

OAKLEY GENERATING STATION

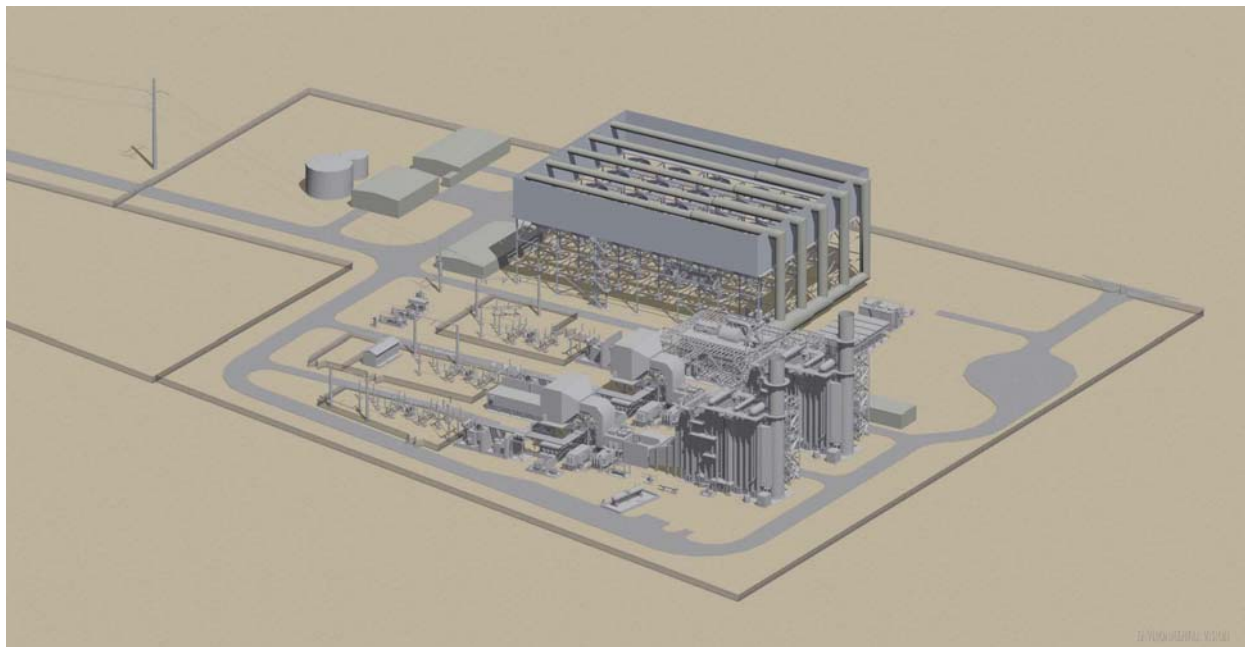
Final Staff Assessment

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**OAKLEY GENERATING STATION
(09-AFC-4)
FINAL STAFF ASSESSMENT**

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EXECUTIVE SUMMARY

Testimony of Pierre Martinez, AICP

INTRODUCTION

Contra Costa Generating Station, LLC (CCGS) is a limited liability corporation, wholly owned by Radback Energy, Inc. CCGS is the proponent of the Oakley Generating Station (OGS), formerly the Contra Costa County Generating Station, and filed an Application for Certification (AFC) with the California Energy Commission (Energy Commission) on June 30, 2009, to construct and operate a natural gas-fired combined cycle electrical generating facility with a gross nominal generating capacity of 624-megawatts (MW). The AFC was reviewed for data adequacy on August 12, 2009, wherein the Energy Commission found the AFC inadequate and adopted a list of deficiencies in five technical areas. Between August 20 and September 9, 2009, the applicant provided additional information to supplement the AFC. At a business meeting held on September 23, 2009, the Energy Commission adopted the Executive Director's data adequacy recommendation, thereby deeming the AFC complete for filing purposes.

On November 9, 2009, an Informational Hearing and Public Site Visit was held in the City of Oakley to facilitate public involvement and agency participation in the certification process.

Staff data requests were issued on January 19, February 17, and March 22, 2010 and a Data Request Workshop was held on April 23, 2010. Since the Data Requests were issued, the applicant has submitted numerous Data Responses to address items raised by staff to ensure that a thorough review and analysis of the project could be conducted.

A Preliminary Staff Assessment (PSA) was previously prepared for this project in two parts. PSA – Part A was published on December 20, 2010 and PSA – Part B was published on January 14, 2011. A Public Workshop was held on February 2, 2011 and a comment period for the PSA was open from December 20, 2010 to February 14, 2011.

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the proposed Oakley Generating Station (OGS) project, Application for Certification (09-AFC-4). The FSA is being published in two parts, this part as an FSA and the second part as a Supplemental Staff Assessment (SSA), anticipated for a March 2011 publication, which would include an appendix to the **Transmission System Engineering** section.

The FSA examines engineering, environmental, public health and safety aspects of the OGS project, based on the information provided by the applicant (CCGS) and other sources available at the time the FSA was prepared. The FSA 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 agency under CEQA, and its regulatory process, which has been certified by the Secretary of the Natural Resources Agency, 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 proposes conditions of certification for construction, operation and eventual closure of the project, if approved by the Energy Commission.

This FSA 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, and federal legal requirements. However, the FSA will serve as staff's official sworn testimony in evidentiary hearings to be held by an assigned Committee of two Energy Commissioners and a Hearing Officer. After evidentiary hearings, the Committee will consider the testimony presented by staff, the applicant, and all parties to the proceeding as well as recommendations and comments provided by government agencies and the public prior to issuing a Presiding Member's Proposed Decision (PMPD). Following a 30-day public review, the full five-member Energy Commission will render its final decision.

PROJECT LOCATION AND DESCRIPTION

The proposed project site is located in the city of Oakley, eastern Contra Costa County, at 6000 Bridgehead Road, northeast of the junction of State Route 4 and State Route 160. This site is at the western city limits of Oakley and adjacent to the eastern city limits of Antioch. The project is located on a 21.95-acre site that was part of a larger 210-acre property owned by E.I. du Pont de Nemours and Company (DuPont).

The project is bounded to the west by the Pacific Gas and Electric (PG&E) Antioch Terminal, a large natural gas transmission hub, to the north by DuPont property that is either industrial or vacant industrial, to the east by DuPont's titanium dioxide landfill area, and to the south by the Burlington Northern Santa Fe railroad.

The majority of the project site is used as a vineyard as this portion of the former DuPont property was never developed for industrial purposes. A small wetland area is located at the northwestern corner of the site.

The OGS project will be a natural gas-fired, combined-cycle facility with a nominal generating capacity of 624 megawatts (MW). The facility will be capable of operating 24 hours per day, 7 days per week. It will be designed as a base-load facility with the added capabilities of rapid startup, high turndown capability (i.e. ability to turn down to a low load), and high ramp rates. Because the combined-cycle configuration will be more efficient than other aging gas-fired steam generation facilities in northern California, the OGS facility is anticipated to be frequently dispatched and operate up to approximately 8,463 hours per year (approximately 96.6% capacity with the balance in downtime for

maintenance), yet with an expected facility capacity factor at 60 to 80%. The applicant has entered into a Purchase and Sale agreement with PG&E to guarantee commercial availability of power by June 1, 2016.

Primary equipment for the generating facility will include:

- Two General Electric (GE) Frame 7FA combustion turbine generators (CTGs)
- One single condensing GE D11 steam turbine generator
- Two unfired heat recovery steam generators (HRSGs)
- One auxiliary boiler
- One air-cooled condenser (dry-cooled technology)
- One evaporative fluid cooler
- One diesel powered fire pump, and other associated equipment.

Power will be transmitted to the regional electrical grid through a 230-kV connection to PG&E's Contra Costa Substation, located 2.4-miles to the southwest of the OGS. The project will replace the existing 60-kV line, located within an existing 80-foot-wide PG&E easement, with a 230-kV line.

Construction laydown and parking areas will be located on a 20-acre parcel east of the plant site on DuPont property.

AGENCY COORDINATION

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 Energy Commission seeks comments from and works closely with other regulatory agencies that administer LORS applicable to the proposed project. These agencies may include as applicable the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Air Resources Board, the Bay Area Air Quality Management District, the California Independent System Operator, and the City of Oakley. On August 5, 2009, Energy Commission staff sent the OGS AFC to all local, state, and federal agencies that might be affected by the proposed project.

CITY OF OAKLEY

On November 25, 2009, Energy Commission staff sent a letter to the City of Oakley (City) Community Development Department requesting that the City provide conditional use permit (CUP) findings it would make for the OGS, and the conditions that they would attach to the proposed project, were they the permitting agency if not for the exclusive siting authority of the Energy Commission. On April 5, 2010, the City responded to this request with a list of CUP findings and a list of 75 recommended conditions of approval.

In response to the City's list of recommended conditions, Energy Commission staff prepared a summary table (Appendix A) to PSA – Part A and PSA – Part B, noting how suggested conditions of approval were addressed in the PSA. At the February 2, 2011 Public Workshop on the PSA, the city of Oakley noted that they were satisfied with how their suggested conditions were being handled and agreed that a similar Appendix A to the FSA was not warranted. Since then, Energy Commission staff has continued to work with city of Oakley staff to ensure that their concerns are acknowledged and/or addressed in the FSA either through specific discussion in the analysis conducted within the FSA environmental and/or engineering sections or via specific language in Conditions of Certification.

OTHER PUBLIC AGENCIES

After publication of the PSA – Part A and PSA – Part B, Energy Commission staff received comments from various public agencies, such as, the city of Oakley, the city of Antioch, the United States Fish and Wildlife Service, the California Department of Water Resources, and the California Department of Substances Control. These letters were all referenced in various sections of this FSA and, depending on the nature of the comment were specifically addressed via either new analyses, updated pertinent information, acknowledgement, updated Conditions of Certification, or some combination thereof.

OUTREACH EFFORTS

Energy Commission regulations require staff to send notices regarding receipt of an AFC and Commission events and reports related to proposed projects, at a minimum, to property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines) and publish a notice in a local newspaper. The Energy Commission's outreach efforts are an ongoing process that, to date, have involved the following efforts; on August 5, 2009, a notice of receipt of the project AFC was mailed out. Notice of the November 9, 2009 Informational Hearing and Site Visit to the proposed site of the OGS was sent by letter on October 8, 2009. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Additionally, public notice was provided of the availability of both PSA – Part A and PSA – Part B publications, and the Public Workshop on the PSA.

LIBRARIES

On August 5, 2009, the Energy Commission staff provided the (OGS) Application for Certification to various libraries within the project vicinity including; Antioch Library, Pittsburg Library, and Oakley/Freedom High Library. In addition to these local libraries, copies of the AFC were made available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco. The libraries noted above also received copies of both PSA – Part A and PSA – Part B publications.

DATA RESPONSE AND ISSUE RESOLUTION WORKSHOP

Energy Commission staff sent a public notice to appropriate parties on March 30, 2010 for an April 23, 2010 Data Response and Issue Resolution Workshop. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project.

NOTIFICATION TO THE LOCAL NATIVE AMERICAN COMMUNITY

Notice was sent to the Ohlone Indian Tribe and the Native American Heritage Commission (NAHC) advising them of submittal of the project AFC and providing them with information on the process and how they may participate. On June 23, 2010, Energy Commission staff also contacted the (NAHC) requesting a current list of Native American representatives with traditional ties to Contra Costa County, who have expressed interest in receiving information regarding development projects in the project area.

PUBLIC ADVISORS OFFICE

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

Prior to the November 9, 2009 Informational Hearing and Public Site Visit, the Public Advisor (PAO) sent a cover letter and two-sided bilingual notice in English and Spanish announcing the Informational Hearing and Public Site Visit and requested posting of the notice to increase outreach. It was also sent to local Antioch, Bethel Island, Brentwood, Oakley, and Pittsburgh elected officials, commissions, and boards; local native American Tribes and registered members (provided by the Native American Heritage Commission); public and private schools; places of worship and many others.

Additionally, the PAO advertised in local newspapers including the *Contra Costa Times* (English) and *Fronteras* (Spanish) that ran on November 7, 2009. The PAO's office also requested Public Service Announcements of local Chambers of Commerce for the cities of Antioch, Pittsburgh, and Bethel Island and the City of Oakley. The bilingual notice was sent to local television and radio stations.

ENVIRONMENTAL JUSTICE

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

In considering environmental justice in energy facility siting cases, staff uses a demographic screening analysis to determine whether low-income and/or minority population exists within the potentially affected area of the proposed site. The demographic screening is based on information contained in two documents: “Environmental Justice: Guidance Under the National Environmental Policy Act” (Council on Environmental Quality, December 1997) and “Guidance for Incorporating Environmental Justice Concerns in EPA’s Compliance Analyses” (U.S. Environmental Protection Agency, April 1998).

The Environmental Justice screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations. Environmental Justice: Guidance Under the National Environmental Policy Act, defines minority individuals as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population or the below-poverty-level population of the potentially affected area is:

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

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

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

DETERMINING MINORITY POPULATION

Socioeconomic Figure 1 (located in the Socioeconomics section of this FSA) shows the minority population within a six-mile radius of the proposed OGS site. As discussed above, a minority population is identified when the minority population of the potentially affected area is greater than 50% or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis. For the OGS project, the 2000 U.S. Census total population within the six-mile radius of the proposed site is 138,443 persons, with a minority population of 57,477 persons, or about 42% of the total population.

DETERMINING BELOW-POVERTY-LEVEL POPULATION

Below-poverty-level populations are identified based on Year 2000 census block group data. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below-poverty-level population within a six mile radius of the OGS project is 10,145 people, or about 7.85% of the population of the area.

SIGNIFICANT IMPACTS

Staff has determined that for the above-mentioned sections of the FSA, there is a reasonable likelihood that significant impacts can be mitigated through the Conditions of Certification thereby ensuring that there would be no disproportionate or significant impact on an environmental justice population.

Staff has identified mitigation measures designed to reduce, to the greatest extent possible, any impact that will occur in the community surrounding the proposed project. Staff's environmental justice outreach has been incorporated into its overall outreach activity, including the preparation of a status report prepared by the Public Advisor's Office on November 5, 2009 in association with preparation for the November 9, 2009 Informational Hearing and Site Visit. One of the purposes of the status report was to provide early outreach to ensure that the Energy Commission is inclusive and responsive to people of all races, cultures and incomes with respect to meaningful public participation in Energy Commission proceedings.

STAFF'S ASSESSMENT OF THE PROPOSED PROJECT IMPACTS

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

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

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes the project, as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, would comply with all applicable laws, ordinances, regulations, and standards (LORS). For a more detailed review of potential impacts, see staff's technical analyses in this FSA. The status of each technical area is summarized in the table below.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Not Applicable	Not Applicable
Facility Design	Yes	Yes
Geology and 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 and Water Resources	Yes	Yes
Traffic and Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

Transmission System Engineering – Staff has concluded that for project development to the first point of interconnection with the existing transmission network, the OGS will comply with LORS and any potential impacts would be mitigated through implementation of staff's proposed Conditions of Certification. However, according to Revision 2.0 to the Transmission Cluster Phase II Interconnection Study for PG&E's Greater Bay Area, three 230kV lines will require reconductoring in order to maintain the reliability of the transmission network. These include:

- 18.3-mile-long Contra Costa PP – Delta Pumps 230kV transmission line,
- 8-mile-long Kelso – Tesla 230kV transmission line; and
- 21-mile-long Las Positas – Newark 230kV transmission line.

These line upgrades represent indirect and reasonable foreseeable consequences of the OGS project and a general screening-level environmental analysis of the reconductoring must be included in the FSA prepared for the project. The previously mentioned Supplemental Staff Assessment, expected to be published in March 2011, will include an Appendix A to the Transmission System Engineering section incorporating the appropriate screening-level environmental information required for the

Contra Costa to Delta Pumps line and the Las Positas to Newark line. The Kelso to Tesla 230kV transmission line reconductoring has been evaluated in staff's analysis of the recent Mariposa Energy Project and therefore staff can rely on that analysis for the OGS project.

NOTEWORTHY PUBLIC BENEFITS

Among others, the OGS project offers the following noteworthy benefits:

- Provide a efficient, reliable, and predictable power supply by using combined-cycle natural gas-fired combustion turbine technology capable of supporting the growing power needs of Contra Costa County.
- Use of state-of-the-art technology to provide operational flexibility and rapid-start and dispatch capability.
- Siting of the project near existing infrastructure, including electrical transmission lines, a high-pressure natural gas transmission pipeline, existing water lines, and nearby sewer lines.
- Provision of two combustion turbine generators, configured as independent equipment trains to provide greater inherent reliability.

