project.** Ms. Blair supported the management team in preparing the project description, alternatives and supporting sections of the Draft and Final EIR.

Transmission Line and Substation Projects

- **Sunrise Powerlink Transmission Line Project.** Under contract to the California Public Utilities Commission (CPUC), Aspen prepared an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to western San Diego via 230 kV overhead and underground transmission lines. Ms. Blair analyzed the impacts to wilderness and recreation. Additionally, she wrote the project description and assisted with overall project support.
- **TANC Transmission Project.** Aspen was awarded a contract with the Transmission Agency of Northern California (TANC) for CEQA/NEPA and environmental permitting support for 600-miles of proposed 500 and 230 kV transmission lines between Lassen County and Santa Clara County, California. The project included evaluation of over 600 additional miles of alternative routes, six new substations, and modifications to six existing substations. Ms. Blair was the Deputy Project Manager, responsible for coordinating the biological and cultural resource field surveys. The project was cancelled in July 2009.

- **Sacramento Area Voltage Support Project.** Under contract to Western Area Power Administration (Western) and in cooperation with SMUD, Aspen prepared an SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Blair was part of the project management team and managed the wetland delineation, Biological Survey Report, and Biological Evaluation.
- **North Area ROW Maintenance Project.** Under contract to Western, Ms. Blair is currently providing project support to prepare an Environmental Assessment and Operation and Maintenance Program associated with the operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the biological and cultural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Blair is working closely with project management and resource specialists to coordinate and execute over 800 miles of surveys. She conducted wildlife inventory and surveyed portions of ROW for sensitive species and recorded habitat types, jurisdictional waters and infrastructure using a Trimble GeoXT GPS unit. Additionally, Ms. Blair was integrally involved in the management and development of the North Area O&M GIS database.
- **Categorical Exclusions for Routine Operation and Maintenance.** Under contract to Western, Ms. Blair has prepared multiple CXs for routine maintenance activities along Western's CVP, PACI, and COTP transmission line ROWs and access roads. She has developed a streamlined and highly efficient system to use the results and analysis for the North Area ROW Maintenance Project to complete these documents.
- **GIS Data Verification and Resource Database Development for the Trinity County PUD Direct Interconnection Project.** Under contract to Western, Ms. Blair was the Deputy Project Manager for this project and also be coordinated and conducted biological resources in support of the development of an O&M GIS database, which included identification of sensitive resources and associated project conservation measures for this new segment of Western's CVP transmission system.
- **Seventh Standard Substation Project.** Under contract to the CPUC, Ms. Blair prepared the biological resource section of an Initial Study/Mitigated Negative Declaration for a proposed 4.9 acre 115/21 kV substation and transmission interconnection in northwest Bakersfield, Kern County, California. Important biological issues included impacts to the State and federally listed San Joaquin kit fox and western burrowing owl (a California species of special concern), as well as compliance with the Metropolitan Bakersfield Habitat Conservation Plan.
- **Atlantic-Del Mar Reinforcement Project Mitigated Negative Declaration.** Under contract to the CPUC, Ms. Blair served as an assistant environmental monitor during the construction of four miles of overhead transmission towers and lines and approximately 1.3 miles of underground lines. The project involved trenching, horizontal drilling and blasting and requires avoidance of several wetlands, seasonal pools and threatened and endangered species.
- **Miguel-Mission 230 kV #2 Project EIR Addendum.** Under contract to the CPUC, Ms. Blair helped to prepare a detailed addendum associated with engineering design changes for the Miguel-Mission 230 kV #2 Project.

Other Infrastructure, Resource Management, and Monitoring Projects

- **Hazardous Fuels and Vegetation Management for Angeles National Forest.** Under contract to the U.S. Forest Service, Ms. Blair conducted botanical and wildlife surveys at approximately 100 sites ranging from one to 2500 acres throughout the Angeles National Forest. Modifications to current fuel management practices were proposed in response to increased frequency and intensity of wildfire resulting from climate change. She prepared 75 Biological Evaluations/Biological Assessments that assessed the biological impacts of proposed fuel management practices throughout the forest.

- **Rare Plant Surveys for the East Branch Extension Pipeline Project.** Under contract to the Department of Water Resources, Ms. Blair conducted rare plant surveys of the endangered Santa Ana River wooly star (*Eriastrum densifolium* ssp. *sanctorum*) and the state and federally endangered slender horned spine flower (*Dodecahema leptoceras*) in response to the proposed construction of a water pipeline through San Bernardino and Riverside Counties.
- **Upper San Antonio Creek Watershed Giant Reed Removal Project.** Ms. Blair prepared the biological resource analysis of an Initial Study to remove invasive plant species from the Upper San Antonio Creek Watershed. Required field survey and development of impact avoidance measures for several special-status species, including California red-legged frog, southern steelhead, and riparian nesting birds.
- **Least Tern Monitoring for the Montezuma Slough Tidal Wetlands Restoration Project.** Under contract to EcoBridges Environmental, Ms. Blair monitored the nesting success of three nesting colonies of the federally and State endangered least tern. This effort involved counting and mapping the nest sites and tern chicks once a week for two years.
- **Endangered Species Monitoring for the Lomita Canal Vegetation Clearing Project.** Monitored the federally threatened California Red-legged frog and the state- and federally endangered San Francisco Giant Garter Snake during vegetation clearing activities along the Lomita Canal at the San Francisco International Airport. Involved identification of these species, relocation of California red-legged frogs, and re-direction of work in the event a SF Garter Snake was spotted.

PREVIOUS EXPERIENCE

Soil Ecology and Restoration Group

January to May 2004

Research Assistant. Ms. Blair assisted in managing the greenhouse where native seeds were germinated and propagated. In this role, she collected seeds from native plants and analyzed the composition of the soil present in their native habitat to ensure seedling viability. The plants were subsequently used in the restoration of degraded habitat as contracted by the U.S. Army Corps of Engineers and others.

DECLARATION OF
Michael D. McGuirt

I, **Michael D. McGuirt**, 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**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped in the preparation of the staff testimony on **Cultural Resources**, for the Marsh Landing Generation Station project, 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: April 13, 2010

Signed: _____

At: Sacramento, California

MICHAEL D. MCGUIRT, MA, RPA

SUMMARY OF PROFESSIONAL EXPERIENCE

Fifteen years of professional academic and cultural resources management experience in western North America, Hawai'i, Central America, and Eastern Europe. Former regulator and present planner with expert knowledge of Section 106 of the National Historic Preservation Act of 1966 (NHPA). Thorough knowledge of the California Environmental Quality Act of 1970, Section 110 of the NHPA, and the US Army Corps of Engineers' Appendix C. Working knowledge of the National Environmental Policy Act of 1969, Native American Graves Protection and Repatriation Act of 1990, and the Archaeological Resources Protection Act of 1979. Expert in developing and coordinating historic preservation solutions that comply with complex Federal, state, and local regulatory environments for large energy, transportation, and telecommunications projects. Expert technical skills in geoarchaeology, mapping and spatial analysis, archaeological survey and excavation, and material culture analysis.

EDUCATION

MASTER OF ARTS, Anthropology, University of Texas at Austin
May 1996

BACHELOR OF ARTS, Anthropology and Archaeological Studies, University of Texas at Austin
December 1990

PROFESSIONAL AFFILIATIONS

Register of Professional Archaeologists
Society for American Archaeology
Society for California Archaeology
National Trust for Historic Preservation
California Preservation Foundation

HONORARY AFFILIATIONS

Honor Society of Phi Kappa Phi

RECENT PROFESSIONAL EMPLOYMENT

ENERGY PLANNER III, California Energy Commission, Sacramento, California
December 2009 to present

Supervise an Energy Commission staff of five professional cultural resources analysts and a varying number of equivalent consultants in the development of CEQA and NEPA analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources, develop and supervise the implementation of agency-wide programs to facilitate agency compliance with Federal historic preservation regulations, and supervise the periodic staff reviews of licensees' actions to ensure compliance with conditions of certification for extant licenses.

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting 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 the **Hazardous Materials Management, Worker Safety/Fire Protection, and Waste Management** sections for the **Marsh Landing Generating Station Application** based on my independent analysis of the amendment petition, 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: April 6, 2010 Signed: _____

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047

415-479-7560 fax 415-479-7563

e-mail agreenberg@risksci.com

Name & Title:

Alvin J. Greenberg, Ph.D., FAIC, REA, QEP
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002

Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001

Member, State Water Resources Control Board Noncompliant Underground
Tanks Advisory Group

January 1999 – June 2001

Member, California Air Resources Board Advisory Committee on Diesel
Emissions

January 1994 - September 1999

Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic
Cleanup Program Advisory Committee

September 1998

Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997

Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996

Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995

Member: California Department of Toxic Substance Control Site Mitigation
Program Advisory Group

January 1989 - February 1995

Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992

Chair: Pollution Prevention and Waste Management Planning Task Force of the
Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991

Member: California Integrated Waste Management Board Sludge Advisory
Committee

September 1987 - September 1988

ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987

California Department of Health Services Advisory Committee on County and
Regional Hazardous Waste Management Plans

January 1984 - October 1987

Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987

Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials
Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986

Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous
Waste

Jan. 1, 1983 - June 30, 1985

Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983

Member, Scientific Panel to Address Public Health Concerns of Delta Water
Supplies, California Department of Water Resources

Present Position

January 1983- present

Owner and principal with Risk Sciences Associates, a Marin County, California,
environmental consulting company specializing in multi-media human health and
ecological risk assessment, air pathway analyses, hazardous materials management-
infrastructure security, environmental site assessments, review and evaluation of
EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation
support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984

Member, State of California Occupational Safety and Health Standards Board
(Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983

Assistant Deputy Chief for Health, California Occupational Safety and Health
Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979

Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975

Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and

groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Sites with EPA, RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of \$750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts

from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca. (March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine

Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long

Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- Almond 2 Power Plant Project, City of Ceres, Ca. 2009 – present. Public health.
- Watson Cogeneration Steam and Electric Reliability Project, Carson, Ca. 2009 – present. Public health.
- Hanford Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Henrietta Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Lodi Energy Center, Lodi, Cal. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Marsh Landing Generating Station, City of Antioch, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Palmdale Hybrid Power Plant, Palmdale, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- Stirling Energy Systems Solar 1 Project, San Bernardino County, Ca. 2008 – present. Public health.
- Stirling Energy Systems Solar 2 Project, Imperial County, Ca. 2008 – present. Public health.
- San Joaquin Solar 1&2, Fresno County, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- GWF Tracy Combined Cycle Power Plant, Tracy, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- CPV Vaca Station Power Plant, Vacaville, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.