CONCLUSIONS AND SCHEDULE

Based on the summary table above, and further supported by the detailed review of each technical section included in this FSA, it appears that the OGS project will comply with all LORS and that any potential environmental impacts can be mitigated to a less-than-significant level, provided compliance with the recommended Conditions of Certification.

The Committee overseeing this proceeding has noticed evidentiary hearings on OGS in March 2011, issuing the Presiding Member's Proposed Decision in April, and conducting final Energy Commission adoption hearings in May 2011.

INTRODUCTION

Testimony of Pierre Martinez, AICP

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission staff's independent analysis of the proposed Oakley Generating Station (OGS), which would be a natural gas-fired, combined cycle base load facility with a generating capacity of 624-megawatts (MW), located at the western border of the City of Oakley, Contra Costa County. For clarity, this FSA is a staff document. It is neither a California Energy Commission Committee document nor a draft decision. The FSA 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, operated and closed, if it is certified; and
- Project alternatives.

The analyses contained in this FSA are based upon information from the following sources: 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) and comments at workshops. 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 FSA 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 FINAL STAFF ASSESSMENT

The FSA 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 19 technical areas. Each technical area is addressed in a separate chapter. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report, including their declarations and resumes.

Each of the 19 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 (AFC process) has been certified by the Natural Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)) as a certified regulatory program. 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 (FSA). The PSA presents for the applicant, interveners, agencies, other interested parties, and members of the public, the staff's preliminary analysis, conclusions, and recommendations. The PSA is typically published with a 30-day comment period to allow for interested parties to review and comment on the document, however, in this case a longer comment period was provided since the PSA was published in two parts. Approximately 20 days after publication of the PSA, a public workshop is held to allow for interested parties to comment on the document in a public forum. Based on the workshop(s) and any written comments that may have been submitted, staff may refine their analysis, correct errors, and/or finalize conditions of certification. This refined analysis, along with responses to comments on the PSA, is published in the FSA. Staff published a PSA – Part A document on December 20, 2010 and a PSA – Part B document on January 14, 2011. A Public Workshop was held on February 2, 2011 and a comment period for the PSA was open from December 20, 2010 to February 14, 2011. The FSA serves as the staff's testimony for evidentiary hearings.

The FSA 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 for 30 days in order to receive public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD will be circulated for a comment period to be determined by the Committee. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any intervener may request that the Energy Commission reconsider its decision.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the FSA 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 compliance with 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 Energy Commission seeks comments from and works closely with other regulatory agencies that administer LORS that are applicable to the proposed project. These agencies may include as applicable the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Air Resources Board, the Bay Area Air Quality Management District, the California Independent System Operator, and the City of Oakley. On August 5, 2009, Energy Commission staff sent the OGS AFC to all local, state, and federal agencies that might be affected by the proposed project.

PROJECT DESCRIPTION

Testimony of Pierre Martinez, AICP

PROJECT LOCATION

The proposed project site is located in the city of Oakley, eastern Contra Costa County, at 6000 Bridgehead Road, northeast of the junction of State Route 4 and State Route 160 (**See Project Description Figures 1, 2, and 3**). This site is at the western city limits of Oakley and adjacent to the eastern city limits of Antioch. The project is located on a 21.95-acre lot that was part of a larger 210-acre property owned by E.I. du Pont de Nemours and Company (DuPont).

The project is bounded to the west by the PG&E Antioch Terminal, a large natural gas transmission hub, to the north by DuPont property that is either industrial or vacant industrial, to the east by DuPont's titanium dioxide landfill area, and to the south by the Burlington Northern Santa Fe railroad.

The majority of the project site is used as a vineyard as this portion of the DuPont property was never developed for industrial purposes. A small wetland area (discussed further in the **BIOLOGY** section) is located at the northwestern corner of the site.

PROJECT PURPOSE AND OBJECTIVES

The OGS would operate as a base loaded power plant proposed to be permitted for 8,463 hours of operation per year and would provide needed electric generation capacity with improved efficiency and operational flexibility to help meet northern California's long-term electricity needs. The proposed power plant will employ General Electric's new state-of-the-art Rapid Response combined-cycle technology with lower emissions than many power plants permitted in the past. PG&E has identified a near-term need for new power facilities that can be online by or before 2015 and that can support easily dispatchable and flexible system operation. Contra Costa Generating Station, LLC (CCGS) has entered into a Purchase-Sale Agreement with PG&E. The OGS objectives are consistent with this need as follows:

- Provide the most efficient, reliable, and predictable power supply available by using combined-cycle natural gas-fired combustion turbine technology capable of supporting the growing power needs of Contra Costa County.
- Use state-of-the-art technology to provide operational flexibility and rapid-start and dispatch capability.
- Site the project as near as possible to 230-kV high voltage electrical transmission lines and high-pressure natural gas transmission pipelines.
- Site the project near the San Francisco Bay Area load center and minimize the need to construct new transmission lines.
- Minimize environmental impacts.

PROJECT FEATURES

The OGS will be a natural-gas-fired, combined-cycle facility with a nominal generating capacity of 624-megawatts (MW). The facility will be capable of operating 24 hours per day, 7 days per week. It will be designed as a base-load facility with the added capabilities of rapid startup, high turndown capability (i.e. ability to turn down to a low load), and high ramp rates. Because the combined-cycle configuration will be more efficient than other aging gas-fired steam generation facilities in northern California, the OGS facility is anticipated to be frequently dispatched and operate up to approximately 8,463 hours per year (approximately 96.6 percent capacity with the balance in downtime for maintenance), yet with an expected facility capacity factor at 60 to 80 percent.

Primary equipment for the generating facility will include:

- Two General Electric (GE) Frame 7FA combustion turbine generators (CTGs)
- One single condensing GE D11 steam turbine generator
- Two unfired heat recovery steam generators (HRSGs)
- One auxiliary boiler
- One air-cooled condenser (dry-cooled technology)
- One evaporative fluid cooler
- One diesel powered fire pump, and other associated equipment.

Power will be transmitted to the regional electrical grid through a 230-kV connection to PG&E's Contra Costa Substation, located 2.4-miles to the southwest of the OGS. The project will replace the existing 60-kV line, located within an existing 80-foot-wide PG&E easement, with a 230-kV line.

Construction laydown and parking areas will be located on a 20-acre parcel east of the plant site on DuPont property. Additionally, DuPont has requested the use of any excess soils resulting from initial leveling and grading of the site. Three stockpile locations, on DuPont properties to the north, have been identified by the applicant for future use by DuPont for potential build-out of the DuPont Oakley Specific Plan. The applicant intends to move these soils and create and stabilize these soil piles in accordance with applicable Best Management Practices (BMPs).

AIR QUALITY

The project design will incorporate the air pollution emission controls designed to meet Bay Area Air Quality Management District (BAAQMD) Best Available Control Technology (BACT) determinations. These controls will include Dry Low Nitrogen Oxides (DLN) combustors in the CTGs to limit nitrogen oxides (NO_x) production, selective catalytic reduction (SCR) with aqueous ammonia for additional NO_x reduction in the HRSGs, an oxidation catalyst to control carbon monoxide (CO) and precursor organic compounds (POC) emissions. Fuel to be used will be pipeline specification natural gas. The auxiliary boiler will be equipped with ultra low NO_x burners and Flue Gas Recirculation (FGR).

Particulate emissions will be controlled by the use of best combustion practices; the use of natural gas, which is low in sulfur, as the sole fuel for the CTGs; and high efficiency air inlet filtration. For each CTG, a separate Continuous Emission Monitoring System (CEMS) will sample, analyze, and record fuel gas flow rate, NO_x and CO concentration levels, and percentage of oxygen in the exhaust gas from the stacks. The CEMS sensors will transmit data to a data acquisition system (DAS) that will store the data and generate emission reports in accordance with permit requirements.

NATURAL GAS SUPPLY

The OGS will require construction of one or two off-site pipelines to supply natural gas to the project site. PG&E operates the Antioch Terminal, a major high-pressure natural gas transmission pipeline hub that borders the OGS site. PG&E proposes to serve the OGS facility from Line 303, which passes through the southwest corner of the OGS site as it enters the Antioch Terminal from the south. The tap to Line 303 will be located either in the southwest corner of the OGS site or in the Antioch Terminal. From this tap, natural gas will be delivered to the site via a new 300-foot-long, 6 to 10-inch-diameter pipeline. The pipeline will terminate in a PG&E gas metering yard located inside the OGS site, west of the plant switchyard. The project owner also may choose to include a secondary natural gas supply via a new 410-foot-long, 6 to 10-inch-diameter pipeline connecting to PG&E's Line 400, which passes through the OGS site and enters the northeast corner of the Antioch Terminal. These alternatives result in the shortest routes for connection, lie entirely within the OGS or Antioch Terminal sites, and will not require additional off-site rights-of-way or utility easements. **See Project Description Figure 4**

WATER SUPPLY

Potable and process water for the project will be provided by the Diablo Water District (DWD). The project will access this water through a tap from an existing 24-inch-diameter distribution pipeline that runs north-south through the OGS site. This water line previously served the former DuPont facility. Because the project proposes an air-cooled condenser (dry-cooled technology) for steam-process cooling, the project will use much less water than a conventional plant using a cooling tower and standard evaporative cooling. It should be noted that Ironhouse Sanitary District (ISD) has plans to install a treatment facility to produce tertiary-treated water at some time in the future and the project will be constructed to tap into that potential water source once it is available. Average annual water use would be approximately 240-acre-feet per year. Additional discussion regarding the potential for the project to use recycled water can be found in the **Soil & Water** section.

WASTEWATER

Wastewater from the OGS facility will be discharged into Ironhouse Sanitary District sewer facilities. The project will install a 0.44-mile force main in Bridgehead Road, along the project's western frontage, that will interconnect to an existing 18-inch gravity sewer line located in Main Street, approximately 600-feet east of the intersection of Bridgehead Road and Main Street. On an average annual basis, the total wastewater discharged from the OGS is estimated to be approximately 43 million gallons per year.

STORM WATER DISCHARGE

Storm water that falls within the process equipment container areas will be collected and discharged to the plant process drain system. Wastewater having the potential for contamination with oil or grease will be routed to the oil/water separator. Effluent from the oil/water separator will be combined with other process wastewater and sanitary wastewater and pumped via a wastewater lift station to the ISD sewer forcemain to be constructed in Bridgehead Road.

Storm water that falls outside the process equipment containment areas will either percolate directly into the soil or drain over the surface into a series of bio-swales that will provide treatment for the removal of suspended solids, oils, and grease that may have accumulated on paved surfaces. These bio-swales will direct treated storm water drainage into an existing wetland (Wetland E)¹ located at the northwest corner of the property. The OGS project storm water management system has been designed so that 1) the quality of storm water draining into the wetland is not negatively affected, and 2) the OGS will not adversely alter the flow of storm water into the wetland.

TRANSMISSION SYSTEM

The OGS will be connected with the regional electrical grid by a 2.4-mile-long, single circuit transmission line between the new OGS switchyard (located within the OGS site) and the 230-kV Contra Costa Substation. This 230-kV line will be placed within an existing 80-foot-wide PG&E 60-kV right-of-way that runs between the project site and the substation. The existing 60-kV line is currently supported by steel lattice towers to be replaced with steel-pole structures at appropriate intervals. **See Project Description Figure 5.**

PROJECT CONSTRUCTION AND OPERATION

When the project AFC was filed, anticipated construction of the generating facility, from site preparation and grading to commercial operation, was expected to take place from the first quarter of 2011 to fourth quarter of 2013 (33 months total). However, since the AFC processing has taken longer than anticipated, the applicant intends to begin construction as soon after AFC approval as possible.

CONSTRUCTION PHASE

There will be an average and peak workforce of approximately 303 and 729, respectively. Typically, noisy construction would be scheduled to occur between 6 a.m. and 7 p.m. Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities (e.g., pouring concrete at night during hot weather, working around time-critical shutdowns and

¹ Wetland E is located at the northwest corner of the project site and is an isolated 0.62-acre wetland located within a 1.60-acre conservation easement with no connection to navigable waters. This wetland was "created to offset impacts associated with the Lauritzen Yacht Harbor property" and was determined by the United States Army Corps of Engineers (USACE), on the basis of its lack of connectivity to other wetlands or waters, to be intrastate isolated waters...not currently regulated by USACE" (i.e. non-jurisdictional). Current hydrology is supported by direct precipitation as well as surface storm water runoff from an approximate 25-acre area located east and south of the wetland.

constraints). During some construction periods and during the startup phase of the project, some activities may continue 24 hours per day, 7 days per week.

The cost of materials and supplies required for the construction of OGS is estimated at approximately \$371.25 – \$412.5 million. The estimated value of materials and supplies that will be purchased locally during construction is estimated at \$3.7 – 4.1 million. OGS is estimated to provide approximately \$26.48 million in annual construction payroll.

OPERATION PHASE

The OGS will employ a staff of 22, including plant operation technicians, supervisors, administrative personnel, mechanics, engineers and others in three rotating shifts. The facility will be capable of operating 24 hours per day, 7 days per week with an anticipated annual operation payroll of \$3.5 million. It is anticipated that the entire permanent workforce will be from within Contra Costa County.

FACILITY CLOSURE

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

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

The planned life of the generation facility is 30 years. However, if the generation facility were still economically viable, it could be operated longer. It is also possible that the facility could become economically noncompetitive in less than 30 years, forcing early decommissioning. Whenever the facility is permanently closed, the closure procedure will follow a plan that may range from “mothballing” to the removal of all equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the CEC when more information is available and the timing for decommissioning is more imminent.

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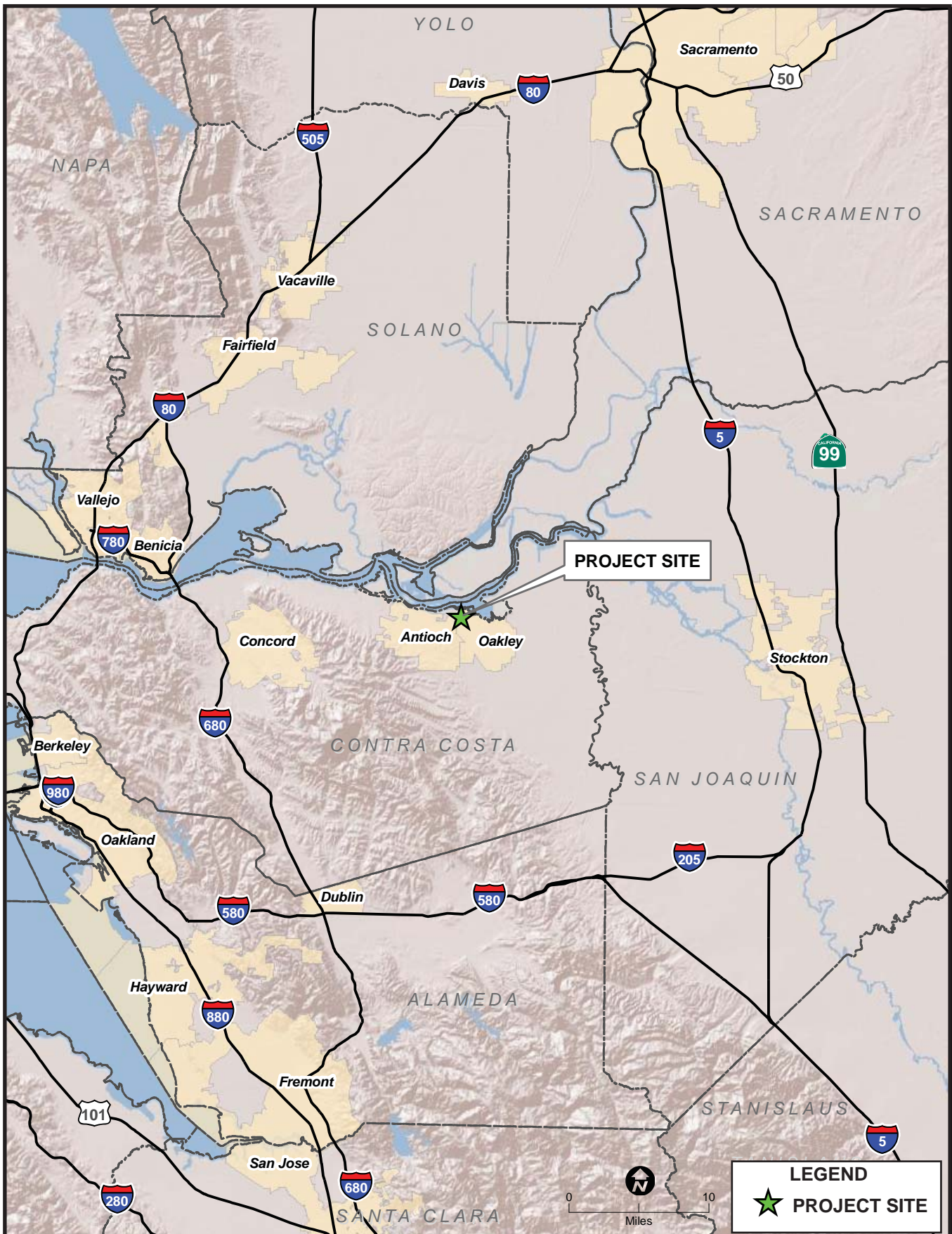
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PROJECT DESCRIPTION - FIGURE 1
Oakley Generating Station - Regional Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC Figure 1.1-1