- Willow Pass Generating Station, Pittsburg, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, waste management.
- Avenal Energy Power Plant, Avenal, Ca. 2008 – 2009. Worker safety/fire protection, public health.
- Orange Grove Energy, San Diego County, Ca. 2008-2009. Public health.
- Riverside Energy Resource Center Units 3&4, Riverside, Ca. 2008 – 2009. Hazardous materials management.
- Canyon Power Plant, Anaheim, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Carlsbad Energy Center, Carlsbad, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Ivanpah Solar Electric Generating System, San Bernardino County, Ca. 2007 – present. Public health.
- Kings River Conservation District Community Power Project, City of Parlier, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chula Vista Energy Upgrade Project, Chula Vista, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chevron Richmond Power Plant Replacement Project, Richmond, Ca. 2007 – 2008. Hazardous materials management, public health.
- Humboldt Bay Generating Station, Eureka, Ca. 2006 – 2008. Hazardous materials management, worker safety/fire protection, waste management.
- El Centro Power Plant – Unit 3 Repower Project, El Centro, Ca. 2006 – 2007. Public health.
- San Francisco Energy Reliability Project, San Francisco, Ca. 2004 – 2006. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials

- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

DECLARATION OF

I, **Rick Tyler** 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 Senior Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I supervised preparation of the staff testimony for Hazardous Materials Management and Worker Safety Fire Protection Sections for the Marsh Landing Generating Station 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 and errata 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 errata 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: 4/21/10 Signed: _____

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 Negar Vahidi

I, **Negar Vahidi**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Senior Project Manager/Senior Land Use Technical Specialist**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Land Use** for the **Marsh Landing Generating Station Project** 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: April 7, 2010 Signed: _____

At: Agoura Hills, California



NEGAR VAHIDI

Senior Associate

Land Use, Policy Analysis, and Socioeconomics

ACADEMIC BACKGROUND

Master of Public Administration, University of Southern California, 1993

B.A. (with Highest Honors), Political Science, University of California, Irvine, 1991

PROFESSIONAL EXPERIENCE

Ms. Vahidi is an environmental planner with over 15 years of experience managing and preparing a variety of federal and State of California environmental, planning, and analytical documents for large-scale infrastructure and development projects. Ms. Vahidi brings the experience of being both a public and private sector planner, specializing in the integration and completion of NEPA and CEQA documentation, joint documentation, land use, socioeconomic, and public policy analysis, environmental justice analysis, and public and community involvement programs. Her diversity and experience in preparing NEPA, CEQA, and NEPA/CEQA joint documentation can be shown through a sample of her projects.

Aspen Environmental Group

1992 to 1998 and 2001 to present

Ms. Vahidi has participated in CEQA and NEPA analyses of major utility development projects, providing public policy and land use expertise as well as managing Public Participation Programs. She has conducted land use analyses for major environmental assessments, including identification of ownership and land use types and identification of sensitive land uses and sensitive receptors. She has also gathered and analyzed information on State, federal and local laws, policies and regulations relevant to land uses and public policy. Her specific projects are described below.

- **TANC Transmission Project (TTP), several Northern California Counties.** Ms. Vahidi is currently serving as the Deputy Project Manager in charge of preparation of the EIR/EIS and guiding the CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of approximately 600 miles of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area. Ms. Vahidi worked with TANC and Western to initiate the scoping process, including preparation of the NOP, preparing for scoping meetings, frameworking the EIR/EIS document, etc. She also led the preparation of the project scoping report.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Ms. Vahidi is the Project Manager for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The Palmdale Water District (District) [CEQA Lead Agency] proposes to remove approximately 540,000 cubic yards of sediment from the reservoir (behind the dam) and haul it to off-site commercial gravel pits located 6 miles north of the dam site in the community of Littlerock. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the

analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal air quality conformity requirements. Under Ms. Vahidi's direction, Aspen developed six different project alternatives for sediment removal, involving detailed hydraulics analysis and preparation of a hydraulics technical report. The most feasible of these alternatives (grade control structure) was chosen by the PWD as their proposed project to be evaluated in the EIS/EIR. In addition, the PWD is currently considering an additional alternative (use of a slurry line for sediment removal) presented by Aspen. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **El Casco System Project, Riverside, CA.** Ms. Vahidi is serving as the Project Manager for this EIR being prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino-El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis.
- **Sacramento Area Voltage Support Supplemental Environmental Impact Statement (SEIS), Western Area Power Administration.** Ms. Vahidi served as the task leader for several social science sections for the SEIS for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. New transmission lines and transmission upgrades are needed to mitigate transmission line overload, reduce the frequency of automatic generation and load curtailment during the summer peak load periods, and help maintain reliability of the interconnected system operation. Ms. Vahidi directed the preparation of the land use, aesthetics, socioeconomics, and environmental justice sections of the SEIS.
- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City. Ms. Vahidi served as the Environmental Project Manager for the initial stages of CEQA documentation prepared for the City's Utility Department.
- **San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Project, San Clemente, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. This project EIR addressed the environmental effects of SCE's proposed replacement of Steam Generator Units 2 & 3 at the SONGS Nuclear Power Plant located entirely within the boundaries of the U.S. Marine Corps Base Camp (MCBCP) Pendleton. Issues of concern included potential conflicts resulting from the transport of the large units through sensitive recreation areas such as beaches, and the San Onofre State Park.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project, San Luis Obispo County, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County. Land

use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.

- **Cabrillo Port Liquefied Natural Gas (LNG) Deepwater Port, Ventura County, CA.** Under contract to the City of Oxnard, Aspen was tasked to review the Draft EIS/EIR for this the proposed construction and operation of an offshore floating storage and regasification unit (FSRU) that would be moored in Federal waters offshore of Ventura County. As proposed, liquefied natural gas (LNG) from the Pacific basin would be delivered by an LNG Carrier to and offloaded onto, the FSRU; re-gasified; and delivered onshore via two new 21.1-mile (33.8-kilometer), 24-inch (0.6-meter) diameter natural gas pipelines laid on the ocean floor. These pipelines would come onshore at Ormond Beach near Oxnard, California to connect through proposed new onshore pipelines to the existing Southern California Gas Company intrastate pipeline system to distribute natural gas throughout the Southern California region. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, and Environmental Justice.
- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore LNG facility to be located at the Port of Long Beach. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, Environmental Justice, and Port Master Plan Amendment.
- **Post-Suspension Activities of the Nine Federal Undeveloped Units and Lease OCS-P 0409, Off-shore Southern California.** Aspen assisted the U.S. Department of the Interior, Minerals Management Service (MMS) to prepare an Environmental Information Document (EID) evaluating the potential environmental effects associated with six separate suspensions for undeveloped oil and gas leases Pacific Outer Continental Shelf (OCS) located offshore Southern California. These undeveloped leases lie between 3 and 12 miles offshore Santa Barbara, Ventura and southern San Luis Obispo Counties and are grouped into nine units, with one individual lease that is not unitized. As the Senior Aspen social scientist, Ms. Vahidi guided the analysis of community characteristics and tourism resources, recreation, visual resources, social and economic environment, and military operations.
- **Otay River Watershed Management Plan (ORWMP) and Special Area Management Plan (SAMP) in San Diego County, CA.** Ms. Vahidi served as a Technical Senior for social science and land use issues. The ORWMP focused on developing strategies to protect and enhance beneficial uses within this watershed and thereby comply with the San Diego Region's NPDES permit, and the SAMP intended to achieve a balance between reasonable economic development and aquatic resource preservation, enhancement, and restoration in this 145-square-mile (93,000 acres) area through the issuance of Corps and CDFG programmatic permits.

California Energy Commission (CEC)

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under three separate contracts. Ms. Vahidi has served as Technical Senior for land use (since 2001), and a specialist for socio-economics and environmental justice, and alternatives analyses and special studies. Her specific projects are listed below.

- Technical Assistance in Application for Certification Review (Contract # 700-99-014; 3/6/2000 through 12/31/2003)
 - **Woodland Generation Station No. 2, Modesto, CA.** As the land use Technical Specialist, prepared the Land Use and Recreation, and Agricultural Resources Staff Assessments of this 80-megawatt nominal, natural gas-fired power generating facility and associated linear facilities (i.e., gas and water pipeline and

transmission line. The Staff Assessment evaluated potential impacts on nearby residential, recreational, and agricultural land uses, including important farmlands being traversed by linear facilities.

- **Valero Cogeneration Project, Benicia, CA.** Prepared the Socioeconomics Staff Assessment for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
- **Rio Linda/Elverta Power Project, Sacramento, CA.** Prepared the Socioeconomics Staff Assessment for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.
- **Magnolia Power Project, Burbank, CA.** As the Socioeconomics technical specialist, prepared the Staff Assessment for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated
- **Potrero Power Plant Project, San Francisco, CA.** Prepared the land use portion of the Alternatives Staff Assessment for this proposed nominal 540 MW natural gas-fired, combined cycle power generating facility. Analysis included review of several alternative sites for development of the power plant and the comparative merits of those alternatives with the proposed site located on the San Francisco Bay.
- **Los Esteros Critical Energy Facility, San Jose, CA.** Technical Senior for the Land Use Staff Assessment of this 180-megawatt natural-gas-fired simple cycle peaking facility. Issues included potential impacts resulting from loss of agricultural land, and impacts associated with the project's non-compliance with local General Plan land use and zoning designations.
- **East Altamont Energy Center, Alameda County, CA.** Technical Specialist for the Land Use Assessment for a 1,100-megawatt nominal, natural gas-fired power plant and associated linear facilities. Provided expert witness testimony on Land Use Staff Assessment. Major issues addressed in the Staff Assessment included loss of Prime Farmlands, recommendation of land preservation mitigation, and the project's non-compliance with local General Plan land use and zoning designations.
- **Tracy Peaker Project, Tracy, CA.** Technical Senior for the Land Use Staff Assessment of this 169-megawatt simple-cycle peaking facility in an unincorporated area of San Joaquin County. Provided expert witness testimony on Land Use Staff Assessment. Issues included potential impacts resulting from loss of agricultural land under Williamson Act Contract, and evaluation of cumulative development in the fast-growing surrounding area.
- **Avenal Energy Project, Kings County, CA.** Socioeconomics Technical Specialist for this 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Tesla Power Project, Alameda County, CA.** Land Use Technical Senior and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this project. The project will be a nominal 1,120-MW electrical generating power plant with commercial operation planned for third quarter of 2004. The Tesla Power Project will consist of a natural gas-fired combined cycle power generator, with 0.8 miles of double-circuit 230-kilovolt transmission line connected to the Tesla PG&E substation, 24-inch 2.8-mile natural gas pipeline, and 1.7-mile water line constructed along Midway Road.
- **Sacramento Municipal Utility District Consumes Power Plant Project, Sacramento, CA.** Socioeconomics and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,000-megawatt (MW) combined-cycle natural gas facility. Provided expert witness testimony on Socioeconomics Staff Assessment. The project would include the construction and operation of a natural gas power plant at the Rancho Seco Nuclear Plant, 25 miles southeast of the City of Sacramento, in Sacramento County. The project would be located on a 30-acre portion of an overall 2,480-acre site owned by SMUD.
- **Inland Empire Energy Center, Riverside County, CA.** Technical Specialist for the Land Use Assessment for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. Provided expert witness testimony on Land Use Staff Assessment. The project would be located on approximately 46-acres near Romoland, within Riverside County. Major issues addressed in the Staff Assessment included potential loss of agricultural lands, impacts to planned school uses, and the project's potential non-compliance with local General Plan land use and zoning designations.