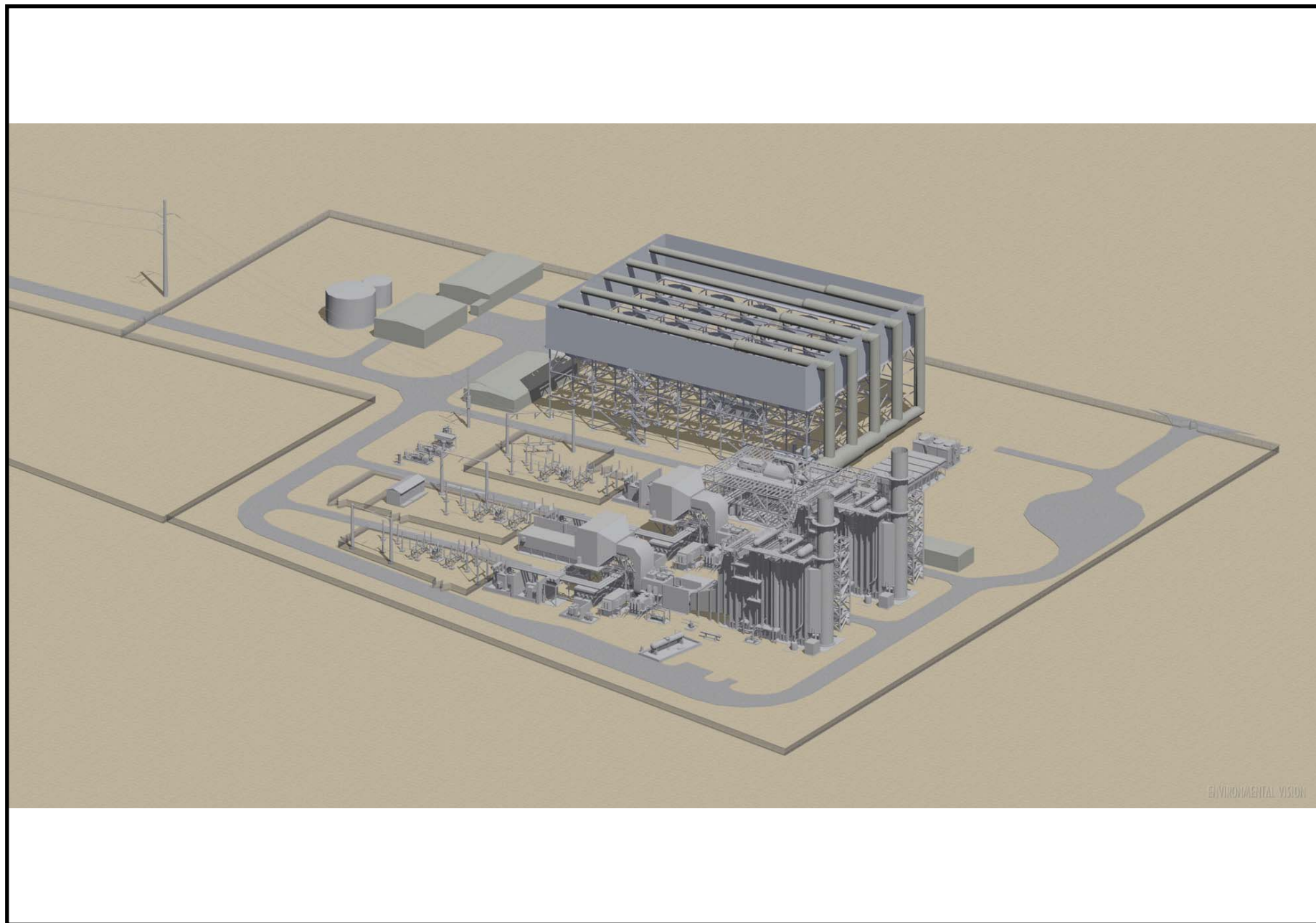
PROJECT DESCRIPTION - FIGURE 2
Oakley Generating Station - Vicinity Map



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

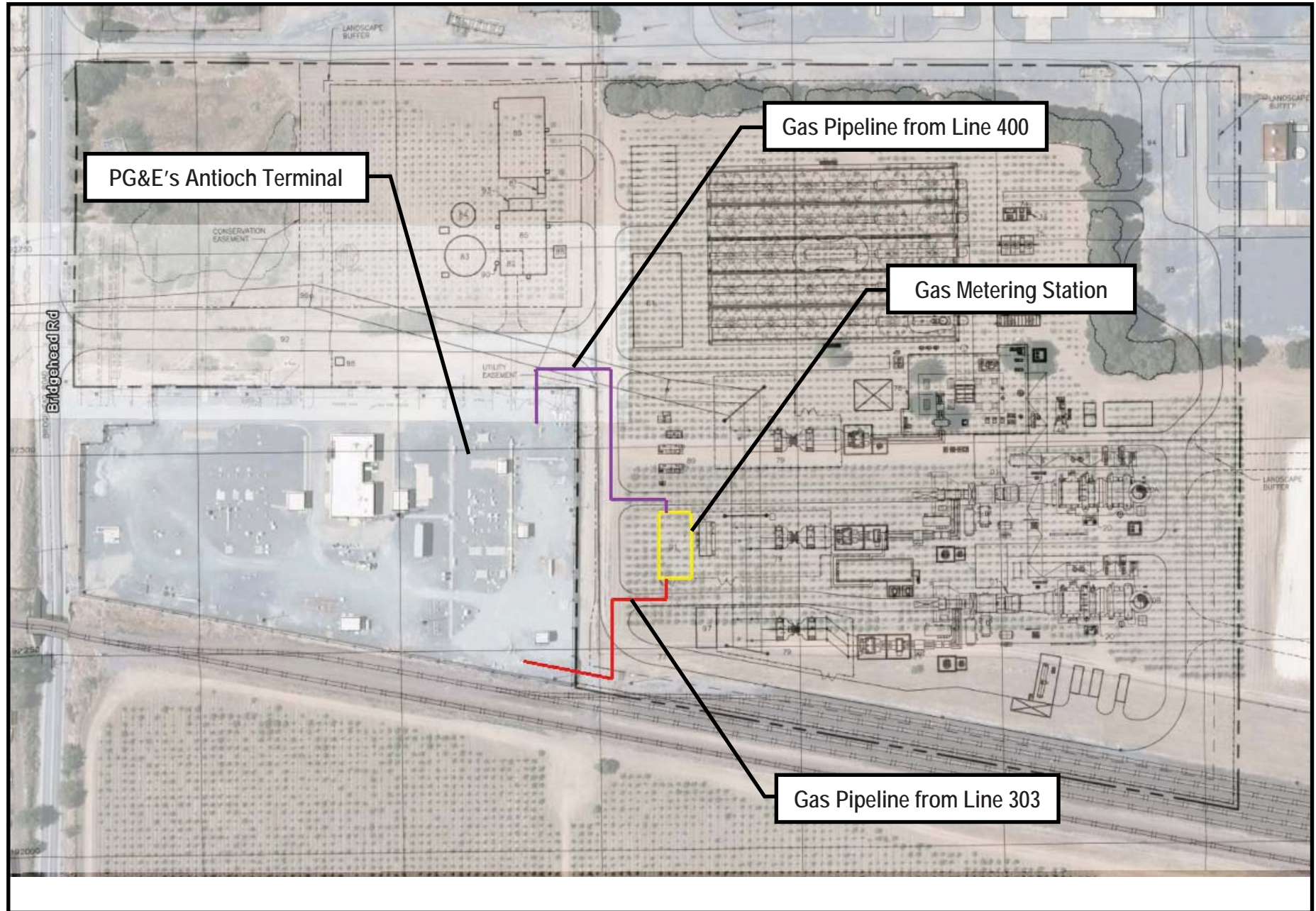
PROJECT DESCRIPTION

PROJECT DESCRIPTION - FIGURE 3
Oakley Generating Station - Architectural Rendering



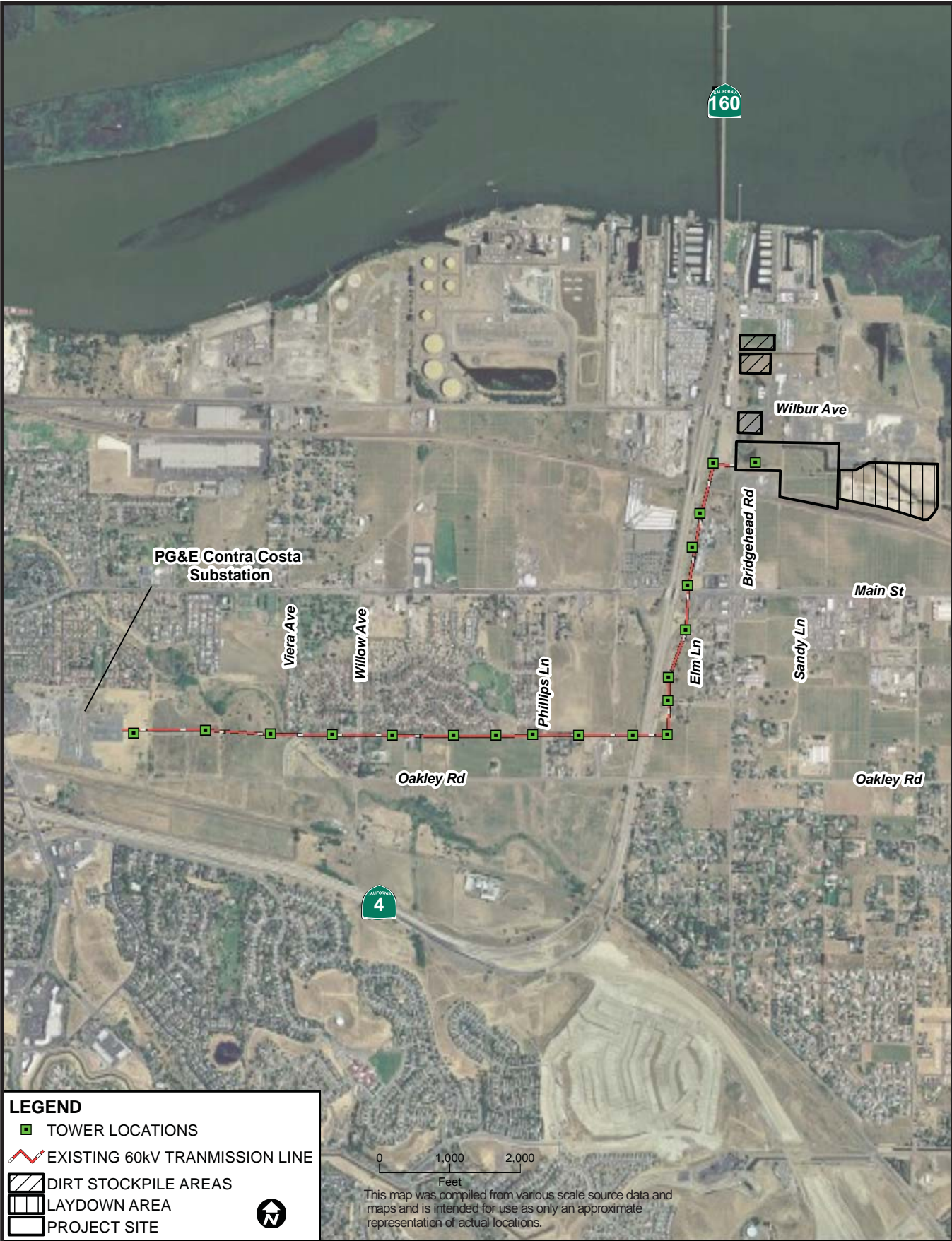
PROJECT DESCRIPTION

PROJECT DESCRIPTION - FIGURE 4
Oakley Generating Station - Natural Gas Pipeline Routes Map



PROJECT DESCRIPTION

PROJECT DESCRIPTION - FIGURE 5
Oakley Generating Station - Interconnection to Contra Costa Substation



ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Joseph Hughes and Brewster Birdsall, P.E., QEP

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification, the proposed Oakley Generating Station (OGS) would conform with all applicable federal, state and Bay Area Air Quality Management District (BAAQMD) air quality laws, ordinances, regulations and standards (LORS), and that the proposed OGS project would not result in significant air quality-related impacts. The OGS applicant identified the specific emissions reductions they would use to mitigate the proposed project's air quality impacts to ozone by ozone precursors, and OGS would enter into a separate mitigation program administered by the BAAQMD that would adequately mitigate particulate matter impacts.

In summary, staff identifies the necessary Conditions of Certification and concludes the following:

- The project would comply with all New Source Review and Best Available Control Technology (BACT) requirements.
- In conjunction with offsets required by BAAQMD, an additional emission reduction program administered by the BAAQMD or additional emission reduction credits would provide adequate 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 OGS would emit approximately 0.36 metric tonnes of carbon dioxide per megawatt hour (MTCO₂/MWh). At these levels, OGS would comply with the limits of SB 1368 (Perata, Chapter 598, Statutes of 2006) and the greenhouse gas Emission Performance Standard for base load power plants seeking contracts with California's utilities. Mandatory reporting of the GHG emissions would occur while the Air Resources Board implements greenhouse gas regulations and/or trading markets. The project may be subject to GHG reduction or trading requirements as the GHG regulations are 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 Oakley Generating Station (OGS) by Contra Costa Generating Station, LLC (applicant). The new OGS would be located in the City of Oakley, Contra Costa County, California, on a 21.95-acre parcel (the project site) that was part of a larger 210-acre parcel owned by E.I. DuPont de Nemours and Company (DuPont). The project site is on land that is zoned heavy industrial. The project would be located at 6000 Bridgehead Road near Wilbur Avenue.

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 (PM2.5). 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 OGS 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 OGS 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 OGS because it would be subject to federally-enforceable operating limitations to emit less than 100 tons per year of NO ₂ and CO (BAAQMD 2011a). The BAAQMD implements the PSD program for U.S. EPA within the San Francisco Bay Area.
CAA §171-193, 42 USC §7501 et seq., 40 CFR 51 Appendix S (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. Federal NSR applies to sources of designated nonattainment pollutants. This requirement is addressed through compliance with BAAQMD Regulation 2 Rule 1.
40 CFR 60, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Requires monitoring of the natural gas fuel source for the proposed auxiliary boiler.
40 CFR 60, Subpart IIII	New Source Performance Standard (NSPS) for Stationary Compression Ignition Internal Combustion Engines. Requires the diesel fire water pump engine to achieve U.S. EPA Tier 3 emission standards.
40 CFR 60, Subpart KKKK	New Source Performance Standard (NSPS) for Stationary Combustion Turbines. Requires each proposed combustion turbine to achieve 15 parts per million (ppm) NO _x or 0.43 pounds NO _x 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 NO _x and SO ₂ emissions for electrical generating units greater than 25 MW, implemented through the Title V Federal Operating Permit 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]

Applicable Law	Description
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.
Airborne Toxic Control Measure for Idling (ATCM, 13 CCR §2485)	ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling – Generally prohibits idling longer than five minutes for diesel-fueled commercial motor vehicles.
Airborne Toxic Control Measure for Stationary Compression Ignition Engines (ATCM, 17 CCR §93115.6)	ATCM for Stationary Compression Ignition (CI) Engines. Establishes operating requirements and emission standards for emergency standby diesel-fueled CI engines [17 CCR 93115.6]. The emission standard is 0.15 g/bhp-hr diesel particulate matter for emergency engines used fewer than 50 hours per year for maintenance and engine testing.
Local	Bay Area Air Quality Management District (BAAQMD)
BAAQMD Regulation 1 – General	Limits releases of air contaminants to not “cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public.” Prohibits contaminants that may endanger “the comfort, repose, health or safety of any such persons or the public, or cause injury or damage to business or property.”
BAAQMD Regulation 2, Rule 1 – Permits	General Requirements – Specifies requirements for issuance or denial of permits, exemptions, and appeals against BAAQMD decisions. An Authority to Construct (ATC) is required for any non-exempt source. Natural gas-fired heaters with a heat input rate of less than 10 million Btu per hour are exempt, and stationary internal combustion engines and gas-fired combustion turbines with an output rating of less than 50 horsepower (hp) are exempt.
BAAQMD Regulation 2, Rule 2	New Source Review – Requires preconstruction review including Best Available Control Technology (BACT) for sources with the potential to emit more than 10 pounds per day (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 project.

Applicable Law	Description
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 OGS. See Public Health .
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 9 ppm NO _x and 400 ppm CO, applicable to the auxiliary boiler.
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 where the proposed project would be located 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 the winter months, and stagnant winter conditions are characterized by periods of light winds and nighttime drainage flows that are a reversal of the usual sea breeze.

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 air 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).

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

- Ozone (O₃): aggravation of respiratory and cardiovascular diseases; impairment of cardiopulmonary function; and eye irritation. Ozone can also affect sensitive plant species by interfering with photosynthesis, and is therefore a threat to California agriculture and native vegetation.

- Particulate matter (PM₁₀ and PM_{2.5}): increased risk of chronic respiratory disease such as bronchitis, emphysema, and asthma; reduced lung function; increased cough and chest discomfort; and particulates may lodge in and/or irritate the lungs.
- Carbon monoxide (CO): impairment of oxygen transport in the bloodstream; aggravation of cardio-vascular disease; impairment of central nervous system function; fatigue, headache, confusion, dizziness; death at high levels of exposure; and aggravation of some heart diseases (angina).
- Nitrogen dioxide (NO₂): risk of acute and chronic respiratory disease.
- Sulfur dioxide (SO₂): aggravation of respiratory diseases (asthma, emphysema); reduced lung function; and irritation of eyes.

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

Current state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various ambient air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (mg or 10⁻³ g) or micrograms (µg or 10⁻⁶ g) of pollutant in a cubic meter (m³) 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)	0.075 ppm (196 µg/m ³) ^c
	24 Hour	0.04 ppm (105 µg/m ³)	None ^d

Source: ARB (<http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>), September 2010.

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

Notes:

a. On January 6, 2010, the U.S. EPA proposed revising the federal 8-hour ozone standard to a range of 0.06 to 0.07 ppm.

b. 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.

c. On June 2, 2010, the U.S. EPA established a new federal 1-hour SO₂ standard.

d. On August 23, 2010, the U.S. EPA revoked both the existing Federal 24-hour SO₂ standard of 0.14 ppm and the annual primary SO₂ standard of 0.030 ppm.

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 most other areas, including 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

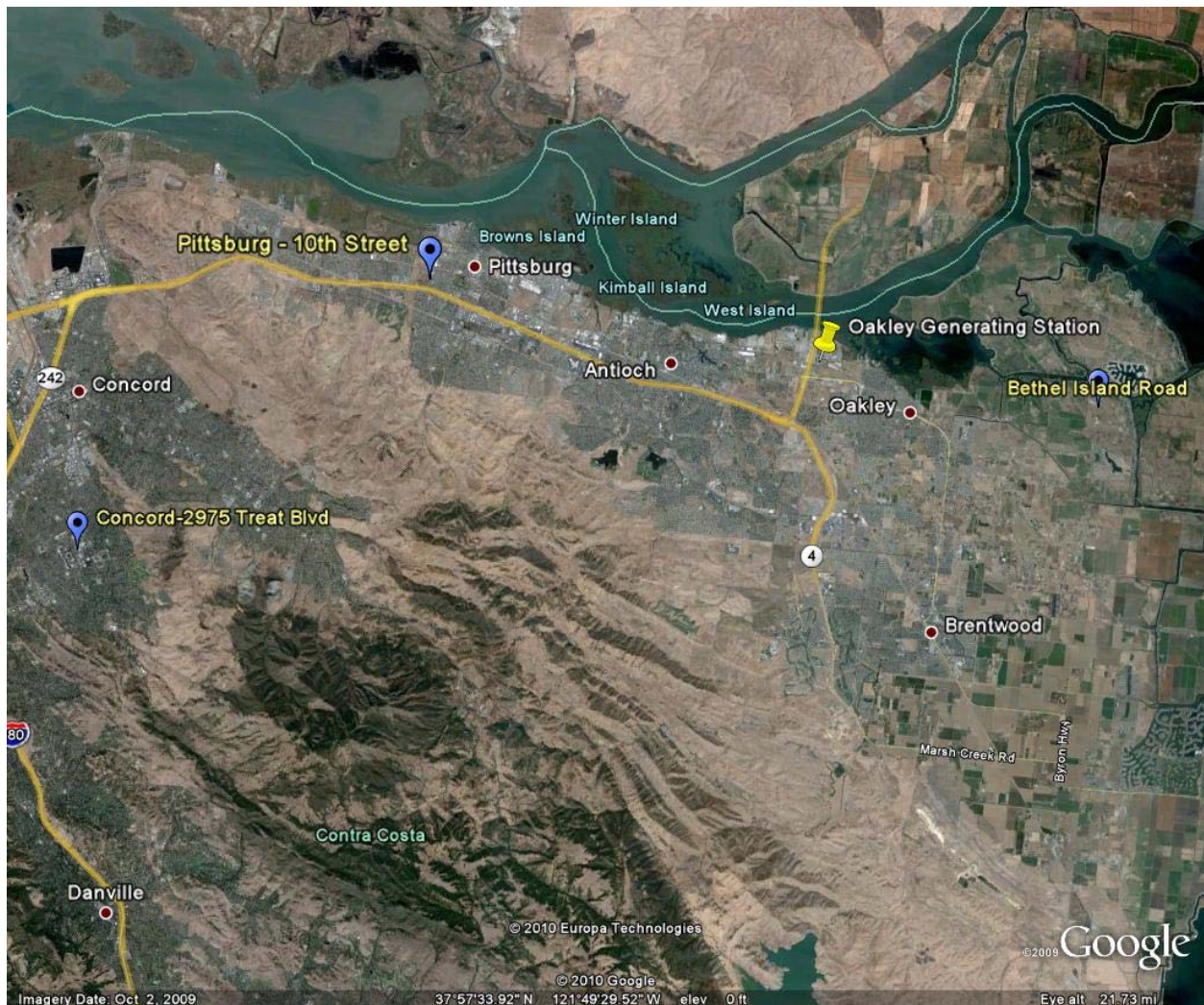
Source: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed July 2010.

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 OGS 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, NO₂, 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. **Air Quality Figure 1** gives a visual representation of the proximity of the selected monitoring stations. The Pittsburg-10th Street monitoring station is approximately 9 miles west of the OGS project site, the Concord-2975 Treat Blvd is approximately 16 miles southwest of the OGS project site, and the Bethel Island Road monitoring station is approximately 6 miles east of the OGS project site.

Air Quality Figure 1
Selected Air Quality Monitoring Stations



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 the three different monitoring stations near the project site. Note that each site consistently records maximum concentrations near or above ambient air quality standards.

Air Quality Table 4 -- OGS, 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
2009	0.109	2	0.095	3	6
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
2009	--	--	--	--	--
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
2009	0.106	2	0.088	2	5

Source: ARB, Air Quality Data Statistics (<http://www.arb.ca.gov/adam/welcome.html>), Accessed July 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 microscopic, solid precipitates. These solids are called secondary particulate matter since the contaminants are not directly emitted, but the particles are 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. Some of the highest concentrations of the past three years occurred during an episode on June 23 2008, a time of heavy wildfire activity in nearby Napa and Solano counties (the Wild Fire) and Lake County (the Walker Fire).

Air Quality Table 5 -- OGS, Background PM10 Air Quality Data ($\mu\text{g}/\text{m}^3$)

Location, Year	Maximum 24-hr PM10 Concentration ^a	Month of Maximum 24-hr Concentration	Days Above CAAQS ^a	Days Above NAAQS ^a	Annual Average PM10 Concentration ^a
Bethel Island Road					
2000	65.1	NOV	11.8	0.0	20.4
2001	91.9	JAN	25.1	0.0	23.6
2002	61.2	NOV	18.4	0.0	24.4
2003	51.3	OCT	6.1	0.0	19.4
2004	42.3	DEC	0.0	0.0	19.4
2005	63.5	OCT	5.7	0.0	18.4
2006	84.3	OCT	6.1	0.0	19.3
2007	49.4	NOV	0.0	0.0	18.7
2008	77.0	JUN	18.3	0.0	24.1
2009	39.1	JAN	--	0.0	--
Pittsburg-10th Street					
2000	55.5^b	NOV	--	0.0	16.3 ^b
2001	97.7^b	JAN	--	0.0	20.7^b
2002	76.7	NOV	18.0	0.0	24.5
2003	59.1	SEP	-	0.0	20.2^b
2004	64.0	APR	6.0	0.0	21.6
2005	57.0	FEB	6.0	0.0	20.0
2006	58.9	OCT	11.5	0.0	19.9
2007	59.0	JAN	24.2	0.0	19.3
2008	72.7	JUN	--	--	19.9 ^b
2009	--	--	--	--	--
Concord-2975 Treat Blvd					
2000	56.4	NOV	11.8	0.0	18.4
2001	111.5	JAN	18.0	0.0	21.4
2002	65.8	NOV	18.4	0.0	21.6
2003	34.0	DEC	0.0	0.0	16.4
2004	50.7	NOV	-	0.0	18.1 ^b
2005	42.2	NOV	0.0	0.0	16.4
2006	80.5	JUL	17.6	0.0	18.5
2007	52.4	JAN	12.0	0.0	16.7
2008	50.5	JUN	6.0	0.0	17.5
2009	32.5	DEC	0.0	0.0	14.7

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

Notes:

a. Concentrations shown in **Air Quality Table 5** are based upon federal reference methods. The number of days above the CAAQS ($50 \mu\text{g}/\text{m}^3$) is calculated by ARB. Because PM10 is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.

b. Where California measurements are not available the National measurements are shown.

Fine Particulate Matter (PM2.5)

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

PM2.5 is mainly a product of combustion and includes nitrates, sulfates, organic carbon (ultra-fine dust), and elemental carbon (ultra-fine soot). Almost all combustion-related particles, including those from wood smoke and cooking, are smaller than 2.5 microns. Nitrate and sulfate particles are formed through complex chemical reactions in the atmosphere. Particulate nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NO_x emissions from combustion sources. The nitrate ion concentrations during the winter make up a large portion of the total PM2.5. Ammonium sulfate is also a concern because of the ready availability of ammonia in the atmosphere.

Air Quality Table 6 summarizes the ambient PM2.5 data collected from the Concord monitoring station at 2975 Treat Blvd, the only PM2.5 monitoring station in Contra Costa County.

Air Quality Table 6
OGS, Background PM2.5 Air Quality Data (µg/m³)

Location, Year	Maximum 24-hr PM2.5 Concentration	Month of Maximum 24-hr PM2.5 Concentration	Days Above NAAQS	Annual Average PM2.5 Concentration
Concord-2975 Treat Blvd				
2000	52.6	DEC	15.1	11.0
2001	85.4	JAN	13.4	10.9
2002	76.7	NOV	27.3	12.9
2003	49.7	NOV	5.1	9.6
2004	73.7	DEC	-	-
2005	48.9	DEC	5.4	9.0
2006	62.1	DEC	5.5	9.3
2007	46.2	JAN	7.1	8.3
2008	60.3	JUN	7.0	9.3
2009	39.0	DEC	1.0	8.3

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

Note: Concentrations shown are based upon federal reference methods.

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

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
OGS, Background Concentrations of Criteria Pollutants in Attainment (ppm)

Location, Year	Maximum 1-hr CO Concentration	Maximum 8-hr CO Concentration	Maximum 1-hr NO ₂ Concentration	Annual Average NO ₂ Concentration	Maximum 1-hr SO ₂ Concentration	Maximum 24-hr SO ₂ Concentration
Bethel Island Road						
2000	9.3	1.53	0.043	0.010	0.018	0.008
2001	8.5	1.50	0.044	0.010	0.015	0.008
2002	8.5	1.30	0.043	0.010	0.029	0.010
2003	12.7	0.89	0.045	0.009	0.016	0.008
2004	6.3	0.91	0.034	0.008	0.024	0.006
2005	5.9	0.91	0.038	0.007	0.017	0.006
2006	5.7	1.04	0.044	0.008	0.017	0.007
2007	5.2	0.84	0.048	0.008	0.018	0.005
2008	5.6	1.11	0.041	0.007	0.012	0.004
2009	4.4	0.94	0.033	0.006	0.013	0.003
Pittsburg-10th Street						
2000	4.9	2.45	0.054	0.013	0.028	0.009
2001	5.2	2.44	0.062	0.014	0.015	0.012
2002	6.2	2.51	0.054	0.013	0.111	0.016
2003	7.2	1.66	0.061	0.012	0.028	0.007
2004	4.1	1.91	0.048	0.011	0.035	0.008
2005	3.3	1.73	0.058	0.011	0.03	0.010
2006	3.3	1.92	0.052	0.011	0.045	0.009
2007	2.8	1.50	0.051	0.010	0.047	0.008
2008	2.8	1.44	0.056	0.010	0.023	0.006
2009	--	--	--	--	--	--
Concord-2975 Treat Blvd						
2000	7.9	2.70	0.074	0.016	0.045	0.005
2001	15.4	2.67	0.065	0.015	0.049	0.005
2002	4.3	2.28	0.063	0.015	0.044	0.007
2003	6.9	1.99	0.062	0.013	0.03	0.003
2004	3.9	2.00	0.065	0.012	0.042	0.010
2005	3.3	1.51	0.055	0.012	0.016	0.008
2006	3.5	1.30	0.047	0.011	0.017	0.006
2007	3.1	1.41	0.049	0.011	0.012	0.005
2008	2.5	1.13	0.050	0.010	0.011	0.005
2009	2.2	1.09	0.040	0.009	0.007	0.003

Source: ARB, Air Quality Data Statistics (<http://www.arb.ca.gov/adam/welcome.html>), Accessed July 2010. EPA 2010. http://www.epa.gov/aqspubl1/annual_summary.html.

Note: Official data for the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations of NO₂ have not yet been released from ARB or EPA for comparison with the federal 1-hour NO₂ standard.

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, although the percentage can vary by the type of fuel and the configuration of the combustion equipment. Once emitted from a stack, 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 relatively 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 (188 µg/m³) 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). For the Pittsburg station, where local NO₂ concentrations tend to be highest, current 2007 to 2009 ARB data reflects an existing maximum 1-hour background concentration of 0.056 ppm (105.7 µg/m³) and a 98th percentile of the daily

highest hourly concentration of 0.044 ppm (83.0 $\mu\text{g}/\text{m}^3$).¹ 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).

¹ The 2007 to 2009 1-hour NO₂ federal design value is preliminarily provided by the California Air Resources Board. This may not reflect data that are complete or representative under U.S. EPA rules, nor do they reflect the higher concentrations that might be expected with the new near-roadway NO₂ monitoring requirements. As a result, the values are subject to change.

Air Quality Table 8
Staff-Recommended Background Concentrations ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Background	Limiting Standard	Percent of Standard
PM₁₀	24 hour	78.2	50	156
	Annual	23.6	20	118
PM_{2.5}	24 hour	60.3	35	172
	Annual	9.3	12	78
CO	1 hour	6,440	23,000	28
	8 hour	1,667	10,000	17
NO₂	1 hour	105.7	339	31
	1 hour Federal	83.0	188	44
	Annual	20.9	57	37
SO₂	1 hour	123.1	655	19
	1 hour Federal	122.8	196	63
	24 hour	21	105	20

Source: ARB 2010 and EPA 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. Federal 1-hour NO₂ value is preliminarily provided by the California Air Resources Board. Federal 1-hour SO₂ data represents the maximum concentrations monitored using federal methods, not adjusted for statistical basis of 2010 federal standard.