- **Senior Technical Lead, Land Use Resources.** The California Energy Commission (CEC) requested that the Aspen Team provide Technical Seniors for the Land Use Resources area in order to help coordinate and review Land Use Resource Assessments. As a Technical Senior, Negar Vahidi was responsible for the technical review of Land Use sections for various power plants assigned to them.
- **Legislative Bill Review.** As a Land Use Technical Senior for the CEC, Ms. Vahidi conducted legislative bill review related to energy facilities siting. She conducted portions of the CEC Systems Assessment & Facilities Siting Division analysis of Senate Bill 1550 which was intended to give the Superintendent of Public Instruction/CDE approval authority over siting of power plants within one mile of existing or proposed K-12 school sites by requiring the CDE (in coordination with the State Architect, and the commission) to develop appropriate siting guidelines.
- **Engineering & Environmental Technical Assistance to Support the Energy Facility Planning and Licensing Program Contract (Contract # 700-02-004; 6/30/03 through 3/30/06)**
 - **Environmental Performance Report (EPR).** Ms. Vahidi managed the preparation of the Socioeconomics chapter of the EPR for the California Energy Commission, which eventually became part of the State of California's Integrated Energy Policy Report (IEPR). The Socioeconomics chapter addressed: the importance of reliable and affordable electricity supply power plant construction and operation impacts, including labor force, taxation, etc.; and trends in the energy section, including renewable power sources such as wind and solar. She also conducted the analysis of a new portion of the Land Resources Chapter, which addressed the siting and land use issues associated with renewable power. This new portion of the land use analysis compared the land use and siting constraints associated with renewable power infrastructure such as wind and solar versus other forms of power infrastructure, such as gas pipelines, transmission lines, LNG facilities, and power plants.
 - **Coastal Plant Study.** Ms. Vahidi served as the Social Sciences Task Manager for this special study being conducted as part of Aspen's contract with the California Energy Commission. The study included identification and evaluation of potential issues associated with the possible modernization, re-tooling, or expansion of California's 25 coastal power plants including: northern California power plants such as Humboldt, Potrero, Hunter's Point, Pittsburg, and Oakland; central coast power plants such as Contra Costa, Diablo Canyon Nuclear, Morro Bay, Moss Landing, Elwood, Mandalay, and Ormond Power Plants; and southern California power plants such as the Alamitos, Long Beach, Los Angeles Harbor, Haynes, Redondo Beach, Scattergood, El Segundo, Huntington Beach, Encina, Silver Gate, South Bay, and San Onofre Nuclear. As Task Manager her responsibilities included, identification of potential political, social, community, and physical land use impacts that may arise from the potential increased output of energy from plants in highly sensitive coastal communities. The intent of the study is to identify red flag items for the Energy Commission in order to streamline future licensing processes. Her task as the Social Science Task Manager also included a thorough review of applicable Local Coastal Plans, and Coastal Commission regulations associated with Coastal Development Permits and Consistency Determinations.
 - **Natural Gas Market Outlook Report (NGMOR).** Ms. Vahidi assisted the CEC's Natural Gas Unit as a technical editor in their preparation and publication of the NGMOR. She managed Aspen's efforts, including format and graphics, to edit technical sections prepared by Natural Gas Unit Staff under a condensed time frame. The Preliminary NGMOR was released for public review in June 2003.
- **Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; 4/11/06 through 3/30/09)**
 - **Chula Vista Energy Upgrade Project, Chula Vista, CA.** Senior Technical Specialist for the Land Use Staff Assessment for MMC Energy, Inc.'s Application for Certification (AFC) to construct and operate replacements and upgrades of equipment at the Chula Vista Power Plant, located on a 3.8-acre parcel in the City of Chula Vista's Main Street Industrial Corridor and within the City's Light Industrial zoning district. Issues of concern include the impacts of the power plant on adjacent residential and open space land uses, and compliance with applicable local LORS. Provided expert witness testimony on Land Use Staff Assessment.
 - **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would

include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California. The document was prepared in compliance with both NEPA and CEQA requirements.

- **Sentinel Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for CPV Sentinel's Application for Certification (AFC) to construct and operate an 850-megawatt (MW) peaking electrical generating facility near SCE's Devers Substation. The proposed project site consists of 37 acres of land situated approximately eight miles northwest of the center of the City of Palm Springs with portions of the construction laydown area and natural gas pipeline within the Palm Springs city limits. Land use issues of concern include the project's compliance with local LORS.
- **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which will consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The CESF is located in an unincorporated area of eastern San Luis Obispo County, west of Simmler and northwest of California Valley, California. The CESF includes the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site will encompass approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern include the impacts of the power plant on adjacent land uses and compliance with applicable local LORS.
- **Carlsbad Energy Center Project, Carlsbad, CA.** Senior Technical Specialist for the Land Use and Alternatives Staff Assessments for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5.
- **Marsh Landing Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Mirant Marsh Landing, LLC AFC for a 930 MW natural gas-fired power plant, which would be sited adjacent to the existing Contra Costa Power Plant in unincorporated Contra Costa County, near the City of Antioch.
- **Canyon Power Plant, Anaheim, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California.
- **Willow Pass Generating Station, Pittsburg, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a new, approximately 550-megawatt (MW) dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines.
- **Marsh Landing Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a new, 930-megawatt (MW) gas-fired electric generating facility proposed by Mirant. Delta. The proposed 27-acre Project site would be located at the existing Contra Costa Power Plant.
- **Stirling Energy Systems Solar One, San Bernardino County, CA.** Senior Technical Specialist for the Land Use Staff Assessment/BLM EIS for a nominal 850-megawatt (MW) Stirling engine project, with construction planned to begin late 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include the conversion of approximately 8,230 acres of open space to industrial uses, compliance with BLM's CDCA Plan, etc.
- **Stirling Energy Systems Solar Two, Imperial County, CA.** Senior Technical Specialist for the Land Use Staff Assessment/BLM EIS for a nominal 750-megawatt (MW) Stirling engine project, with construction

planned to begin either late 2009 or early 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include conversion of 6,500 acres of public recreation land used for OHV use and camping, and compliance with the BLM's CDCA plan..

- **GWF Tracy Combined Cycle Power Plant, San Joaquin County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for GWF's proposal to modify the existing TPP (see description above), a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City).
- **Lodi Energy Center, Lodi, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-megawatt (MW) power generating facility.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Senior Technical Specialist for the Land Use Staff Assessment of a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. Issues of concern include the impacts associated with the conversion of 1,765 acres of open space lands.
- **Genesis Solar Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment/BLM EIS for two independent solar electric generating facilities with a nominal net electrical output of 125 megawatts (MW) each, for a total net electrical output of 250 MW. Electrical power would be produced using steam turbine generators fed from solar steam generators. The project is located approximately 25 miles west of the city of Blythe. Major issues of concern include conversion of 4,460 acres of BLM lands to an industrial use.
- **Contra Costa Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The project would be located in the City of Oakley.
- **Topaz Solar Project EIR, San Luis Obispo County, CA.** (Applicant: First Solar). Aspen is managing preparation of an EIR for this 500 MW solar photovoltaic project in the Carrizo Plain area. A major issue of concern is the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use. Ms. Vahidi is the Senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the CA Department of Conservation LESA Model. One major issue of concern related to agricultural resources is impacts to lands under Williamson Act contracts. She will be guiding the analysis.
- **California Valley Solar Ranch EIR, San Luis Obispo County, CA.** (Applicant: SunPower). Aspen is managing preparation of an EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. A major issue of concern is the conversion of approximately 4,000 acres of open space to an industrial use. Ms. Vahidi is the Senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the CA Department of Conservation LESA Model. She will be guiding the analysis.
- **Santa Ana Valley Pipeline Repairs Project, San Bernardino and Riverside Counties, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation and permitting efforts related to the repair of 12 sites along the pipeline portion of the East Branch of the California Aqueduct. The repair of the 12 sites was crucial because, eight of the Priority 1 sites included areas of the pipeline that were under high stress and subject to rupture. Issues of concern included, potential impacts to special status species, sensitive receptors, and traffic. As the DWR's CEQA consultant, Ms. Vahidi determined that the proposed SAPL Repairs Project would qualify for a CEQA Categorical Exemption, and recommended the preparation

of a Technical Memorandum to justify this exemption. The Technical Memorandum and supporting documentation, including a Biological Constraints Report, and analyses of proposed project potential construction-related air quality, noise, and traffic impacts, were prepared and presented to DWR as one packet to support both a Class 1 and Class 2 CEQA Exemption. Subsequent to preparation of this packet, DWR filed a Notice of Exemption on June 13, 2003 for their repair activities.

- **Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project, Northern Los Angeles County, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation for this project. An IS/MND was prepared to evaluate the impacts of the project, which proposed to maintain four access routes to DWR's facilities along the West Branch of the California Aqueduct downstream of the Pyramid Dam. Repair and improvement activities would occur on Osito Canyon (an intermittent tributary to Piru Creek) at Osito Adit, adjacent to Old Highway 99 at North Adit (or access tunnel), alongside an eroded section of Old Highway 99 along Piru Creek, and at Pyramid Dam Bridge. Repair activities would serve to improve conditions of access routes, as well as strengthening and reinforcing them against seismic or flood events. Project-related construction could result in potentially significant impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic.
- **Pyramid Lake Repairs and Improvements Project, northern Los Angeles County.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation, ADA (Americans with Disabilities Act) compliance, and permitting efforts for this project. DWR and the Department of Boating and Waterways (DBW) are planning repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. The lake is also part of Federal Energy Regulatory Commission Project 2426. Aspen worked with DWR and DBW to determine ADA compliance components at each site. CEQA documentation in support of a Class 1 and 2 Categorical Exemption was prepared to evaluate the potential impacts of the repairs and improvements, and provide CEQA clearance for filing of required permit applications, including but not necessarily limited to 404, 401, and 1602 permits. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.
- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Task Leader for land use issues and is in charge of development and analysis of project alternatives for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the

Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.