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The proposed OGS would include the following new stationary sources of emissions, capable of generating a net electrical capacity of 624 MW (OGS 2009a; CH2MHILL 2010d, Revised AFC Section 5.1):

- Two General Electric (GE) 7FA natural gas-fired combustion turbine generators (CTG) with dry low-NO_x (DLN) combustion and evaporative inlet air cooling with a nominal capacity of 213 MW and a heat input capacity of up to 2,150 MMBtu/hr for each gas turbine (higher heating value), in a combined cycle configuration; and
- Two non-fired Heat Recovery Steam Generators (HRSGs) capable of 643,000 lb/hr nominal steam production rating, coupled to a single GE D11 condensing steam turbine generator capable with a nominal rating of 218 MW.
- Auxiliary boiler rated at 50.6 MMBtu/hr, fired on pipeline quality natural gas and estimated steam production of 34,000 lb/hr.
- Three cell evaporative cooler for inlet air cooling with water circulation rate of 5,880 gallons/minute, expected total dissolved solids (TDS) of 1,500 parts per million (ppm), and mist eliminator efficiency of 0.003%.
- Fire water pump engine fueled on ultra low sulfur diesel, rated at 400 brake horsepower (bhp) and certified to achieve ARB Tier 3 emission standards.

The project is planning to operate as a base load power plant and is proposed to be permitted to operate up to approximately 8,463 hours per year (annual capacity factor of 97%), with an expected actual capacity factor at 60 to 80%.

The CTGs would each be equipped with evaporative coolers to decrease the temperature of the inlet air under warm weather circumstances. The chilled air would be drawn into the turbine combustion chamber to increase power output and efficiency. The proposed OGS 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 (OGS 2009a, AFC Section 2.0).

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 OGS is expected to take about 33 months (CH2MHILL 2010d, Revised AFC Section 5.1). Onsite construction activities include site preparation, foundation work, construction and installation of major structures, and, installation of major equipment. The main site is approximately 20 acres in size and is essentially flat. A laydown yard sized at 20 acres lies immediately adjacent to the main site. The total acreage for purposes of calculating on-site emissions will be approximately 20 acres. Offsite linear acreages will be approximately 5.27 acres. The site is currently part of the existing DuPont facility. As such, the site will require only minimum grading and leveling prior to construction of the power block and cooling tower cell additions. Site preparations include finish grading, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence (CH2MHILL 2010d, Appendix 5.1E).

Fugitive dust emissions would result from:

- Dust entrained during site preparation and finish grading/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 diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from diesel-powered welding machines, electric generators, air compressors, and water pumps;
- 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** and **10**.

Air Quality Table 9
OGS Construction, Maximum Daily Emissions (lbs/day)

	NOx	VOC	PM10	PM2.5	CO	SOx
Onsite Construction Emissions						
Construction Equipment Exhaust	164.80	24.80	9.50	9.40	83.80	0.20
Site Support Vehicle Emissions	1.20	1.19	0.11	0.11	11.58	0.002
Onsite Fugitive Dust Emissions	--	--	15.60	3.30	--	--
Paved Road Fugitive Dust	--	--	0.46	0.05	--	--
Subtotal of Onsite Emissions	166.00	25.99	25.67	12.86	95.38	0.20
Offsite Construction Emissions						
Delivery Vehicle Exhaust	7.52	0.43	0.29	0.28	2.10	0.011
Worker Travel Vehicle Exhaust	2.45	2.76	0.24	0.24	26.18	0.003
Rail Deliveries to Construction Site	6.76	0.31	0.20	0.20	1.29	0.16
Offsite Construction Fugitive Dust	--	--	0.90	0.19	--	--
Track Out Fugitive Dust	--	--	0.94	0.16	--	--
Subtotal of Offsite Emissions	16.73	3.5	2.57	1.07	29.57	0.174
Total Maximum Daily Emissions	182.73	29.49	28.24	13.93	124.95	0.374

Source: AFC Appendix 5.1E (CH2MHILL 2010d); Response to DR33 (CH2MHILL 2010a).

Air Quality Table 10
OGS Construction, Total 33-month Construction Period Emissions (tons)

	NOx	VOC	PM10	PM2.5	CO	SOx
Onsite Construction Emissions						
Construction Equipment Exhaust	38.60	5.80	2.23	2.21	19.60	0.000
Site Support Vehicle Emissions	0.44	0.43	0.04	0.04	4.20	0.001
Onsite Fugitive Dust Emissions	--	--	1.10	0.20	--	--
Paved Road Fugitive Dust	--	--	0.14	0.01	--	--
Subtotal of Onsite Emissions	39.04	6.23	3.51	2.46	23.8	0.001
Offsite Construction Emissions						
Delivery Vehicle Exhaust	2.73	0.15	0.10	0.10	0.76	0.004
Worker Travel Vehicle Exhaust	0.89	1.00	0.09	0.09	9.50	0.001
Rail Deliveries to Construction Site	0.68	0.03	0.02	0.02	0.13	0.02
Offsite Construction Fugitive Dust	--	--	0.27	0.06	--	--
Track Out Fugitive Dust	--	--	0.28	0.05	--	--
Subtotal of Offsite Emissions	4.3	1.18	0.76	0.32	10.39	0.007
Total Construction Period Emissions	43.34	7.41	4.27	2.78	34.19	0.008

Source: AFC Appendix 5.1E (CH2MHILL 2010d); Response to DR33 (CH2MHILL 2010a).

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 that about 415 hours of commissioning with emissions above normal operation limits for each CTG would be needed (CH2MHILL 2010d, Table 5.1-21 and Appendix 5.1A, Table 5.1A-5b) to accomplish the following 3 stages of commissioning activities:

- Stage 1 – combustion turbine first fire and combustion turbine full speed /no load testing. During this stage of commissioning the DLN and SCR/CO would not be operated. An estimated 72 hours per turbine would be required.
- Stage 2 – steam blow, combustion turbine tuning, and partial load testing. During this stage of commissioning the DLN would be in partial operation and the SCR/CO would not be operated. An estimated 218 hours per turbine would be required.
- Stage 3 – combustion turbine full load testing, combustion turbine tuning, and SCR tuning. During this stage the DLN and SCR/CO will be in partial operation. An estimated 72 hours per turbine would be required.

Air Quality Table 11 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 to normal operations (BAAQMD 2011a).

Air Quality Table 11
OGS, Maximum Initial Commissioning Emissions (hourly, daily, and total)

Source	NO _x	VOC	PM ₁₀ / PM _{2.5}	CO	SO _x
Each CTG Maximum Commissioning (lb/hr)	148.7	37.9	7.74	700	6.0
Each CTG Maximum Commissioning (lb/day)	2,380.8	1,320	--	13,303	--
Each CTG Total Commissioning (ton)	28.6	6.4	3.7	40.8	2.5

Source: CH2MHILL 2010d, Appendix 5.1A Table 5.1A-5b; FDOC (BAAQMD 2011a) with staff estimate for SO_x.

PROPOSED OPERATION EMISSION CONTROLS

NO_x Controls

Each combustion turbine would use dry low-NO_x (DLN) combustors to maintain low levels of NO_x formation while ensuring complete combustion of the fuel and a Selective Catalytic Reduction (SCR) system for post-combustion NO_x control. Exhaust from each turbine would enter the SCR system before being released into the atmosphere. SCR refers to a process that chemically reduces NO_x 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 NO_x 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 NO_x 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. The auxiliary boiler would be equipped with ultra low NO_x burners and flue gas recirculation (FGR) without SCR (CH2MHILL2010d).

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 NO_x, an oxidation catalyst does not require any additional chemicals.

PM₁₀/PM_{2.5} and SO_x Controls

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

Ammonia Emissions Resulting from NO_x Controls

Ammonia is injected into the flue gas stream as part of the SCR system that controls NO_x emissions. In the presence of the catalyst, the ammonia and NO_x react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NO_x; 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 (NH₃) emissions from each CTG emission control system to 5 ppmvd.

PROPOSED OPERATION EMISSIONS

Air Quality Table 12 through **Air Quality Table 15** summarize the maximum (worst-case) criteria pollutant emissions associated with the OGS project's normal and routine operation. Emissions for each CTG/HRSG are based upon:

- NO_x emissions controlled to 2.0 parts per million by volume, dry basis (ppmvd) corrected to 15% oxygen (1.5 ppmvd assumed for annual average), averaged over any 1-hour period except during startups and combustor tuning;
- 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 (1.0 ppmvd for annual average);

- PM10 emissions at 7.74 lb/hr based on exclusive use of pipeline-quality natural gas fuel with no provisions for an alternative or backup fuel (based on PM10 emission factor of 0.0036 lb/MMBtu; BAAQMD 2011a); and
- SOx emissions based on hourly or daily levels of fuel sulfur content of up to 1 gr/100 scf in the short-term (an emission factor of 0.00281 lb/MMBtu), and annually averaging 0.25 gr/100 scf.

Air Quality Table 12 lists the maximum hourly emissions from the proposed equipment. Emissions for NOx, CO, and VOC during startup and shutdown events would have higher emissions than during normal operation. Allowable emissions during startups are also shown. The FDOC is based on a cold startup taking no longer than 90 minutes and warm/hot startups taking no longer than 30 minutes (BAAQMD 2011a). Since PM10 and SOx emissions are proportional to fuel use, PM10 and SOx emissions rates would be lower during any partial-load operation.

Air Quality Table 12
OGS, Maximum Hourly Emissions (pounds per hour [lb/hr])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG (steady-state, full load)	15.52	2.71	7.74	9.45	6.0
Each CTG (cold startups)	99.9	67.7	7.74	362.4	6.0
Each CTG (warm/hot startups)	33.9	33.1	7.74	92.2	6.0
Each CTG Combustor Tuning Hour	96.0	67.0	7.74	360.0	6.0
Each CTG (shutdown)	46.8	18.4	7.74	144.7	6.0
Auxiliary Boiler (steady-state)	0.42	0.11	0.35	0.37	0.14
Auxiliary Boiler (startup/shutdown)	1.27	0.32	0.35	1.11	0.14
Auxiliary Boiler (commission/tuning)	2.55	0.63	0.35	2.22	0.14
Diesel Fire Water Pump Engine	2.311	0.122	0.105	0.592	0.004
Evaporative Inlet Air Cooler	--	--	0.132	--	--
Oil-Water Separator	--	0.024	--	--	--

Source: AFC (CH2MHILL 2010d, Appendix 5.1A); FDOC Table 1 through 5 (BAAQMD 2011a).

Air Quality Table 13 lists the worst-case emissions during any given day of operation of the proposed OGS. The District assumed a reasonable maximum operating scenario consists of one cold startup lasting 45 minutes and with the maximum permitted cold startup emissions; one shutdown lasting 30 minutes and with maximum permitted shutdown emissions; and the remaining 22.75 hours of the day in normal steady-state operation. For days on which combustor tuning occurs (limited to twice per year per turbine), 6 hours of the 22.75 steady-state operating hours were assumed to involve combustor tuning. The District based the proposed daily emissions limits on these assumptions as a reasonable scenario of maximum foreseeable daily emissions, but it is important to note that emissions from this equipment will be limited to these rates regardless of actual operating profile (BAAQMD 2011a).

Air Quality Table 13
OGS, Maximum Daily Emissions (pounds per day [lb/day])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG (without tuning)	488	146	186	715	144
Each CTGs (with tuning)	971	531	186	2,818	144
Auxiliary Boiler	9.8	2.8	8.5	9.8	3.4
Diesel Fire Pump Engine	55.5	2.9	2.5	14.2	0.1
Evaporative Inlet Air Cooler	--	--	3.2	--	--
Oil Water Separator	--	0.6	--	--	--

Source: AFC (CH2MHILL 2010d, Appendix 5.1A); FDOC Table 6 (BAAQMD 2011a).

Air Quality Table 14 lists maximum potential annual emissions from the proposed project, based on applicant and District calculations reviewed by staff. The annual operating emission rates are based on three worst case operating scenarios that provide maximum project impact for each criteria pollutant. The operating assumptions are provided in the notes for **Air Quality Table 14**. The project would be available for either base-load or load-following power, up to an allowable annual capacity factor of 97%, equivalent to 8,463 hours annually (BAAQMD 2011a).

Air Quality Table 14
OGS, Maximum Annual Emissions (tons per year [tpy])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Total Two CTGs Maximum Annual	98.626	29.274	63.715	98.000	12.524
Auxiliary Boiler	0.099	0.217	0.060	0.803	0.024
Diesel Fire Water Pump Engine	0.057	0.003	0.003	0.015	0.0001
Evaporative Inlet Air Cooler	--	--	0.099	--	--
Oil Water Separator	--	0.105	--	--	--
Total Maximum Annual Emissions	98.78	29.60	63.88	98.82	12.55

Source: AFC (CH2MHILL 2010d, Appendix 5.1A); FDOC Table 7 (BAAQMD 2011a).

Notes:

a. Annual NOx, PM, and SO₂ emissions are based on 8,463 hours per year of operation from the turbines (including 1 cold start, 51 hot starts, 52 shutdowns), 401 hours for the auxiliary boiler (including 52 startups and 52 shutdowns), 1,500 hours per year for the evaporative fluid cooler, and 49 hours per year of maintenance and testing for the fire pump diesel engine. Gas turbine annual NOx emissions are based on expected 1.5 ppmvd; annual SO₂ emissions are based on annual average grain loading (0.25 gr/100 scf) and 1.5 lb/hr emission rate.

b. Annual CO emissions are based on 5,390 hours per year of operation from the turbines (including 25 cold starts, 275 warm/hot starts, 300 shutdowns), 3,978 hours for the auxiliary boiler (including 300 startups and 300 shutdowns), 1,500 hours per year for the evaporative fluid cooler, and 49 hours per year of maintenance and testing for the fire pump diesel engine. Gas turbine annual CO emissions are based on expected 1.0 ppmvd.

c. Annual VOC emissions are based on 5,662 hours per year of operation from the turbines (including 1 cold start, 311 hot/warm starts, 312 shutdowns) and 3,717 hours for the auxiliary boiler (including 312 startups and 312 shutdowns), 1,500 hours per year for the evaporative fluid cooler, and 49 hours per year of maintenance and testing for the fire pump diesel engine.

Worker trips and material deliveries cause emissions of criteria pollutants from mobile sources operating offsite. These are shown in **Air Quality Table 15** based on 22 plant employees commuting daily and about 60 deliveries of ammonia and other materials per month (CH2MHILL 2010a).

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

Source	NOx	VOC	PM10	PM2.5	CO	SOx
Worker Commutes (Offsite)	0.05	0.05	0.01	0.01	0.49	< 0.01
Material Deliveries (Offsite)	0.14	0.03	<0.01	<0.01	0.35	<0.01
Total Annual Emissions (tpy)	0.19	0.08	0.01	0.01	0.84	<0.01

Source: Response to DR28, Attachment DR28-1 (CH2MHILL 2010a).

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 (NO_x, VOC, PM₁₀, PM_{2.5}, SO_x, 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, and 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 OGS, the surface meteorological data used as an input to the dispersion model included five years (2001-2002 and 2004-2006)² 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.

² Complete meteorological data were not available for 2003.

The applicant conducted the air dispersion modeling based on guidance presented in the Guideline on Air Quality Models (EPA, 2005) and the American Meteorological Society/Environmental Protection Agency Regulatory Model, known as AERMOD (version 09292). The U.S. EPA designates AERMOD as a “preferred” model for refined modeling in all types of terrain. For determining impacts during inversion breakup fumigation and shoreline fumigation conditions, the U.S. EPA SCREEN3 model was used. The original modeling protocol was submitted in April 2009, in advance of the AFC, and was subject to independent Energy Commission staff review (AFC Appendix 5.1C; OGS 2009a). However, the applicant’s original modeling was completed before the new federal short-term NO₂ standard was adopted, and because the form of the standard is different than most other pollutants, modeling requires additional post-processing of the NO₂ results, which the applicant provided later in the process (CH2MHILL2010d). The worst-case results are shown in this Final Staff Assessment.

The applicant version of the impact assessment for NO_x emissions is refined by using 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, using data from the Pittsburgh monitoring station. The staff version uses Plume Volume Molar Ratio Method (PVMRM) to arrive at similar results. 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.

The 1-hour NO₂ results are shown here in two forms. The state standard uses the maximum concentration for any one year. These results are not comparable to the new federal standard promulgated by U.S. EPA in 2010, after the June 2009 application filing date. The federal 1-hour NO₂ standard is expressed as a 3-year average of the 98th percentile value of the daily maximum 1-hour NO₂ concentrations. For comparison with the federal 1-hour standard, staff shows the results of the applicant’s analysis, which is based on the 5-year average concentration of 8th highest daily maximum concentrations (comparable to the 98th percentile of the daily maximum) including concurrent background 1-hour NO₂ concentrations (CH2MHILL2010d). Where the modeled 1-hour NO₂ concentration is paired with the concurrent hourly monitored background concentration, the NO₂ result is shown as “paired” in staff’s tables. For the paired computation, hourly concurrent background values are used, not those shown in **Air Quality Table 8**.

Project-related modeled concentrations for all other 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 OLM procedure in AERMOD.

Air Quality Table 16 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 16
OGS, Construction-Phase Maximum Impacts ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	122.0	78.2	200.2	50	400
	Annual	2.3	23.6	25.9	20	130
PM2.5	24 hour	25.8	60.3	86.1	35	246
	Annual	0.6	9.3	9.9	12	83
CO	1 hour	48	6,440	6,488	23,000	28
	8 hour	18	1,667	1,685	10,000	17
NO ₂ ^a	1 hour	89.9	105.7	195.6	188	58
	Annual	19.5	20.9	40.4	57	71
SO ₂	1 hour	0.11	123.1	123.2	655	19
	24 hour	0.02	21	21.0	105	20

Source: Appendix 5.1B Table 5.1B-5 (CH2MHILL 2010d), with independent staff assessment for PM10/PM2.5.

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 construction-phase PM10 and PM2.5 impacts include both dust and exhaust from combustion. For the 24-hour PM10 construction dust impacts, the maximum modeled project construction impacts would occur at the northeastern property boundary. The highest diesel exhaust combustion-related impact would be about 2 $\mu\text{g}/\text{m}^3$ (24-hour PM10/PM2.5) at the southwestern property boundary. Over a limited area, the construction-phase modeled impact would be greater than 50 $\mu\text{g}/\text{m}^3$ (in addition to the background concentration); this impact area is limited to approximately a 1/4 mile radius (1,320 feet) with the highest concentrations being north and east of the project site. For each pollutant, the concentrations would decrease rapidly with distance. The nearest residential receptors are located approximately 900 feet (275 meters) southwest of the site, 2,350 feet (720 meters) east of the site, and approximately 3,280 feet (1,000 meters) northeast of the project boundary (near Big Break Marina). In the vicinity of the nearest residential receptors located approximately 900 feet (275 meters) southwest of the site, the modeled construction impact for PM10 would be about 40% (20 $\mu\text{g}/\text{m}^3$) of the limiting standard (50 $\mu\text{g}/\text{m}^3$). In the vicinity of Big Break Marina and Big Break Road, the modeled construction impact for PM10 would be about 10% (5 $\mu\text{g}/\text{m}^3$) of the limiting standard (50 $\mu\text{g}/\text{m}^3$).

Staff believes that particulate matter emissions from construction would cause a significant impact because they will contribute to existing violations of PM10 and PM2.5 ambient air quality standards, and additionally that those emissions can and should be mitigated to a level of insignificance. Although not modeled, significant secondary impacts would also occur for PM10, PM2.5, 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 applicable NO₂ ambient air quality standards. 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. The federal NO₂ standard was not modeled for construction-related impacts because the standard is based upon a 3-year average, and construction would not persist more than three years.

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.

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 OGS project.

Operation Impacts and Mitigation

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

Routine Operation Impacts

A refined dispersion modeling analysis was performed by the applicant to identify off-site criteria pollutant impacts that would occur from routine operational emissions

throughout the life of the project. The worst case one-hour impacts reflect 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 with the highest background levels. Emissions rates are shown in **Air Quality Table 12** to **Air Quality Table 14**. The predicted maximum concentrations of criteria pollutants are summarized in **Air Quality Table 17**. PM10 and PM2.5 values are shown in **bold** because they exceed ambient air quality standards due to high background levels.

Air Quality Table 17
OGS, 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	4.2	78.2	82.4	50	165
	Annual	0.5	23.6	24.1	20	120
PM2.5	24 hour	4.2	60.3	64.5	35	184
	Annual	0.5	9.3	9.8	12	81
CO	1 hour	763.0	6,440	7,203.0	23,000	31
	8 hour	95.0	1,667	1,762.0	10,000	18
NO ₂ ^a	1 hr State	154.7	105.7	260.3	339	77
	1 hr Federal	--paired--	--paired--	136.9	188	73
	Annual	0.4	20.9	21.3	57	37
SO ₂	1 hr State	10.1	123.1	133.2	655	20
	1 hr Federal	10.1	122.8	132.9	196	68
	24 hour	2.00	21	23.0	105	22

Source: AFC Supplement Table 5.1-19 (CH2MHILL2010d).

Note: a. The maximum 1-hour NO₂ concentration is based on staff AERMOD PVMRM output, and the ambient ratio method (ARM) is applied for annual NO₂, using national default 0.75 ratio. NO₂ impacts do not show the effects of occasional emergency fire pump engine testing. For a 30-minute test of the fire pump engine, maximum impacts caused by the fire pump engine would be approximately: 86 $\mu\text{g}/\text{m}^3$ 1-hour NO₂ without background, at the OGS fence-line.

The maximum 24-hour PM10/PM2.5 impact due to OGS occurs about 1,600 feet (500 meters) southeast of the proposed combustion turbines, in the largely undeveloped and flat terrain north of Highway 4 and west of Big Break Road. Because of the high exhaust temperature and velocity, project impacts (in addition to the background concentration) would be about one-half the maximum level (or less than 2.2 $\mu\text{g}/\text{m}^3$) for the nearest residences at 900 feet (275 meters) southwest of the site and 2,350 feet (720 meters) east of the site. For all other nearby residences, including those approximately 3,280 feet (1,000 meters) northeast of the project boundary near Big Break Marina and those east of Big Break Road, the highest modeled impacts of PM10/PM2.5 would be less than 4% (2 $\mu\text{g}/\text{m}^3$) of the limiting standard (50 $\mu\text{g}/\text{m}^3$) and less than 3% of the background. The highest NO₂ impacts occur during startup of the two CTGs and are not substantially influenced by weekly 30-minute testing of the fire water pump engine because they tend to not impact the same downwind locations.

Staff believes that particulate matter emissions from routine operation would cause a significant impact because they will contribute to existing violations of PM10 and PM2.5 ambient air quality standards. Significant secondary impacts would also occur for PM10, PM2.5, and ozone because operational emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and VOC) would contribute to existing violations of these standards. The direct impacts of NO₂, in conjunction with worst-case background conditions, would not create a new violation of the NO₂ ambient air quality standards. 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, PM2.5, SOx, NOx, and VOC to reduce PM10, PM2.5, and ozone impacts.

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SOx, VOC, and ammonia are precursor pollutants that can contribute to the formation of secondary pollutants, including ozone, PM10, and PM2.5. Gas-to-particulate conversion in ambient air involves complex chemical and physical processes that depend on many factors, including local humidity, pollutant travel time, and the presence of other compounds. Currently, there are no agency-recommended models or procedures for estimating ozone or particulate nitrate or sulfate formation from a single project or source. However, because of the known relationships of NOx and VOC to ozone and of NOx, SOx, and ammonia emissions to secondary PM10 and PM2.5 formation, unmitigated emissions of these pollutants would likely contribute to higher ozone and PM10/PM2.5 levels in the region. Significant impacts of ozone and PM10/PM2.5 precursors would be mitigated with offsets that would be provided under a recommended condition of certification (**AQ-SC7** and **AQ-SC8**).

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 (FDOC, p. 31 and FDOC Appendix C, Response to III.2, BAAQMD 2011a). 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** and FDOC Appendix C, Response to III.3, BAAQMD 2011a). With sulfuric and nitric acid availability being a key component of particulate matter formation, minimizing and offsetting SOx and NOx emissions would avoid PM10/PM2.5 impacts and reduce secondary pollutant impacts to a less than significant level.

Ammonia emissions are not restricted by the Bay Area Air Quality Management District except for avoiding excessive health risks. Energy Commission staff recommends limiting ammonia slip emissions to the extent feasible to avoid unnecessary ammonia emissions, consistent with staff policy to reduce emissions of all nonattainment pollutant precursors to the lowest feasible levels. The feasibility of reducing ammonia slip depends on the power plant technology, the design of the NOx control system, the expected operating profile, and the cost-effectiveness. Generally, levels of 5 ppmvd can

be achieved by combined-cycle power plants, during steady operations with a sufficiently designed catalyst and ammonia injection system (ARB 1999). This level is considered by staff to be the achievable performance standard to avoid unnecessarily high levels of ammonia emissions, and it would be required by the Bay Area Air Quality Management District's determination of compliance (**AQ-15**, BAAQMD 2011a).

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 analyzed the air quality impacts 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 both CTGs simultaneously under any mode of routine operation using the SCREEN3 Model (version 96043) (CH2MHILL2010d). The maximum impacts under shoreline fumigation conditions would occur during startups at approximately 2.2 km from the project site, and the maximum impacts under inversion breakup fumigation conditions would occur more than 16 km away. These short-term fumigation impacts for NO₂ (which are not adjusted downward by the OLM) shown in **Air Quality Table 18** would be higher than the impacts under routine operation, but the fumigation impacts would not create any new violation of the limiting standard.

Air Quality Table 18
OGS, Maximum Impacts During Shoreline Fumigation (µg/m³)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
CO	1 hour	700	6,440	7,140	23,000	31
NO ₂	1 hour	195.3	105.7	301.0	339	89
SO ₂	1 hour	14.6	123.1	137.7	655	21

Source: AFC Supplement Table 5.1-23 and 5.1-24 (CH2MHILL2010d).

Commissioning-Phase Impacts

Commissioning impacts would occur over short-term periods within a window of 90 days allowed for completing the commissioning period (**AQ-7**, **AQ-25**, and **AQ-26**, BAAQMD

2011a). The commissioning emissions estimates are based on partial load operations before the emission control systems become operational, as shown in **Air Quality Table 11**. 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. Commissioning of OGS could involve simultaneous routine operation of one CTG while the second undergoes commissioning tests. Modeling results are based on the applicant's prediction that two CTGs would not undergo uncontrolled commissioning tests simultaneously (AFC Table 5.1B-4B, CH2MHILL 2010d). The CTGs would be limited so that they do not operate with uncontrolled emissions simultaneously during any phase of commissioning through a staff-recommended Condition of Certification (**AQ-SC10**).

Air Quality Table 19 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 19
OGS, Commissioning-Phase Maximum Impacts (µg/m³)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
CO	1 hour	1,136.0	6,440	7,576	23,000	33
	8 hour	477.0	1,667	2,144	10,000	21
NO ₂ ^a	1 hour	198.5	105.7	304.2	339	90

Source: AFC Supplement Table 5.1-19 (CH2MHILL2010d).

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 OGS 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, 86 kilometers (53 miles) away. Due to its distance from Class I areas being nearly 100 kilometers, and due to the potential emissions of the project being less than the PSD applicability thresholds, Energy Commission staff anticipates that the project's impacts to visibility in Class I areas would be insignificant.

Mitigation for Routine Operation

Applicant's Proposed Mitigation

The proposed OGS 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 OGS would include a dry low-NO_x burner system and two catalyst systems: the SCR 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 and inlet air cooler drift eliminators would be used to minimize particulate emissions.

Emission Offsets

In addition to emission control strategies included in the project design, OGS proposes to provide offsets in the form of emission reduction credits (ERCs). BAAQMD Rule 2-2-302 requires OGS to provide emission reduction credits to offset the new emissions of NO_x and VOC (also known as POC).

The original AFC describes the proposed strategy of providing emission reduction credits to offset operational emissions. The AFC and supplemental filings, however, do not demonstrate that OGS has sufficient holdings of ERCs to offset the proposed emission increases of NO_x, VOC, SO₂, and PM₁₀/PM_{2.5}.

Air Quality Table 20 summarizes the BAAQMD Rule 2-2-302 offset requirements for the OGS (including the mandatory NO_x offset ratio of 1.15-to-1); however, there are no offsets identified by OGS.

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

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Total Two CTGs Maximum Annual	98.626	29.274	63.715	98.000	12.524
Auxiliary Boiler	0.099	0.217	0.060	0.803	0.024
Diesel Fire Water Pump Engine	0.057	0.003	0.003	0.015	0.0001
Evaporative Inlet Air Cooler	--	--	0.099	--	--
Oil Water Separator	--	0.105	--	--	--
OGS Potential to Emit	98.78	29.60	63.88	98.82	12.55
Offset Requirements					
BAAQMD Offset Requirements	113.60 ^a	29.49 ^b	0 ^c	0 ^d	0 ^e
OGS Offset Holdings Certificate, Site of Reduction					
#1241 New United Motor Manufacturing, Inc., Fremont	---	20.79	---	---	---
#1242 New United Motor Manufacturing, Inc., Fremont	---	18.47	---	---	---
#1245, New United Motor Manufacturing, Inc., Fremont	---	103.84	---	---	---
Separate Mitigation Agreement with BAAQMD per AQ-SC8	0	0	63.88	0	12.55
OGS Mitigation Total	---	143.1	63.88.	0	12.55
Staff Recommended Mitigation for CEQA Only	98.78	29.60	63.88	---	12.55
Fully Offset?	Yes	Yes	Yes	---	Yes

Source: Independent staff assessment, FDOC Appendix C, Response to II.1 (BAAQMD 2011a).

Notes:

- a. BAAQMD offset requirements for NOx for OGS include an offset ratio of 1.15-to-1. In BAAQMD, VOC (POC) offsets may be used to offset emission increases of NOx.
- b. BAAQMD offset requirements for VOC (POC) for OGS are at a ratio of 1-to-1. The fire water pump engine and oil water separator are exempt from BAAQMD offset requirements, but it would be offset with staff recommended mitigation.
- c. Offsets are not required by BAAQMD for PM10 or PM2.5 since OGS 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 OGS would not be subject to PSD review for CO. This Staff Assessment demonstrates that OGS 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 OGS would not exceed 100 tons per year.

Emission Offsets for Ozone Impact

Air Quality Table 20 summarizes NOx and VOC offset requirements established by the BAAQMD. To satisfy the local air district offset requirements, OGS would need to surrender more than 143 tons per year of NOx and VOC combined offsets. Both NOx and VOC emissions are recognized precursors to the formation of ambient ozone, and NOx is also a recognized precursor to the formation of the nitrate fraction of fine particulate matter. OGS has option contracts to procure the ERCs identified in **Air Quality Table 20** (BAAQMD 2011a). This ensures that OGS would be able to achieve compliance with BAAQMD's NOx and VOC offset requirements and provide overall total ERCs of more than 143 tons per year for the proposed ozone precursor emissions. This level demonstrates adequate CEQA mitigation at an offset ratio of at least one-to-one. This would satisfy the CEQA mitigation requirements for ozone impacts as established by Energy Commission staff in recent fossil fuel-fired power plant cases, such as the Marsh Landing Generating Station (09-AFC-3).

Emission Offsets for Particulate Matter Impact

Air Quality Table 20 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. Purchasing and surrendering ERCs for PM₁₀ or SO₂ would be one optional approach for offsetting the impact, if OGS demonstrates control of sufficient PM₁₀ or SO₂ ERCs. OGS would need to surrender at least 76.4 tons per year of PM₁₀ and SO₂ combined ERCs. Aside from surrendering ERCs, certain emission-reduction programs may be funded by OGS to achieve reductions from non-traditional sources (i.e., routinely exempt or non-stationary sources).

OGS identifies a number of optional programs and the various cost-effectiveness data, including the Carl Moyer Program and wood-burning device retrofitting that could be used (GB 2010i). OGS has an agreement committing OGS financially to implementing a mix of programs for offsetting and abatement of particulate matter, with an emphasis of achieving reductions in and near the City of Oakley, up to a cost of \$2,500,000 (COO 2010c). Highly cost-effective programs, such as the Carl Moyer Program, can achieve reductions at a cost as low as \$19,200 per ton including administration fees (GB 2010i), although Carl Moyer Program focuses on NO_x rather than PM₁₀. The cost data for that program indicates that \$2,500,000 could be sufficient to provide about 130 tons per year of ozone or particulate matter precursor reductions (i.e., NO_x).