- **Valley Generating Station Site Survey & Documentation Report, Los Angeles, CA.** Ms. Vahidi managed the preparation of a comprehensive report (over 150 pages) documenting all of the structures and facilities located at the Valley Generating Station (VGS). The report includes exhibits that illustrate locations of each structure at the VGS, a detailed appendix of color photos of each structure, and a written description of each structure. The report also provides a general discussion of the history and background of the VGS and its development to provide a context for the structures on site.
- **Taylor Yard Water Recycling Project (TYWRP), Los Angeles and Glendale, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.
- **Antelope-Pardee 500 kV Transmission Line Project EIR/EIS, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi is served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **Antelope Transmission Project, Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC,

Ms. Vahidi is served as the Deputy Project Manager in the early stages (i.e., during Scoping) of the project for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described above.

- **Jefferson-Martin 230 kV Transmission Line Project EIR, San Francisco Bay Area, CA.** Ms. Vahidi served as the Issue Area Coordinator for the Social Science issues of the EIR, and was responsible for preparation of the socioeconomics, recreation, and public utilities sections of the EIR prepared on behalf of the California Public Utilities Commission (CPUC) to evaluate a proposed 27-mile transmission line in San Mateo County. Major issues of concern included EMF and visual impacts on property values, impacts on the area's recreational resources, and evaluation of several route alternatives.
- **Miguel-Mission 230 kV #2 Project EIR, San Diego, CA.** Ms. Vahidi conducted the land use, recreation, socioeconomics, and environmental justice analyses for this EIR for a proposed 230 kV circuit within an existing transmission line ROW between Miguel and Mission substations in San Diego County. The proposed project included installing a new 230 kV circuit on existing towers along the 35-mile ROW, as well as relocate 69 kV and 138 kV circuits on approximately 80 steel pole structures. In addition, the Miguel Substation and Mission Substation would be modified to accommodate the new 230 kV transmission circuit.
- **Viejo System Project, Orange County, CA.** Ms. Vahidi served as the Deputy Project Manager for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19 double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.
- **MARS EIR/EIS, Monterey, CA.** Ms. Vahidi served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.
- **Kinder Morgan Concord-Sacramento Pipeline EIR.** Ms. Vahidi prepared the environmental justice and utilities and service systems sections of an EIR evaluating a proposed 70-mile petroleum products pipeline for the California State Lands Commission. Analysis included consideration of potential impacts of pipeline accidents in Contra Costa, Solano, and Yolo Counties.

- **Shore Marine Terminal Lease Consideration Project EIR, Contra Costa County, CA.** Served as Aspen's Project Manager (under contract to Chambers Group, Inc.) in charge of conducting the preparation of the Land Use, Recreation, Air Quality, and Noise sections of this EIR evaluating Shore Terminal, LLC's application to the California State Lands Commission (CLSC) to exercise the first of two 10-year lease renewal options, with no change in current operations. Shore Terminals operations comprise the marine terminal and on-land storage facilities in an industrial part of the city of Martinez. The marine terminal is on public land leased from the CSLC with the upland storage facilities located on private land.
- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompassed the evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Ms. Vahidi served as the Deputy Project Manager and Study Area Manager for the Los Angeles Basin for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties. Issues of concern focused on potential construction impacts of linear alignments in highly urbanized rights-of-way, and resultant land use, traffic and utilities conflicts.
- **U.S. Army Corps of Engineers, Los Angeles District.** Ms. Vahidi is responsible for managing Delivery Orders and conducting the analyses of the social science issue areas for 16 projects throughout southern California and Arizona as part of two environmental services contracts. Delivery orders have included:
 - **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** As the project manager guided the preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
 - **Imperial Beach Shore Protection EIS/EIR, Imperial Beach, CA.** Responsible for preparing the affected environment and environmental consequences sections for the land use, recreation, aesthetics, and socioeconomics issue areas. This EIS will analyze the impacts of shore protection measures along a 4.7-mile stretch of beach in southwest San Diego County.
 - **U.S. Food and Drug Administration Laboratory EIS/EIR, Irvine, CA.** Prepared the land use and recreation; socioeconomics, public services, and utilities; and visual resources/aesthetics analyses for this proposed "mega-laboratory" on the University of California Irvine Campus. Also developed the cumulative projects scenario for analyses of cumulative impacts. As the Public Participation Coordinator for the EIS/EIR review process, prepared the NOP, set up the scoping meeting and public hearing, prepared meeting handouts, and developed the project mailing list.
 - **San Antonio Dam EIS, Los Angeles and San Bernardino Counties, CA.** Responsible for preparing the cultural resources, land use and recreation, and aesthetics sections for the analysis of impacts resulting from the re-operation of San Antonio Dam to increase flood protection.
 - **Rio Salado Environmental Restoration EIS, Phoenix and Tempe, AZ.** Conducted the land use and recreation, and aesthetics analyses for this environmental restoration project in the Salt River and Indian Bend Wash located in the Cities of Phoenix and Tempe. Incidental to the primary objective of the Proposed Action (environmental restoration) is the creation of passive recreational opportunities associated with the restored habitat areas, such as trails for walking and biking, and areas for observing wildlife and learning about the natural history of the river.
 - **Airspace Restrictions EA, Ft. Irwin, CA.** Conducted the land use, recreation, aesthetics, and socioeconomics analyses of impacts for the conversion of unrestricted airspace to restricted airspace above Ft. Irwin in the Mojave Desert.
 - **National Guard Armory Building EA, Los Angeles, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the cumulative impacts and policy consistency sections.

- **Supplemental EA for the Seven Oaks Dam Woolly Star Land Exchange, San Bernardino County, CA.** Prepared the land use and recreation analyses and policy consistency section.
- **Lower Santa Ana River Operations and Maintenance EA, Orange County, CA.** Responsible for conducting the land use, recreation, aesthetics, socioeconomics, and cultural resources analyses.
- **EA for Area Lighting, Fencing, and Roadways at the International Border, San Diego, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the policy consistency section.
- **Border Patrol Checkpoint Station EA, San Clemente, CA.** Analyzed the aesthetic impacts of the installation of a concrete center divider and a Pre-inspected Automated Lane adjacent to and parallel to Interstate 5.
- **Upper Newport Bay Environmental Restoration Project, Newport Beach, CA.** Prepared physical setting, socioeconomics, land and water uses, and cultural resources sections for the Baseline Conditions Report and the Environmental Planning Report.
- **Whitewater/Thousand Palms Flood Control Project, Thousand Palms, CA.** Prepared the land use and recreation, aesthetics, and socioeconomics affected environment sections for the project's Baseline Conditions Report that was incorporated into the project EIS.
- **San Antonio Creek Bridges Project, Vandenberg Air Force Base, CA.** Prepared the physical setting, land use, socioeconomics, utilities, and aesthetics sections for analyses of bridge alternative impacts for missile transport on Vandenberg Air Force Base.
- **Ft. Irwin Expansion Mitigation Plan, Mojave Desert, CA.** Responsible for developing Ft. Irwin's Public Access Policy based on mitigation measures from the Army's Land Acquisition EIS for the National Training Center. Policy includes provisions for access by research and scientific uses.
- **Los Angeles Unified School District (LAUSD), Los Angeles County, CA.** Ms. Vahidi is Program Manager for Aspen's Environmental Master Services Agreement with the LAUSD (nation's second largest school district) to prepare CEQA documents (EIRs, IS/MNDs, Categorical Exemptions) in review of the LAUSD's four-phased new school construction program intended to meet existing and projected overcrowded conditions (200,000 seat shortfall) within the LAUSD (i.e., City of Los Angeles and all or parts of 28 surrounding jurisdictions cover 700 square miles of land). As the Program Manager, she is responsible for client interface and providing CEQA expertise to the LAUSD on day-to-day basis, QA/QC activities for all Aspen documents submitted, budget tracking and allocation, staff assignments, and the general day-to-day management of this contract. Thus far, Aspen has been awarded 48 CEQA document assignments for new school projects, school expansions and additions. In addition to her duties as the contract manager, Ms. Vahidi has managed the preparation of several CEQA documents under this contract, including:
 - **East Valley Middle School No. 2 EIR.** This middle school was proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
 - **Canoga Park New Elementary School IS/MND.** This elementary school would be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "Turn-Key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
 - **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** This project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, were impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **New School Construction Program EIR.** Serves as a Study Area Manager (Valley Districts), and Issue Area Coordinator (IAC) (i.e., technical lead and reviewer) for social science issues, including land use, socioeconomics, public services, population and housing, and utilities and service systems. As the IAC, she has formulated the scope of work and methodology for analysis of issues and mitigation options. In addition to her managerial duties, Ms. Vahidi is preparing the Land Use section of the EIR, and directing the preparation of the Project's Scoping Report.
- **Belmont Senior High School 20-Classroom Modular Building Addition Project.** Under Aspen's ongoing master services agreement with the LAUSD, served as the project manager for CEQA documentation and permitting efforts related to the addition of modular classrooms to the existing Belmont Senior High School campus. Issues of concern included, potential impacts to sensitive receptors adjacent to the school from construction-related air quality, noise, and traffic, and operation-related noise generated by the new classrooms. As the LAUSD's CEQA consultant, Ms. Vahidi directed the preparation of technical documentation in support of a Class 32 In-Fill CEQA Categorical Exemption. This technical documentation included analyses of potential project-related air quality, noise, and traffic impacts, which were then submitted to LAUSD as one packet. Subsequent to preparation of this packet, LAUSD filed a CEQA Notice of Exemption for the classroom addition project.
- **Narbonne High School Stadium Lighting Project MND Addendum.** Served as the project manager for this project proposed to add a new stadium, lighting, and associated sport facilities needed to address existing needs at Narbonne High School. Issues of concern include lighting impacts to the surrounding neighborhood, and available parking stock.
- **SCE Calnev Power Line and Substation Project IS/MND.** Aspen was contracted to thoroughly review and analyze Southern California Edison Company's Application for a Permit to Construct and Proponent's Environmental Assessment (PEA) for the Calnev Power Line and Substation Project in the City of Colton. Ms. Vahidi served as the Deputy Project Manager for preparation of the IS/MND. Tasks include: a site visit, and evaluation of the project's compliance with the Commission's General Order 131D, Rule 17.1, and associated information submittal requirements; and preparation of a letter report identifying data deficiencies of the Application and PEA. Upon formal CPUC acceptance of the Application and PEA, Aspen prepared a CEQA Initial Study Checklist by identifying baseline data, project characteristics, and determining impact significance for each issue area. Each issue area's impact determination was supported by a paragraph or more of analysis describing the rationale for the impact identified, or for the lack of a significant impact. Upon completion of the Initial Study, the Mandatory Findings of Significance were prepared and Aspen determine that a Mitigated Negative Declaration should be prepared per CEQA Guidelines.
- **SCE Six Flags Substation and Power Line Project IS/MND.** Ms. Vahidi served as Deputy Project Manager for preparation of the IS/MND. Reviewed and provided comments on the permit application by SCE to construct a substation and power line to provide electrical service to Six Flags Amusement Park in Valencia, CA. Subsequent to the application completeness review, she prepared the project's Initial Study Checklist and Mitigated Negative Declaration for the California Public Utilities Commission (CPUC). Identified possible deficiencies and provided recommendations.
- **Industrywide Survey for the South Coast Air Quality Management District.** Ms. Vahidi coordinated Aspen's work for an Air Toxics Survey of harmful emissions by auto body and paint shops, performed in compliance with AB2588. She was responsible for development of an industrywide emission inventory for these facilities; she also performed information management, facility verifications, survey mail-outs, emissions calculations, analysis of calculated results, and preparation of the final report.
- **Technical Support to NEPA Lawsuit, Angeles National Forest, CA.** Ms. Vahidi prepared a detailed project chronology and a list of all applicable federal, State, and local laws and regulations in support of the USDA Office of General Counsel and National Forest's response to the City of Los Angeles' 1996 lawsuit on the adequacy of the Pacific Pipeline EIS.
- **Yellowstone Pipeline EIS, Lolo National Forest, Montana.** Environmental Justice and Public Services Issue Area Specialist. Responsible for conducting the analysis of project impacts on minority and