In the Preliminary Staff Assessment workshop on February 2, 2011, OGS indicated that it would be willing to enter into an agreement with the BAAQMD to administer a program of cost-effective emission reductions targeted to occur first in and near the City of Oakley. Staff requested language for this measure, and OGS provided it in its comments on the Preliminary Staff Assessment (GB 2011b). This Final Staff Assessment includes the measure with subsequent revisions by Energy Commission staff to ensure that enforceable emission reductions would occur at the targeted quantities and be verified by OGS with data from BAAQMD (**AQ-SC8**).

OGS proposes to retain the optional approach to procure and surrender ERCs, which could occur in conjunction with the separate emission reduction program targeted for Oakley. Particulate matter or precursor (PM₁₀ or SO₂) ERCs beyond the BAAQMD offset requirements could also be used to mitigate the particulate matter impacts. The AFC and public records available from the BAAQMD show the numerous PM₁₀ and SO₂ ERCs held by other entities in the BAAQMD, and OGS may eventually opt to acquire the necessary quantity of these.

Although OGS would satisfy the local air district requirements without surrendering any PM₁₀ or SO₂ offsets, the emission reduction program targeted for Oakley and the option to procure and surrender additional ERCs would be able to achieve reductions for PM₁₀/PM_{2.5} impacts to avoid a net increase of particulate matter and precursors. Providing overall total PM₁₀ and SO₂ ERCs for the proposed PM₁₀/PM_{2.5} plus SO_x emissions at an offset ratio of at least one-to-one would satisfy the CEQA mitigation requirements for particulate matter impacts.

Adequacy of Proposed Mitigation

Energy Commission staff have long held that emission reductions need to be provided for all nonattainment pollutants and their precursors at a minimum overall one-to-one ratio of annual operating emissions. For this project, the BAAQMD's offset requirements for ozone would meet or exceed that minimum offsetting goal, while an additional emission reduction program administered by the BAAQMD or additional emission reduction credits would mitigate particulate matter impacts (**Air Quality Table 20**). Staff's mitigation (**AQ-SC7** and **AQ-SC8**) ensures that all nonattainment pollutant and precursor emissions are offset by at least one-to-one.

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 precursors would be mitigated with a sufficient quantity of BAAQMD offsets and to ensure agency consultation if substitutions are made to the proposed emission reduction credits.

Condition of Certification **AQ-SC8** would require OGS to enter into a separate mitigation agreement with the BAAQMD to achieve adequate reductions of PM10/PM2.5 precursors. Local emission reduction projects would be identified by the BAAQMD administering a program of grants, through the Bay Area Clean Air Foundation, which was established by the BAAQMD Board of Directors in 2008. Energy Commission staff would be given a quarterly review of how the applicant's funding (up to \$2,500,000) is used for emission reduction projects. The diesel emission reduction projects and other cost-effective projects will most likely provide combined ozone and particulate matter precursor reductions (namely, NOx, SOx, along with diesel particulate matter). OGS would need to make a final demonstration of the quantity of all pollutants reduced and the schedule of the reductions prior to the first turbine fire.

Staff also proposes mitigation to ensure ongoing compliance during commissioning and routine operation through quarterly reports (**AQ-SC9**).

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 (NSR) 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. Thus, when a project has been determined to comply with NSR requirements, including obtaining required emissions offsets, the project is determined to also comply with the regional attainment plans, such as those for ozone and particulate matter.

Ozone

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

BAAQMD rules and regulations specify performance standards, offset requirements, and emission control requirements for all sources. The regulations also include

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

Particulate Matter

The BAAQMD is currently designated as an attainment area for the federal PM10 standard and was recently designated nonattainment for the federal PM2.5 standard. The California Clean Air Act does not require any local air district to provide a plan for attaining the state PM10 or PM2.5 standards, so there is no adopted implementation plan for particulate matter. The 2010 Clean Air Plan provides an outline of achieving reductions in particulate matter, but it is not a formal state implementation plan for meeting the federal Clean Air Act Requirements regarding PM2.5. 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 precursor emissions and concentrations. 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-SC8**) ensures that project PM10/PM2.5 and precursor impacts will be mitigated and consistent with the forecasted BAAQMD trends.

LOCALIZED CUMULATIVE IMPACTS

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

Reasonably foreseeable future projects in the area are those that are either currently under construction or in the process of being approved by a local air district or municipality. Projects that have not yet entered the approval process do not normally qualify as “foreseeable” since the detailed information needed to conduct this analysis is not available. Sources that are presently operational are included in the background

concentrations. Stationary source projects located up to six miles from the proposed project site usually need to be included in the analysis. Background conditions take into account the effects of non-stationary (mobile and area) sources.

The applicant, in conjunction with Energy Commission staff, 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 (CH2MHILL 2010w):

- Contra Costa Power Plant, Antioch – Existing natural gas fired boilers 9 and 10 stacks: Units 6 and 7.
- Gateway Generating Station, Antioch – Existing power plant with two natural gas-fired combustion turbines paired with heat recovery steam generators.
- Marsh Landing Generating Station, Antioch – Future simple-cycle power plant with four combustion turbines and fuel gas heaters, approved in 2010.
- Pittsburg Power Plant, Pittsburg – Existing natural gas-fired boilers 5, 6, and 7.
- Willow Pass Generating Station, Pittsburg – Proposed power plant with two natural gas-fired combined cycle combustion turbines and one natural gas-fired fuel gas heater. This power plant is under review for possible approval at the Energy Commission.
- Delta Energy Center, Pittsburg – Existing power plant with three combined cycle combustion turbines.
- Los Medanos Energy Center, Pittsburg – Existing power plant with two combined cycle combustion turbines.
- GWF Wilbur Avenue East Power Plant, Antioch – Existing combustion turbines.
- Silgan Containers Manufacturing Corporation, Antioch – Proposed thermal oxidizer modification.
- Ameresco Keller Canyon LLC, Bay Point – Proposed two landfill gas-fired internal combustion engines and one waste gas flare.
- United Spiral Pipe LLC Manufacturing Plant, Pittsburg – Proposed plant welding, cleaning, miscellaneous particulate matter.
- Freedom High School, Oakley – Proposed diesel generator set.
- Additional cumulative sources, non-major, not electric generating facilities identified by applicant (in Table 4 of CH2MHILL 2010w).

The maximum modeled cumulative impacts are presented below in **Air Quality Table 21**. The total impact is conservatively estimated by the maximum modeled impact plus existing maximum background pollutant levels.

Air Quality Table 21
OGS, 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	169.0	78.2	247.2	50	494
	Annual	15.6	23.6	39.2	20	196
PM2.5	24 hour	169.0	60.3	229.3	35	655
	Annual	15.6	9.3	24.9	12	208
CO	1 hour	777.0	6,440	7,217	23,000	31
	8 hour	105.0	1,667	1,772	10,000	18
NO ₂ ^a	1 hr State	170.2	105.7	275.9	339	81
	1 hr Federal	--paired--	--paired--	136.9	188	73
	Annual	3.9	20.9	24.8	57	43
SO ₂	1 hr State	10.8	123.1	133.9	655	20
	1 hr Federal	10.8	122.8	133.6	196	68
	24 hour	2.3	21	23.3	105	22

Source: Supplemental Response to DR23 (CH2MHILL 2010w).

Note: a. The maximum 1-hour NO₂ concentration is based on staff AERMOD PVMRM output, and the ambient ratio method (ARM) is applied for annual NO₂, using national default 0.75 ratio. NO₂ impacts do not show the effects of occasional emergency fire pump engine testing. For a 30-minute test of the fire pump engine, maximum impacts caused by the fire pump engine would be approximately: 86 $\mu\text{g}/\text{m}^3$ 1-hour NO₂, without background. The plume from the fire pump engine's exhaust tends to not impact the same locations as the main stack.

Compared with the impacts from the OGS project alone, maximum cumulative impacts caused by the sources in this assessment would be substantially higher for PM10 and PM2.5, and this is because of one cumulative source (BAAQMD Facility #09029), a concrete batch plant, south of Wilbur Avenue and west of Highway 160, about 400 meters west of OGS. The areas impacted by the batch plant are generally confined to the elevated highway, within a radius of 660 feet (200 meters). In the areas of modeled violation for 24-hour PM10/PM2.5, the OGS would contribute less than 1 $\mu\text{g}/\text{m}^3$, which would be less than the federal Significant Impact Level (SIL) for PM10 of 5 $\mu\text{g}/\text{m}^3$, which staff considers to be a suitable level for determining whether the contribution by OGS would be cumulatively considerable. With OGS's contribution to modeled concentrations being below 5 $\mu\text{g}/\text{m}^3$ in the area of modeled exceedance, the local contribution made by OGS would not be cumulatively considerable.

However, because they would contribute to existing violations of the PM10 and PM2.5 ambient air quality standards in the region, staff believes that particulate matter emissions from OGS would be cumulatively considerable. Secondary impacts would also be cumulatively considerable for PM10, PM2.5, 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, PM2.5, and ozone standards. To address the contribution caused by OGS to cumulative particulate matter and ozone impacts, staff-recommended mitigation would require offsets for 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 OGS was issued on October 29, 2010 (CH2MHILL 2010x), and Energy Commission staff provided public comments in a letter to the BAAQMD on December 1, 2010 (CEC 2010k), suggesting that the BAAQMD should identify which ERCs would be surrendered to offset ozone precursor emissions. The Final Determination of Compliance (FDOC) for OGS was issued on January 21, 2011 (BAAQMD 2011a). Compliance with all District Rules and Regulations was demonstrated to the BAAQMD's satisfaction in the FDOC, and the FDOC conditions are presented in the proposed Conditions of Certification of this Final Staff Assessment.

FEDERAL

40 CFR 51, Nonattainment New Source Review. The FDOC includes conditions that would implement the federal nonattainment New Source Review (NSR) permit for OGS. The FDOC shows how OGS has option contracts for ERCs that would enable OGS to comply with the federal NSR requirement to offset ozone precursor emissions (BAAQMD 2011a). Federal nonattainment NSR rules and regulations for PM_{2.5} are not yet in place at the local level. Because the applicable interim federal program applies to new sources of PM_{2.5} emitting greater than 100 tons per year, and OGS PM_{2.5} emissions would be less than 64 tons per year as shown in **Air Quality Table 14**, OGS is not subject to federal nonattainment NSR for PM_{2.5} (BAAQMD 2011a).

40 CFR 52.21, Prevention of Significant Deterioration (PSD). A PSD permit would not be required for the proposed OGS project because it would be neither a new major source nor a major modification to an existing major source. The PSD program would not apply as long as OGS is subject to federally-enforceable operating limitations, which are included in the BAAQMD's Determination of Compliance. The operating limitations and monitoring of NO₂ and CO emissions (Conditions **AQ-43** and **AQ-44**) avoid the applicability of PSD. Note, there is a separate discussion of applicability of PSD for GHG in **AIR QUALITY APPENDIX AIR-1**. To ensure that OGS promptly amends the Energy Commission license as necessary to incorporate any future changes triggered by BAAQMD or U.S. EPA action related to PSD, staff proposes Condition of Certification **AQ-SC6**.

40 CFR 60, NSPS, Subpart Dc. The auxiliary boiler would be fueled exclusively by natural gas, and therefore would not be subject to emission limits in this standard. However, fuel monitoring requirements apply, and these are reflected in the Condition of Certification **AQ-36**.

40 CFR 60, NSPS, Subpart IIII. The diesel emergency fire water pump engine would be required to meet U.S. EPA Tier 3 standards and the ARB ATCM for stationary compression ignition (17 CCR 93115), and the engine proposed by the applicant would meet these standards.

40 CFR 60, NSPS Subpart KKKK. The two CTGs proposed for OGS would be likely to comply with the applicable emission limits by achieving a NO_x emission rate of

2.0 ppmvd over any one-hour period except during startup, shutdown, and combustor tuning.

STATE

OGS has demonstrated that the project would comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury. Compliance with the FDOC (BAAQMD 2011a) and the Energy Commission staff's Conditions of Certification enable staff's affirmative finding.

LOCAL

The Final Determination of Compliance (BAAQMD 2011a) summarizes how the proposed OGS project would comply with BAAQMD requirements, and the FDOC lists those specific requirements. Staff raised the following concern during the BAAQMD public comment period.

BAAQMD Regulation 2-2-302. This rule requires OGS to surrender ERCs to offset ozone precursor emissions. Energy Commission staff commented that the BAAQMD should identify which ERCs would be surrendered to offset ozone precursor emissions (CEC 2010k). As part of the January 2011 FDOC, the BAAQMD illustrated that the OGS applicant has entered into option contracts for the purchase of specific credits that would be likely to comply with the federal NSR requirement to offset ozone precursor emissions (BAAQMD 2011a).

FACILITY CLOSURE

Eventually the OGS 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 any 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.

RESPONSES TO PUBLIC AND AGENCY COMMENTS

Staff received no comments on the Air Quality portion of the Preliminary Staff Assessment for OGS, except for one item from City of Antioch (COA 2011a). The neighboring city noted that the OGS project is within the BAAQMD. Staff notes this comment and reiterates that the BAAQMD Final Determination of Compliance, from January 2011, is reflected throughout this Final Staff Assessment.

CONCLUSIONS

- Construction impacts would contribute to violations of the ozone, PM₁₀, and PM_{2.5} 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.

- Because OGS has entered into option contracts for the purchase of sufficient emissions reductions to offset ozone precursor emissions, staff is able to conclude that operation of the project would be likely to comply with all applicable BAAQMD rules and regulations, including New Source Review and requirements to offset emission increases. The BAAQMD Final Determination of Compliance demonstrates that the project would comply with Best Available Control Technology (BACT) requirements.
- This Final Staff Assessment reflects the BAAQMD Final Determination of Compliance conditions, from January 2011.
- 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.
- 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. Staff recommends Condition of Certification **AQ-SC8** to ensure that a separate mitigation program administered by the BAAQMD or additional offsets beyond those required by the BAAQMD would provide reductions 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-SC10** to limit simultaneous uncontrolled commissioning on the two CTGs.
- Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in **AIR QUALITY APPENDIX AIR-1**. The OGS would emit approximately 0.36 metric tonnes of carbon dioxide per megawatt hour (MTCO₂/MWh). At these levels, the project would comply with the limits of SB 1368 (Perata, Chapter 598, Statutes of 2006) and the greenhouse gas Emission Performance Standard for base load power plants seeking contracts with California's utilities. The project would be subject to mandatory GHG reporting requirements and any GHG reduction or trading requirements developed by the U.S. EPA and 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 construction and operation 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 and for consultation with the Oakley City Engineer: 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 and for consultation with the Oakley City Engineer. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

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

- a. All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of **AQ-SC4**. The frequency of watering may be either reduced or eliminated during periods of precipitation.
- b. No vehicle shall exceed 15 miles per hour within the construction site.
- c. The construction site entrances shall be posted with visible speed limit signs.
- d. All construction equipment vehicle tires shall be inspected and washed as necessary to be free of dirt prior to entering paved roadways.
- e. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.
- f. All unpaved exits from the construction site shall be graveled or treated to

prevent track-out to public roadways.

- g. All construction vehicles shall enter the construction site through the treated entrance roadways unless an alternative route has been submitted to and approved by the CPM.
- h. Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.
- i. All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.
- j. At least the first 500 feet of any public roadway exiting from the construction site shall be swept as needed on days when construction activity occurs or on any other day when dirt or run-off from the construction site is visible on the public roadways.
- k. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered or treated with appropriate dust suppressant compounds.
- l. All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks to provide at least two feet of freeboard.
- m. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

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

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

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

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

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

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

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

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

Protection Agency to control the engine in question to Tier 2 equivalent emission levels and either a Tier 1 engine or the highest level of available control is being used; or

2. The construction equipment is intended to be on site for five days or less.
 3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not possible.
 4. Equipment owned by specialty subcontractors may be granted an exemption, for single equipment items on a case-by-case basis, if it can be demonstrated that extreme financial hardship would occur if the specialty subcontractor had to rent replacement equipment, or if it can be demonstrated that a specialized equipment item is not available by rental.
- c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and the AQCMM demonstrates that one of the following conditions exists:
1. The use of the control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.
 2. The control device is causing or is reasonably expected to cause significant engine damage.
 3. The control device is causing or is reasonably expected to cause a significant risk to workers or the public.
 4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.
- d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.
- e. All diesel heavy construction equipment shall not idle for more than five minutes, to the extent practical.
- f. Construction equipment will employ electric motors when feasible.