low-income populations to comply with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates to determine the potential for disproportionate project impacts on affected communities. Also responsible for conducting analysis of project impacts such as population immigration and pipeline accidents on public services in western Montana. During the EIS scoping process, she served as the project public participation coordinator and was responsible for preparation of the project newsletter, setup of the first round of scoping meetings, and determination of project information centers.

- **Santa Fe Pacific Pipeline Project EIR.** Ms. Vahidi was responsible for development and screening of alternatives for a 13-mile petroleum products pipeline from Carson to Norwalk, CA. Prepared analyses of project impacts on socioeconomics, public services, utilities, and aesthetics.
- **Pacific Pipeline Project Mitigation Monitoring, Compliance, and Reporting Program (MMCRP).** Ms. Vahidi served as the expert technical reviewer for the socioeconomics and environmental justice issues. As the MMCRP Agency Liaison, was responsible for developing protocol for efficient interagency communication procedures in coordination of mitigation activities with the CPUC, USFS, Responsible Agencies, and the project proponent. Also responsible for the development and management of the MMCRP Community Outreach and Public Access Program.
- **Pacific Pipeline Project EIR.** For the California Public Utilities Commission's (CPUC) EIR on the originally proposed route of this proposed pipeline (from Santa Barbara County to Los Angeles), Ms. Vahidi developed and coordinated a public participation program to comply with CEQA's mandate for information disclosure and public involvement in decision-making. The Final EIR was certified in September 1993.
- **Pacific Pipeline Project EIS and Subsequent EIR.** Ms. Vahidi prepared the socioeconomics and public services analysis, the Environmental Justice analysis in compliance with Presidential Executive Order 12898, as well as portions of the Land Use and Public Recreation analyses, including a comprehensive comparative analysis of project alternatives on this EIS/Subsequent EIR for the U.S. Forest Service (Angeles National Forest) and the CPUC. Ms. Vahidi managed the subsequent GIS mapping of socioeconomic data relative to pipeline corridor alternatives and other industrial facilities. She also prepared the cumulative projects list (covering a five county area for the Proposed Project and its alternatives) used for the cumulative scenario analyses of the various issue areas in the EIS/SEIR. As the Public Participation Program Coordinator for the project, she developed, implemented, and managed the public involvement efforts for the NEPA and CEQA environmental review processes. This included: setup and logistics for 20 separate scoping meetings, informational workshops, and public hearings along the project route; preparation of all meeting handouts; preparation of project newsletters and public notices; placement of project documents on Internet; and maintenance of the a project telephone information hotline. She also reviewed over 2,000 public comments (written and verbal) received on the Draft EIS/SEIR, for subsequent distribution to the project team.
- **Alturas Transmission Line Project EIR/EIS.** Ms. Vahidi conducted the analysis of potential impacts on minority populations and low-income populations in compliance with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates, and the potential impacts of the transmission line on affected communities. She also prepared the cumulative projects list and map used for analyses of cumulative impacts. She managed development of meeting handouts; scheduling and logistics for four scoping meetings; developed and maintained project mailing list; reviewed public scoping comments and prepared the Scoping Report; coordinated four sets of informational workshops and public hearings for the Draft EIR/EIS; supervised the distribution of comments on the Draft EIR/EIS to the project team; and coordinated the distribution of the Draft and Final EIR/EIS to affected public agencies, organizations, and citizens.

EIP Associates**1998 to 2001**

- **Program EIR for the Divestiture of PG&E's Hydroelectric Generation Assets.** For the CPUC's EIR evaluating the Pacific Gas & Electric Company's (PG&E) proposal to divest their hydroelectric facilities in California, served as the land use technical analyst for two watershed areas, and the Task Manager for the Socioeconomics and Transportation sections of the EIR covering five watershed areas. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management. The land use section of the EIR examines the implications of the change in ownership of lands and the potential for impacts due to development or potential changes in use. Contributed significantly to the extensive GIS analysis, which was conducted to determine the development suitability and potential intensity of development that might occur on the lands if sold. These results served as one of the primary bases for analysis of impacts associated with the sale of the hydroelectric assets.
- **Section 108 Loan Guarantee EA/FONSI for the Waterfront Development Project.** Served as the Manager and Principal Preparer for this EA/FONSI for the City of Huntington Beach Economic Development Department. Prepared NEPA documentation evaluating the impacts resulting from the use of HUD Section 108 Loan guarantee funds for the Waterfront Resort Expansion Project in accordance with The HUD NEPA Guidelines and Format 1 (Environmental Assessments at the Community Level). Tasks included: (1) Evaluation of activities that would be categorically excluded from NEPA based on an assessment of the NEPA Implementing Guidelines for HUD Projects; (2) Evaluation of proposed actions compliance with all applicable federal statutes, regulations, and policies; and (3) Preparation of an Environmental Assessment/Mitigated Finding of No Significant Impact (EA/FONSI) for proposed actions that are not categorically excluded. Proposed actions to be evaluated consisted mainly of infrastructure improvement projects, rehabilitation and/or development of affordable housing, provision of relocation assistance, facilitation of development and/or redevelopment plans, property acquisition, provision of open space, etc.
- **MTA Mid Cities/Westside Transit Corridor Study EIS/EIR.** Served as the EIS/EIR Deputy Project Manager (DPM) for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles, Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to her duties as DPM for this comprehensive joint EIS/EIR, Ms. Vahidi prepared the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.
- **Wes Thompson Ranch Development Project EIR.** Served as the EIR Project Manager for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources.
- **City of Santa Monica Environmental Assessments.** As one of the City's qualified CEQA consultants managed several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA, including:

- **Berkeley Manor Condominium EIR and Technical Reports.** This one-issue EIR originally was a CEQA Categorical Exemption per direction of the City. During preparation of the Categorical Exemption documentation, it was determined that project-generated traffic would have potentially significant impacts. As a result, a traffic technical report was prepared as the background document for and EIR. In addition, shade and shadow impacts were evaluated in a technical report to ensure that shading impacts from the proposed structure on surrounding uses would not be significant. A simple Excel model was developed for calculation of shade and shadow angles.
- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the project's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main Street Mixed-Use Development Project EIR.** This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.
- **Specific Plans and Redevelopment Projects.** As the senior technical lead for land use, prepared the project description, alternatives screening and development, cumulative scenario, and land use analysis for:
 - **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted of a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
 - **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
 - **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generated population inducement.
 - **Blocks 104/105 Redevelopment Project EIR in Huntington Beach (Project Manager).** This EIR evaluated the development of a supermarket, retail shops, and office space in the City's Waterfront Redevelopment Zone. Issues of concern evaluated included traffic, land use, and impacts to on-site historic structures.

HONORS AND AWARDS

- 2006 American Planning Association, Los Angeles Section Environmental Award for the Los Angeles Unified School District New School Construction Program, Program EIR
- 2004 Association of Environmental Professionals Statewide Best EIR Award for the Jefferson-Martin 230 kV Transmission Project EIR.
- 2001 Outstanding Performance Award from the State of California Energy Commission.

- 1992-93 recipient of the USC Merit (“Ides of March”) Scholarship from the Southern California Association of Public Administrators (SCAPA).
- University of California, Irvine, School of Social Sciences. Graduated with Highest Honors in Political Science.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Los Angeles Section Executive Board Member
- Association of Environmental Professionals (AEP)

regulations and the cultural resource regulations of California, Nevada, and New Mexico.

ASSISTANT ANTHROPOLOGIST, Bernice Pauahi Bishop Museum, Honolulu, Hawai'i
August 1996 to June 1998

Assisted with archaeological project design, preparation of proposals, and client contract negotiations, directed Phase I pedestrian inventory surveys, test excavations for Phase I subsurface inventory surveys, test excavations for property evaluations, and data recovery excavations, and assisted with preparation of technical reports on short-term cultural resource management contracts. Analyzed field records, prepared site reports and synthetic report chapters, and analyzed and prepared reports on lithic assemblages for Phases I–III of a long-term federal highway project (Interstate Route H–3). Conducted research in Hawaiian archaeology, and delivered public and professional presentations of that research. Advised on the integration of geoarchaeological methods and techniques into cultural resource management field efforts, and on geoarchaeological interpretations of extant field records, and designed and conducted geoarchaeological components of fieldwork for short-term cultural resource management contracts.

RECENT PROFESSIONAL DEVELOPMENT

CULTURAL RESOURCE AND ENVIRONMENTAL LAW

Successful CEQA Compliance: An Intensive Two-Day Seminar

Sacramento, California, University of California, Davis, Continuing and Professional Education, Terry Rivasplata and Maggie Townsley
June 2009

ACHP - FHWA Advanced Seminar: Reaching Successful Outcomes in Section 106 Review

Vancouver, Washington, Advisory Council on Historic Preservation, Don Klima and Carol Legard; Federal Highway Administration, Mary Ann Naber
October 2007

NEPA Compliance and Cultural Resources

Portland, Oregon, National Preservation Institute, Joe Trnka
October 2007

Section 106: How to Negotiate and Write Agreements

Sacramento, California, National Preservation Institute, Claudia Nissley
November 2004

Consultation with Indian Tribes on Cultural Resource Issues

Sacramento, California, National Preservation Institute, Thomas F. King and Reba Fuller
September 2003

Section 106: How to Negotiate and Write Agreements

The Presidio, San Francisco, California, National Preservation Institute, Thomas F. King
May 2002

Introduction to CEQA

Sacramento, California, University of California, Davis, Continuing and Professional Education, Ken Bogdan and Terry Rivasplata
July 2000

TECHNICAL ARCHAEOLOGY

Introduction to Historic Site Survey, Preliminary Evaluation, and Artifact ID

West Sacramento, California, California Department of Transportation, Julia Huddleson, Anmarie Medin, Judy Tordoff, and Kimberly Wooten; California Department of Parks and Recreation, Glenn Farris, Larry Felton, and Pete Schulz
September 2006

Principles of Geoarchaeology for Transportation Projects (Course No. 100246)

Sacramento, California, California Department of Transportation, Graham Dalldorf, Glenn Gmoser, Jack Meyer, Stephen Norwick, Adrian Praetzellis, and William Silva
October 2006

INFORMATION TECHNOLOGY AND CULTURAL RESOURCE MANAGEMENT

GIS: Practical Applications for Cultural Resource Projects

Sacramento, California, National Preservation Institute, Deidre McCarthy
September 2006

RECENT PAPERS AND REPORTS

BASTIAN, BEVERLY E. AND MICHAEL D. MCGUIRT

2009 **Cultural Resources**. In *Final Staff Assessment, Canyon Power Plant, Application for Certification (07-AFC-9), Orange County* (CEC-700-2009-008-FSA, September 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-51. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

BLOSSER, AMANDA, MICHAEL D. MCGUIRT, AND BEVERLY E. BASTIAN

2008 **Cultural Resources**. In *Staff Assessment, Orange Grove Project, Application for Certification (08-AFC-4), San Diego County* (CEC-700-2008-009, November 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-43. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, ANDREA GALVIN, AND CLARENCE CAESAR

2004 **Section 106 for Experienced Practitioners: Consulting with the California SHPO (GEV4111)**. Course taught on 8 September 2004 in Oakland to California Department of Transportation cultural resources personnel and private sector cultural resource consultants (8 hours).

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, AND ANDREA GALVIN

2005 ***How to Consult with the California SHPO***. Workshop presented on 23 April 2005 at the 39th Annual Meeting of the Society for California Archaeology, Sacramento, California (6 hours).

JONES & STOKES

1999a ***Cultural Resource Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Wendover, Nevada to the California State Line***. Volume 1: Draft Report. July. (JSA 98-358.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

1999b ***Cultural Resources Report for the Williams Communications, Inc. Interstate 80 Fiber Optic Cable System Installation Project***. Volume I. September. (JSA 98-358.) Submitted to Williams Communications, Inc., Tulsa, Oklahoma. On file with the State Historic Preservation Office, Carson City, Nevada.

1999c ***Archaeological Site Avoidance and Monitoring Plans for Williams Communications' Fiber Optic Cable Installation In the Union Pacific Railroad Right-of-Way, Doña Ana County to Hidalgo County, New Mexico***. October. (JSA98-379.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

2001 ***Final Phase II Cultural Resource Evaluation for the Kramer Mining District, Edwards AFB, Kern and San Bernardino Counties, California***. Volume I. November. Sacramento, California. On file with the Base Historic Preservation Officer, Edwards AFB, California.

LEBO, SUSAN A. AND MICHAEL D. MCGUIRT

1997 ***Geoarchaeology at 800 Nuuanu: Archaeological Inventory Survey of Site 50-80-14-5496 (TMK1-7-02:02), Honolulu, Hawai'i***. Department of Anthropology, Bishop Museum, Honolulu. (100 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998a ***Assessments of Stone Architecture: a Case Study from North Hālawā Valley, O'ahu***. Paper presented at the 11th Annual Hawaiian Archaeology Conference of the Society for Hawaiian Archaeology, Kailua-Kona, Hawai'i.

1998b ***Pili Grass, Wood Frame, Brick, and Concrete: Archaeology at 800 Nuuanu***. Department of Anthropology, Bishop Museum, Honolulu. (142 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

LENNSTROM, HEIDI A., P. CHRISTIAAN KLIEGER, MICHAEL D. MCGUIRT, AND SUSAN A. LEBO

1997 ***Archaeological Reconnaissance of Pouhala Marsh, Ewa District, O'ahu***. Department of Anthropology, Bishop Museum, Honolulu. (14 pp.) Submitted to Ducks

Unlimited, Inc., Rancho Cordova, California. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D.

1996 ***The Geoarchaeology and Palynology of an Early Formative Pithouse Village in West-Central New Mexico.*** Unpublished M.A. thesis, Department of Anthropology, University of Texas at Austin.

1998 **50-80-10-2010, 50-80-10-2016, 50-80-10-2088, and 50-80-10-2134.** In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawā Valley, Oʻahu*, vols. 2a and 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–3, 1–44, 1–5, and 1–46. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

2002 **Committee Reports, OHP Liaison.** *SCA Newsletter* 36(3):4–5.

2004 **Committee Reports, OHP Liaison.** *SCA Newsletter* 38(2):7, 38(3):6–8.

2006 **Preservation Archaeology.** In *California Statewide Historic Preservation Plan: 2006–2010*, edited by Marie Nelson, pp. 8–15. California Department of Parks and Recreation's Office of Historic Preservation, Sacramento. Submitted to the National Park Service, Washington, D.C. On file at the California Office of Historic Preservation, Sacramento.

2008 **Dealing with Multi-element Cultural Resources under Section 106.** In *Historic Properties Are More Than Meets the Eye: Dealing with Historical Archaeological Resources under the Regulatory Context of Section 106 and CEQA*. Session presented on 25 April 2008 at the *33rd Annual California Preservation Conference* of the California Preservation Foundation in Napa, California, moderated by Michelle Messinger and Michael D. McGuirt (1 1/2 hours).

MCGUIRT, MICHAEL D., AMANDA BLOSSER, AND BEVERLY E. BASTIAN

2009 **Cultural Resources.** In *Final Staff Assessment, Beacon Solar Energy Project, Application for Certification (08-AFC-2), Kern County* (CEC-700-2009-005-FSA, August 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-131. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

MCGUIRT, MICHAEL D. AND LESLIE H. HARTZELL

1997 **50-80-10-2139 and 50-80-10-2459.** In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawā Valley, Oʻahu*, vols. 2c and 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–17 and 1–5. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998 **Chapter 1: Introduction.** In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawā Valley, O`ahu*, vol. 1, edited by Department of Anthropology, Bishop Museum, pp. 1–14. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D. AND SHANNON P. MACPHERRON

1998 **50-80-10-2137.** In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawā Valley, O`ahu*, vol. 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–86. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL AND SARAH C. MURRAY

2008 **Cultural Resources.** In *Preliminary Staff Assessment, Ivanpah Solar Electric Generating System, Application for Certification (07-AFC-5), San Bernardino County* (CEC-700-2008-013-PSA, December 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 5.3-1–5.3-73. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

MCGUIRT, MICHAEL D. AND DEBORAH I. OLSZEWSKI

1997 **50-80-10-2256.** In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawā Valley, O`ahu*, vol. 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–9. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MIKESELL, STEPHEN, MICHAEL MCGUIRT, AND TRISH FERNANDEZ

2007 **Introduction to the White Papers in State Historical Resources Commission Archaeology Committee White Papers.** *SCA Newsletter* 41(1):18–21.

SHARP, JOHN, MICHAEL D. MCGUIRT, JENNIFER DARCANGELO, AND ANDREA GALVIN

2004 ***How to Consult with the California SHPO.*** Workshop presented on 18 March 2004 at the 38th Annual Meeting of the Society for California Archaeology, Riverside, California (4 hours).

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 **Noise and Vibration** for the **Marsh Landing Generating Station** 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: April 21, 2010

Signed: _____

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

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities 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 helped prepare the staff testimony on **Public Health** for the Marsh Landing Generating Station 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: 04/21/2010 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

Kristin Ford

I, Kristin Ford declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Siting, Transmission, & Environmental Protection Division as Planner 1.
2. I prepared staff testimony for the Marsh Landing 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.
3. The information in the project description is correct, as the subject site is owned by Mirant Marsh Landing, LLC.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 04/21/10 Signed: _____

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
Vince Geronimo, PE

I, Vince Geronimo, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Energy Facilities Siting Division as a Soil & Water Resources Specialist.
2. I helped prepare the staff testimony on Soil & Water Resources, for the Marsh Landing Generating Station Project 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.
3. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
4. 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: April 21, 2010 Signed: _____

At: Sacramento, California

Vince C. Geronimo, PE, CFM

Associate Principal

Vince Geronimo is a registered California Professional Civil Engineer with 14 years of experience in the field of civil, environmental, and water resources engineering. Mr. Geronimo specializes in the planning, design, and implementation of flood mitigation projects that integrate ecosystem restoration. As part of PWA's fluvial team Mr. Geronimo provides technical QA/QC review of hydrologic and hydraulic analyses. Mr. Geronimo manages PWA's IDIQ contract with FEMA Region IX. For the California Energy Commission, Mr. Geronimo has conducted CEQA analysis, recommended mitigation measures, and contributed to Staff Assessments on four siting cases. Mr. Geronimo has conducted various environmental compliance reviews for more than 20 energy facilities. His education and project experience includes wastewater treatment facility design, water transmission and storage analysis, economic analysis, sediment and erosion control planning, stream and wetland restoration, and design of hydraulic structures. As a Certified Floodplain Manager and an engineer, Mr. Geronimo is knowledgeable of methods, to employ, that help reduce flood losses and protect and enhance the natural resources and functions of floodplains.

Education	M.S., 2004	Civil Engineering, Water Resources Emphasis, University of Colorado - Denver, Colorado
	B.S., 1995	Civil Engineering, Environmental Emphasis, Southern Illinois University - Edwardsville, Illinois
Professional Registration	2001	Professional Engineer, State of Colorado, 35224
	2006	Civil Engineer, State of California, 70165
Certifications	2002	Certified Floodplain Manager, Certificate No. US-02-00543, Association of State Floodplain Managers
Memberships		American Society of Civil Engineers Environmental & Water Resources Institute of ASCE-Sacramento (Treasurer) Association of State Floodplain Managers Floodplain Managers Association
Selected Project Experience	Beacon Solar Energy Plant; Kern County, CA 2005 -Present. PWA Project Manager provided environmental review for the California Energy Commission of a proposed solar energy plant in the Mojave desert. The environmental review focused on the stormwater, BMPs, and flood related impacts. Mr. Geronimo conducted hydrologic, hydraulic, and geomorphic analyses to assess the project plan to divert an existing dry wash through a constructed earthen diversion channel. Mr. Geronimo provided environmental review of the Storm Water Pollution Prevention Plan and the Drainage Erosion and Sediment Control Plan (DESCP). Mr. Geronimo authored the stormwater and flood related portions of the Preliminary Staff Assessment which included an engineer's evaluation of the project in a separate appendix. GWF Tracy; Tracy, CA 2008 – Present. PWA Project Manager 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. Mr. Geronimo specifically reviewed the project's proposed stormwater related facilities, BMPs, the septic facility, and water use to evaluate potential soil and water impacts. Mr. Geronimo conducted an assessment of the availability of recycled water and provided oversight for the Soil and Water Section of the Preliminary Staff Assessment. Compliance Reviews; Throughout California. 2006 – Present. PWA Project Manager responsible for compliance reviews for the California Energy Commission. Mr. Geronimo is a technical reviewer for Soil & Water and Waste compliance submittals. Mr. Geronimo reviews Storm Pollution Prevention Plans (SWPPPs), Drainage Erosion and Sediment Control Plans (DESCP), water use, monthly/annual compliance reports, and flood related compliance submittals to determine if the Project remains in compliance with the Conditions of Certification specified in the Energy Commission's licensing decision.	

**Selected
Project
Experience**
(Continued)

San Francisco Electric Reliability Plant; San Francisco, CA 2005 -Present. PWA Assistant Project Manager provided environmental review of a proposed power plant in San Francisco for the California Energy Commission. The environmental review was focused on the impacts to soil and water use. Mr. Geronimo specifically reviewed potential flooding, water reclamation and re-use, tertiary wastewater treatment facility, water quality impacts related soil erosion, and the Storm Water Pollution Prevention Plan and storm water best management practices.

Inland Empire Energy Center; Romoland, CA 2005. PWA Assistant Project Manager provided environmental review of a proposed power plant in Romoland for the California Energy Commission. The environmental review was focused on the impacts to soil and water use. Specific analyses included assessing potential flooding, water quality impacts related soil erosion, and the Storm Water Pollution Prevention Plan and storm water BMPs.

South Bay Salt Ponds Restoration Project, For the California State Coastal Conservancy, 2004 – 2008. PWA Task Manager for the riverine analysis of the Guadalupe River/Alviso Slough system. The analysis supported the EIR/S documentation for the South Bay Salt Pond Restoration Project NEPA/CEQA environmental review processes. The analysis combined a steady-state HEC-RAS model and an unsteady UNET model to test a combination of flooding scenarios related to the project alternatives that reduce offline storage and improve conveyance. The South Bay project is approximately 15,000 acres and will restore and enhance wetland habitats, improve public access and reduce flood hazards.

Independent QA/QC Review; FEMA Region IX, 2005 - 2008, PWA Project Manager responsible for developing the QA/QC procedures and checklist to provide independent review of three FEMA Flood Insurance Restudies within Monterey County, Siskiyou County, and Placer County. The independent technical review was conducted in accordance with the established policy principles and procedures in the *Guidelines and Specifications for Flood Hazard Mapping Partners*. The technical review included: Topographic Data, Hydrologic Data, Hydraulic Data, Floodplain Mapping (Revised Areas), as well as secondary checks of the data submitted as part of the TSDN for each re-study.

Flood Insurance Re-Studies; FEMA Region IX, 2007 - Present, PWA Project Manager responsible for managing a Marin County (Ross Valley) and a Santa Cruz County (Watsonville) Flood Insurance Re-study of several creeks in the study areas. The re-studies include: field survey, topographic mapping, hydrologic and hydraulic modeling, flood hazard assessment, and floodplain mapping.

Newhall Ranch Development, Valencia, CA, 2006-2008. For Newhall Land and Farming Company. Led the hydraulic assessment and conceptual civil design for improving five tributaries of the Santa Clara River that will be subject to hydromodification. Mr. Geronimo developed a suite of channel stabilization and bank stabilization application methods and design criteria to achieve stable channel morphology in response to reductions in sediment delivery and increases in flow.

Contra Costa Clean Water Program Hydrograph Modification Management Plan – Project Engineer, 2006-2007; for Contra Costa Clean Water program. Mr. Geronimo was part of the consultant team to assist the Contra Costa Clean Water Program in developing a Hydrograph Modification Management Plan (HMP). The HMP will include standards and performance criteria for hydrograph modification management by new development projects. Mr. Geronimo was involved in developing engineering concepts and practical civil design for Integrated Maintenance Practices (IMP).

Lake Sonoma Water Diversion; Sonoma County, CA 2005, PWA Project Manager to study feasibility of diverting water from Lake Sonoma, to the Russian River. The purpose of the analysis was for an EIR scoping process. Mr. Geronimo performed a reconnaissance level, engineering evaluation and provided an approximate cost to deliver 26,000 acre-feet of water from Lake Sonoma to the Russian River. The summary cost estimate included: facilities cost, approximate electrical demand engineering costs as percentage of facilities cost.

DECLARATION OF James Adams

I, James Adams declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission, and Environmental Protection Division as an Environmental Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on Traffic and Transportation for the Staff Assessment for the Marsh Landing Energy Project (08-AFC-3), 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 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: 04/21/2010 Signed: _____

At: Sacramento, California

**James S. Adams
Environmental Protection Office
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 654-3882
Jadams@energy.state.ca.us**

5/1999

Present **Environmental Planner**

Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics and traffic and transportation.

11/1997

Present **Energy and Resource Consultant**

Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an Intervention by the Redwood Alliance before the California Public Utilities Commission regarding the decommissioning of the Humboldt Bay Power Plant's nuclear reactor.

9/1994--

10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**

Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised \$140,000 from private foundations to support SECC activities.

6/1978--

12/1992 **Principal Consultant - Redwood Alliance**

Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--

8/1986 **Natural Resource Specialist**

Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--

present Consultant/Journalist/Paralegal/Lobbyist

Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The legal/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 I served on the Board of Directors for two local non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June

1978.

Academic

Honors. Member of Phi Gamma Mu Honor Society since 1986.

MILITARY SERVICE

7/1969--

9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities 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 helped prepare the staff testimony on **Transmission Line safety and Nuisance** for the Marsh Landing Generating Station 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: 04/21/2010 Signed: _____

At: Sacramento, California

DECLARATION OF DAVID FLORES

I, **David Flores** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Planner 3, Supervisor**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared staff testimony on **Visual Resources** for the Marsh Landing Generating Station Project 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: April 19, 2010 Signed: _____

At: Sacramento, California

DAVID FLORES

WORK EXPERIENCE

Sept. 1998
to Present

Planner 2. California Energy Commission, Energy Facilities Siting and Protection Division.

- Provide technical analysis of proposed energy planning, conservation, and development programs on land use, visual and traffic and transportation resources. Specific tasks include: the analysis of potential impacts; identification of suitable mitigation measures; preparation of testimony; participate in public workshops; present sworn testimony during evidentiary hearings, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

March 29,1988
to September 12, 1998

Senior Planner. County of Yolo Planning and Public Works Department

Senior Planner - Current and Advanced Planning (Resources Management and Planning)

Responsibilities included the following:

- Administered the establishment of Planning schedules and timeframe completion schedules; Administration and staff support to Planning Commission and Board of Supervisors; Staff support and liaison to citizen's committees. Preparation of Environmental documents (Negative Declarations, preparation of Environmental Impact Reports and Categorical Exemptions) in accordance with State and Federal Regulations.

June 1, 1976
to March 25, 1988

Manager of Resources Citizens Utilities Company of California

Responsibilities included the following:

- Coordinated, planned and developed semi-annual and annual construction and operating and maintenance budgets for all Northern California operations.
- Assisted in the development of rate and fee schedules before the California Public Utilities Commission for all Northern California Operations.
- Direct five employees and twenty-five employees in the outlying operations.
- Extensive experience in specification writing, project planning and scheduling, construction management, and site supervision

EDUCATION

California State University @ Sacramento
University of California @Davis
Major: Environmental Studies
Minor: Business Administration

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting 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** for **Marsh Landing Generating Station** 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: 04/21/2010 Signed: _____

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting-- California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer -- Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer -- Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.

I, **Patrick A. Pilling**, declare as follows:

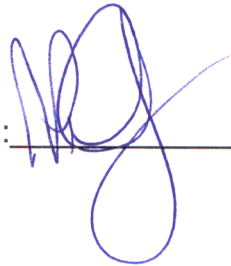
1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a Geotechnical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Geology and Paleontology**, for the **Marsh Landing Generating Station (MLGS)** 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: April 22, 2010

Signed: _____

At: Reno, Nevada



PATRICK A. PILLING, Ph.D., P.E., G.E.

Executive Vice President

Principal Geotechnical Engineer

Education

- \$ B.S. B Civil Engineering B1986 B Santa Clara University
- \$ M.S. B Civil Engineering B 1991 B San Jose State University
- \$ Ph.D. B Civil Engineering B 1997 B University of Nevada, Reno

Registrations

- P.E. - Civil - Nevada – No. 9153
- P.E. - Civil – California – No. C 49578
- P.E. - Geotechnical – California – No. GE 2292
- P.E. - Civil - Oregon – No. 19675PE
- P.E. – Geotechnical – Oregon – No. 19675PE
- P.E. - Civil – Arizona – No. 35310
- P.E. - Civil – Utah – No. 971338-2202

Associated Experience

- University of Nevada, Reno - Course Instructor - CE 771 - Mining Waste Containment Design
- University of Nevada, Reno - Course Instructor - CE 771 - Practical Foundation Engineering

Experience

1997 to Present: Black Eagle Consulting, Inc.; Executive Vice President. Dr. Pilling maintains over 18 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. As Executive Vice President, Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinates company marketing efforts, and performs project management, engineering and laboratory analyses, and report preparation on most projects. Dr. Pilling presently serves as our project manager of the Reno Retrack construction management team reviewing geotechnical design submittals for this rail 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. Responsibilities included design and

construction of drilled shafts, earth retention, and underpinning systems, in addition to construction scheduling and cost control.

Affiliations

- \$ American Public Works Association
- \$ 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
- \$ American Society of Engineering Education
- \$ Deep Foundations Institute

Publications

- Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, June 1996, A Development of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects, @ Report No. CCEER-94-4, University of Nevada, Reno; Federal Study No. F94TL16C, Submitted to State of California Department of Transportation (CalTrans).
- Ashour, M., P. A. Pilling, and G. M. Norris, March 1997, A 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, pp. 344-359.
- Ashour, M., P. Pilling, and G. Norris, 1998, “Updated Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Piles and Pile Groups,” Proceedings, 33rd Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Reno, pp. 177-178.
- Ashour, M., G. Norris, and P. Pilling, April 1998, A Lateral Loading of a Pile in Layered Soil Using the Strain Wedge Model, @ Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, pp. 303-315.
- Ashour, M., G. M. Norris, S. Bowman, H. Beeston, P. Pilling, and A. Shamsabadi, March 2001, “Modeling Pile Lateral Response in Weathered Rock,” Proceeding 36th Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Las Vegas, 2001.
- Ashour, M., G. Norris, and P. Pilling, July/August 2002, “Strain Wedge Model Capability of Analyzing the Behavior of Laterally Loaded Isolated Piles, Drilled Shafts, and Pile Groups,” Journal of Bridge Engineering, ASCE, Vol. 7, No 4, pp. 245-354.
- Ashour, M., P. Pilling, and G. M. Norris, March 26 – 31, 2001, “Assessment of Pile Group Response Under Lateral Load,” Proceedings, 4th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, University of Missouri – Rolla, MO, Paper 6.11.
- Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, March 1995, A The Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis, @ Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, pp. 40-53.

- Norris, G. M., P. K. Gowda, and P. A. Pilling, February 1993, A Strain Wedge Model Formulation for Piles, @ Report No. CIS 91-11, University of Nevada, Reno.
- Pilling, P. A., 1997, 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.
- Pilling, P. A. and P. V. Woodward, March 1995, A Dependent Facility Closure in California, @ Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, pp. 315-326.
- Pilling, P.A. and H. E. Beeston, March 1998, A Expansion Testing of Clay Soils in Forensic Investigations, @ Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, pp. 119-127.
- Pilling, P.A., M. Ashour, and G.M. Norris, 2001, “Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group,” Journal of the Transportation Research Board, Transportation Research Record No. 1772, Paper No. 01-0174, pp. 115-121.
- Pilling, P.A., July 2002, “Assessing the Liquefaction Potential of Sand Deposits Containing an Appreciable Amount of Gravel,” Program with Abstracts 2002 Annual Meeting Association of Engineering Geologists and American Institute of Professional Geologists, Reno, Nevada, p35.

Awards

- \$ Hugh B. Williams Industry Advancement Scholarship, International Association of Foundation Drilling (ADSC), 1993-94.
- \$ National Society of Professional Engineers, Northern Nevada Chapter, Young Engineer of the Year, 1996.

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting 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 **Power Plant Efficiency** for **Marsh Landing Generating Station** 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: 04/21/2010 Signed: _____

At: Sacramento, California

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting 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 **Power Plant Reliability** for **Marsh Landing Generating Station** 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: 04/21/2010 Signed: _____

At: Sacramento, California

DECLARATION OF LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission & 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 helped prepare the staff testimony on Transmission System Engineering, for the Marsh Landing Generating Station 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: 04/19/201 Signed: _____

At: Sacramento, California

Laiping Ng
Associate Electrical Engineer

Education:

Master of Science: Electrical Engineering - Power
California State University, Sacramento. December 1997.

Bachelor of Science: Electrical Engineering - Power
California State University, Sacramento. May 1991.

Power Certificate – EPRI, May 1991

Experience:

April 1999 – Present:

- Review and evaluate electrical transmission system sections of the application to ensure that the transmission engineering aspects of the power plant, switchyards, substations, and the related facilities comply with applicable laws, ordinances, regulations, and standards (LORS).
- Prepare written analysis, which address the issues of the adequacy of proposed projects to meet applicable LORS.
- Perform load flow studies and fault analysis.
- Coordinate with CAISO, WSCC and other regulatory agencies and coordinate with utilities companies in the review and evaluation of the power plant siting process.

May 1991 – April 1999:

- Prepared engineering bid specifications for recommended lighting and HVAC projects. Evaluated contractor bids and recommended contractors to customers. Reviewed RFPs and RFQs. Evaluated, selected, and managed engineering consultants. Administrated and coordinated contracts.
- Designed electrical systems for indoor and outdoor lighting and lighting controls. Assisted in design cooling systems and controls for school buildings and office buildings. Reviewed and checked electrical lighting designs and drawings. Analyzed designs and made recommendations for effective actions.
- Performed facility energy audits and field surveys on schools, offices, hospitals and county jail facilities to identify energy efficiency improvements and cost estimate with respect to lighting and HVAC systems. Inspected lighting and HVAC system equipment installation.
- Worked with regulatory agencies to conduct day-to-day basis works such as participated in Nonresidential Energy Efficiency Standards development teams. Prepared and updated Standards concentrating on interior building illumination and indoor and outdoor flood lighting.

**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** for the **Marsh Landing Generating Station** (08-AFC-03) 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: 04/21/2010

Signed: _____

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
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.
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 Alternatives for the Marsh Landing Generating Station Licensing Case Project 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: April 6, 2010 Signed: _____

At: Sacramento, California



SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group

2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared CEQA equivalent analyses for multiple power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following list of power plants under review by the Energy Commission. The Alternatives analysis considers renewable technologies, including utility-scale and distributed PV.
 - **Palomar Energy Project** – 500 MW combined-cycle natural gas facility in Escondido, San Diego County
 - **Russell City Energy Center** – 600 MW combined-cycle natural gas facility in Hayward, Alameda County
 - **Eastshore Energy Center** - 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
 - **Carrizo Energy Solar Farm** – 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
 - **CPV Sentinel Energy Project** – 850 MW natural gas plant in the Coachella Valley, Riverside County
 - **Marsh Landing Generating Station**- 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
 - **Orange Grove Project** – 96 MW natural-gas peaking facility near Pala, San Diego County
 - **Willow Pass Generating Station** – 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Rice Solar Energy Project** – 150 MW solar thermal (power tower) plant with molten salt storage in Riverside County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center** – 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm** – 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project** – 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case** – 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant** – 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

Energy Policy Studies, CEC, Project Management/Technical Support (2001 – Present). Dr. Phinney prepared the policy reports and provided expert support to the Energy Commission on the following projects:

- **RETI Stakeholder Steering Committee Support, CEC, Project Team (2010).** Dr. Phinney is supporting state agency coordination of and stakeholder input to support California ISO and publicly-owned utility planning of initial Competitive Renewable Energy Zone (CREZ)-transmission projects and update CREZ and conceptual transmission plan to facilitate project applications and permitting approvals beyond 2010.
- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the

development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005).** Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007).** Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach; these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California*, which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Gas Projections to the year 2020*.
- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 – 2007).** Dr. Phinney contributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment*. She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges*.
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005).** Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report*. In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005).** Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of

the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.

- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants*.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and supported many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR, U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp

1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation

1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a \$20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, Los Angeles. Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition

- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

- Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.
- Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.
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- Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.
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- Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.
- Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.
- Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.
- Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.
- Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.
- Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

- Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.
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- Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.
- Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.
- Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.
- Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.
- Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.
- Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.
- Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.
- Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.
- Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.
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- Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds.), "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.
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- Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.
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- Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF MARY DYAS

I, **MARY DYAS** declare as follows:

1. I am presently employed by the California Energy Commission in the **SITING AND COMPLIANCE OFFICE** of 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 helped prepare the staff testimony on **GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN**, for the **Marsh Landing** 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: April 22, 2010

Signed: _____

At: Sacramento, California

MARY DYAS
CALIFORNIA ENERGY COMMISSION – COMPLIANCE PROJECT MANAGER

PROFESSIONAL EXPERIENCE

Planner II/III – Energy Facilities Compliance Project Manager 05/01/2008 to Present
Siting Unit / Siting and Compliance Office, California Energy Commission, Sacramento, California

Compliance Project Manager—Provide oversight of energy facility construction and operation activities to ensure compliance with conditions of certification. Function as team leader for all compliance monitoring activities, processing of post-certification amendments, complaints, and facility closures.

Currently acting as working team leader on projects filed with the Energy Commission including renewable energy projects (SES Solar One and Solar Two), transmission line projects (Blythe Transmission Line), and natural gas-fired energy projects (Russell City Energy Center) in the licensing, construction and operational phases of each project.

Planner I/II – Energy Facilities Siting Project Manager 01/18/2006 to 04/30/2008
Siting Unit / Siting and Compliance Office, California Energy Commission, Sacramento, California

Siting Project Manager – Provide day-to-day management of complex and controversial energy facility siting projects and renewable solar projects, including the Carrizo Energy Solar Farm Project, Bullard Energy Center, El Centro Unit 3 Repower Project and Chevron Replacement Project. Planning, organizing and directing the work of an interdisciplinary environmental and engineering staff team engaged in the review of complex or controversial energy facility siting Applications for Certification.

Energy Analyst / Associate Energy Specialist – LNG Research 09/27/2002 to 01/17/2006
Natural Gas Office / Transportation Division, California Energy Commission, Sacramento, California

Coordinating and assisting with the facilitation of monthly Interagency LNG Working Group meetings involving cooperative federal, state, and local agencies; assisting with report writing conducting LNG facility assessments; Organizing/facilitating public workshops and preparing status reports on LNG facility development for use by Commissioners and Governor's Office, as well as reviewing and analyzing LNG-related legislative bills in California; Creating and maintaining the Commission LNG webpage, researching and preparing numerous LNG fact sheets for public education, and gathering information on new technology, tracking new LNG projects, and LNG market information.

Office Technician / Energy Analyst - Assistant Siting Project Manager 06/27/2000 to 09/27/2002
Siting Unit / Siting and Compliance Office, California Energy Commission, Sacramento, CA

Assisting energy facility project managers with organization of and conducting workshops and public meetings between staff and power plant developers, other governmental agencies, private organizations, and the public. Also assisting with the reviewing, evaluating and editing of project correspondence, reports, and testimony as well as assisting project secretaries, and Office Managers as needed. Also performed all the same duties in relation to the Emergency Power Plant Permitting 21-day, 4-month, 6-month and 12-month projects.

Office Technician / Energy Analyst - Assistant Siting Project Manager 06/27/2000 to 09/27/2002
Siting Unit / Siting and Compliance Office, California Energy Commission, Sacramento, CA

Managing the Siting Peak Workload Contract, including the preparation of hundreds of work authorizations, invoices, and general coordination of work between technical staff and contractor and preparing associated budget information for office managers and executive office.

EDUCATION

Bachelor of Science degree in Biological Sciences California State University, Sacramento ~ 1995



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
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**APPLICATION FOR CERTIFICATION
FOR THE MARSH LANDING
GENERATING STATION**

Docket No. 08-AFC-3

PROOF OF SERVICE
(Revised 4/19/2010)

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DECLARATION OF SERVICE

I, Teraja` Golston, declare that on April 26, 2010, I mailed hard copies of the attached (08-AFC-3) Marsh Landing – 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/marshlanding/index.html>].

(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. 08-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:
Teraja` Golston