Verification: The project owner shall include in the MCR: (1) a summary of all actions taken to maintain compliance with this condition; (2) a list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that the equipment has been properly maintained; and (3) any

other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

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 emission reduction credits (ERCs) in the quantities of at least 98.78 tons per year (tpy) NO_x and 29.60 tpy VOC. 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 1241, 1242, and/or 1245, or a modified list, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit a modified list 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 mitigate 63.88 tons per year (tpy) of PM₁₀/PM_{2.5} and 12.55 tpy of SO_x emissions by using either or a combination of the following methods:

- a. The project owner may provide ERC's for either or both pollutants satisfying the requirements of the BAAQMD. Such ERC's shall be from emission reductions occurring within the BAAQMD air basin and shall be applied at a 1:1 offset ratio.

- b. The project owner may enter into an agreement with the Bay Area Clean Air Foundation for the project owner to contribute \$32,750 per tpy of project PM10/PM2.5 and SOx emissions to be mitigated, which includes a Bay Area Clean Air Foundation administration fee of 20 percent. The funds contributed by the project owner shall fund emission reduction projects based on the proximity of the emissions reduction project to the project site and the relative health benefit to the local community surrounding the project site by including the following project-specific conditions:
 1. Diesel emission reduction projects funded by the Bay Area Clean Air Foundation with the funds contributed by the project owner shall be weighted for evaluation, qualification, and selection, in accordance with the California Air Resources Board's Carl Moyer Program Guidelines. Other emission reduction projects with the cost-effectiveness of \$32,750 per tpy may be selected by the Bay Area Clean Air Foundation.
 2. Funding shall initially be made available to qualified projects located preferentially within the boundaries City of Oakley, City of Antioch, City of Brentwood, and City of Pittsburg. After twelve (12) months from the date on which the administration funding has been provided to the Bay Area Clean Air Foundation, the program shall expand to include qualified projects located in Contra Costa County and Alameda County, with priority given to those projects located within areas designated by the BAAQMD as "priority communities" in the Community Air Risk Evaluation (CARE) program.
 3. At all times, identified qualifying emission reduction projects located within the City of Oakley will be given the highest priority.

To implement item (b), the project owner shall provide initial funding for emission reduction projects and administrative fees to the Bay Area Clean Air Foundation in the amount of \$500,000 within 90 days after the issuance of the Authority to Construct (ATC). The project owner shall provide additional funding to the Bay Area Clean Air Foundation on a monthly basis as necessary to fund the qualifying emission reduction projects selected for that month. The project owner shall make a final demonstration of the quantity and schedule of all emission reductions sponsored by the funding at least 30 days prior to first turbine fire. The project owner may, at any time up to 30 days prior to first turbine fire, surrender ERC's as defined in item (a) above to fulfill a portion or all of this mitigation obligation.

Verification: The project owner shall submit to the CPM confirmation that the appropriate initial funding has been provided within 90 days after the issuance of the ATC. The project owner shall provide quarterly summaries of the emission reduction project selection information to the CPM for review until such time that all funds have been committed by the Bay Area Clean Air Foundation to qualifying projects. The project owner shall submit to the CPM confirmation that the appropriate funding has

been provided to the Bay Area Clean Air Foundation, and/or ERC's have been surrendered at least 30 days prior to turbine first fire.

AQ-SC9 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-SC10 The facility shall be operated such that simultaneous commissioning of the two combustion turbines without abatement of nitrogen oxide or carbon monoxide emissions by its SCR system and oxidation catalyst system will not occur. Operation of one combustion turbine during commissioning without abatement shall be limited to times when the second combustion turbine is either non-operational or in compliance with emission limits for routine operation.

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 OGS facility (BAAQMD 2011a). This Final Staff Assessment reflects the BAAQMD Final Determination of Compliance conditions, from January 2011. The BAAQMD conditions are grouped as follows:

- **AQ-1** through **AQ-9** apply during the commissioning period.
- **AQ-10** through **AQ-30** apply to the two CTGs with unfired HRSGs (S-1 and S-2) after the commissioning period has ended [Gas Turbine Generator #1 and #2, GE Frame 7FA, Natural Gas-Fired, 213 MW, 2,150 MMBtu/hr (HHV) maximum rated capacity with high-efficiency inlet air filter; abated by A-1 and A-3 Selective Catalytic Reduction System (SCR) and A-2 and A-4 Oxidation Catalyst].
- **AQ-31** through **AQ-38** apply to the auxiliary boiler (S-3) [Natural Gas-Fired, 50.6 MMBtu/hr (HHV) maximum rated capacity (abated by A-5 Oxidation Catalyst if required)].
- **AQ-39** through **AQ-42** apply to the diesel fire water pump engine (S-4) [Fire Pump Diesel Engine, Clarke JW6H-UFAD80, 400 hp, 2.78 MMBtu/hr maximum rated heat input].
- Facility-wide conditions are **AQ-43** to **AQ-50**.

GE 7FA Combined-Cycle Gas Turbines

Applicability:

Conditions of Certification **AQ-1** through **AQ-9** of this condition shall only apply during the commissioning period as defined below. Unless otherwise indicated, **AQ-10** through **AQ-30** of these conditions shall apply after the commissioning period has ended.

Conditions for the Commissioning Period for GE 7FA Gas Turbines (S-1 and S-2)

AQ-1 The owner/operator shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 and S-2 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-SC9**).

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 and S-2 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-SC9**).

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-2 and A-4 Oxidation Catalysts and A-1 and A-3 SCR Systems to minimize the emissions of carbon monoxide and nitrogen oxides from S-1 and S-2 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-SC9**).

AQ-4 The owner/operator shall submit a plan to the District Engineering Division and the CEC CPM at least four weeks prior to first firing of S-1 and S-2 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-NO_x combustors, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1 and S-2) without abatement or with partial abatement by their respective oxidation catalysts and/or SCR Systems. The owner/operator shall not fire any of the Gas Turbines (S-1

or S-2) 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 shall demonstrate compliance with **AQ-7**, **AQ-8**, and **AQ-9** 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 and S-2). 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 and S-2). 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 instruments shall operate at all times of operation of S-1 and S-2 including start-up, shutdown, upset, and malfunction, except as allowed by BAAQMD Regulation 1-522, BAAQMD Manual of Procedures, Volume V. If necessary to comply with this requirement, the owner/operator shall install dual-span monitors. The type, specifications, and location of these monitors shall be subject to District review and approval. (Basis: Regulation 2, Rule 2, Section 419)

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

AQ-7 The owner/operator shall not fire S-1 and S-2 Gas Turbine without abatement of nitrogen oxide emissions by the corresponding SCR System A-1 and A-3 and/or abatement of carbon monoxide emissions by the corresponding Oxidation Catalyst A-2 and A-4 for more than a combined total of 831 hours during

the commissioning period. Such operation of any Gas Turbine (S-1, S-2) 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 Division and Compliance and Enforcement Division and the unused balance of the 831 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-SC9**).

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, and S-2) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in **AQ-43**. (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-SC9**).

AQ-9 The owner/operator shall not operate the Gas Turbines (S-1 and S-2) 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). (Basis: BACT, Regulation 2, Rule 2, Section 409)

NO _x (as NO ₂)	2,380.8 pounds per calendar day	148.7 pounds per hour
CO	13,303 pounds per calendar day	700 pounds per hour

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

Conditions for the GE 7FA Combined-Cycle Gas Turbines (S-1 and S-2)

AQ-10 The owner/operator shall fire the Gas Turbines (S-1 and S-2) 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 and S-2 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 OGS. (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-SC9**).

AQ-11 The owner/operator shall not operate the units such that the heat input rate to each Gas Turbine (S-1 and S-2) exceeds 2,150 MMBtu (HHV) per hour. (Basis: BACT for NO_x)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

AQ-12 The owner/operator shall not operate the units such that the heat input rate to each Gas Turbine (S-1 and S-2) exceeds 51,600 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-SC9**).

AQ-13 The owner/operator shall not operate the units such that the combined cumulative heat input rate for the Gas Turbines (S-1 and S-2) exceeds 35,397,277 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-SC9**).

AQ-14 The owner/operator shall ensure that each Gas Turbine (S-1, S-2) is abated by the properly operated and properly maintained Selective Catalytic Reduction (SCR) System A-1 or A-3 and Oxidation Catalyst System A-2 or A-4 whenever fuel is combusted at those sources and the corresponding SCR catalyst bed (A-1 or A-3) 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-SC9**).

AQ-15 The owner/operator shall ensure that the Gas Turbines (S-1, S-2) comply with the following limits. The limits in this part 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 and P-2 (exhaust point for S-1 and S-2 Gas Turbine after abatement by A-1 and A-3 SCR System) shall not exceed 15.52 pounds per hour, averaged over any 1-hour period. (Basis: Cumulative Increase for NO_x)
- b) The nitrogen oxide emission concentration at each exhaust point P-1 and P-2 shall not exceed 2.0 ppmv, on a dry basis, corrected to 15% O₂, averaged over any 1-hour period. (Basis: BACT for NO_x)
- c) Carbon monoxide mass emissions at each exhaust point P-1 and P-2 shall not exceed 9.45 pounds per hour, averaged over any 1-hour period.

(Basis: Cumulative Increase for CO)

- d) The carbon monoxide emission concentration at each exhaust point P-1 and P-2 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 and P-2 shall not exceed 5 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-1 and A-3. The correlation between the gas turbine heat input rates, A-1 and A-3 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1 and P-2 shall be determined in accordance with **AQ-24** or a District approved alternative method. The APCO may require the installation on one exhaust point (P-1 or P-2 at the owner/operator's discretion) of a CEM designed to monitor ammonia concentrations if the APCO determines that a commercially available CEM has been proven to be accurate and reliable and that an adequate Quality Assurance/Quality Control protocol for the CEM has been established. The District or another agency must establish a District-approved Quality Assurance/Quality Control protocol prior to the ammonia CEM being a requirement of this part. The APCO shall use the first year of ammonia CEM data to establish the appropriate ammonia emission concentration limit and averaging time for compliance demonstration by CEM. After the APCO has established the ammonia limit, the ammonia CEM shall be used to demonstrate compliance for the gas turbine being monitored by CEM. The gas turbine with the ammonia CEM shall still be subject to the emission testing requirements in **AQ-24**. For the gas turbine with the ammonia CEM, calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate shall be submitted to the District for informational purposes only. (Basis: Regulation 2, Rule 5)
- f) Precursor organic compound (POC) mass emissions (as CH₄) at each exhaust point P-1 and P-2 shall not exceed 2.71 pounds per hour.

(Basis: Cumulative Increase for POC)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

AQ-16 The owner/operator shall ensure that the regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, and S-2) during a start-up or shutdown does not exceed the limits established below. (Basis: BACT Limit for Non-Steady-State Operation)

Pollutant	Hot/Warm Startup (lb/startup)	Maximum Emissions During an Hour Containing a Hot/Warm Startup (lb/hr)	Maximum Emissions Per Cold Startup (lb/startup)	Maximum Emissions During an Hour Containing a Cold Startup (lb/hr)	Maximum Emissions Per Shutdown (lb/shutdown)	Maximum Emissions During an Hour Containing a Shutdown (lb/hr)
NO _x (as NO ₂)	22.3	33.9	96.3	99.9	39.3	46.8
CO	85.2	92.2	360.2	362.4	140.2	144.7
POC (as CH ₄)	31.1	33.1	67.1	67.7	17.1	18.4

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

AQ-17 The owner/operator shall not perform combustor tuning on each Gas Turbine (S-1 or S-2) more than twice in any consecutive 12 month period. Each tuning event shall not exceed 8 hours. Combustor tuning shall only be performed on one gas turbine per day. The owner/operator shall notify the District Engineering Division and Compliance and Enforcement Division no later than 7 days prior to combustor tuning activity, except in exigent circumstances. If exigent circumstances arise, the owner/operator shall notify the District Engineering Division and Compliance and Enforcement Division in writing 24 hours prior to combustor tuning activity detailing the circumstances. The emissions during combustor tuning from each gas turbine shall not exceed the hourly limits established below, and shall not exceed hourly limits established by the District based on emissions data obtained during the first tuning event for each turbine. The owner/operator shall measure and record mass emissions of NO_x and CO using the continuous emission monitors during tuning.

The owner/operator shall measure POC emissions during the first tuning after the first turbine has been commissioned using a District-approved source test method. The owner/operator shall seek District approval of the test method in accordance with **AQ-29** below. The owner/operator shall submit the record of the NO_x, CO, and POC emissions during the first tuning event after the first turbine has been commissioned to the District within 60 days after the first tuning event. The District shall establish mass emissions limits for the future tuning events based on this test data and shall notify the owner/operator of these limits. (Basis: BACT, Offsets, Cumulative Increase)

Pollutant	Emissions Limit (lb/hr)
NO _x (as NO ₂)	96
CO	360
POC (as CH ₄)	67

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-SC9**).

AQ-18 The owner/operator shall not allow total emissions from each Gas Turbine (S-1 or S-2), including emissions generated during gas turbine start-ups, and shut-downs to exceed the following limits during any calendar day (except for days during which combustor tuning events occur, which are subject to **AQ-19** below):

- a) 488 pounds of NO_x (as NO₂) per day (Basis: Cumulative Increase)
- b) 715 pounds of CO per day (Basis: Cumulative Increase)
- c) 146 pounds of POC (as CH₄) 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-SC9**).

AQ-19 The owner/operator shall not allow total emissions from each Gas Turbine (S-1 or S-2), including emissions generated during gas turbine start-ups, shut-downs, and combustor tuning events to exceed the following limits during any calendar day on which a tuning event occurs:

- a) 971 pounds of NO_x (as NO₂) per day (Basis: Cumulative Increase)
- b) 2818 pounds of CO per day (Basis: Cumulative Increase)
- c) 531 pounds of POC (as CH₄) 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-SC9**).

AQ-20 The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions (per **AQ-23**) from the Gas Turbines (S-1, S-2) combined to exceed the following limits:

Formaldehyde	16,636.1 pounds per year
Benzene	462.9 pounds per year
Specified polycyclic aromatic hydrocarbons (PAHs)	4.54 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-23** and **AQ-27** shall confirm the toxic air contaminant emission rates or the project owner shall submit an updated health risk assessment.

AQ-21 The owner/operator shall demonstrate compliance with **AQ-11** through **AQ-13**, **AQ-15(a)** through **AQ-15(d)**, **AQ-16** (NO_x, and CO limits), **AQ-17** (NO_x, and CO limits), **AQ-18(a)**, **AQ-18(b)**, **AQ-19(a)**, **AQ-19(b)**, **AQ-43(a)** and **AQ-43(b)** by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up, combustor tuning, and shutdown periods). If necessary to comply with this requirement, the owner/operator shall install dual-span monitors. The owner/operator shall monitor for all of the following parameters and record each parameter at least every 15 minutes (excluding normal calibration periods):

- a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1 and S-2
- b) Oxygen (O₂) concentration, Nitrogen Oxides (NO_x) concentration, and carbon monoxide (CO) concentration at exhaust points P-1 and P-2
- c) Ammonia injection rate at A-1 and A-2 SCR Systems

The owner/operator shall use the parameters measured above and District approved calculation methods to calculate and record the following parameters for each gas turbine (S-1 and S-2):

- d) Corrected NO_x concentration and corrected CO concentration, averaged for each clock hour
- e) Corrected NO_x concentration and corrected CO concentration, averaged for each calendar day

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate and record the following parameters for each gas turbine (S-1 and S-2) and totaled for S-1 and S-2:

- f) For each rolling three hour period, the heat input rate in MMBtu (HHV) per hour
- g) For each calendar day, the average hourly heat input rate in MMBtu

(HHV) per hour and total daily heat input rate in MMBtu (HHV) per day

- h) For each consecutive twelve month period, the total heat input rate in MMBtu (HHV) per year
- i) For each clock hour, the NO_x mass emission rate (as NO₂) and CO mass emissions rate in pounds per hour
- j) For each calendar day, the NO_x mass emission rate (as NO₂) and CO mass emissions rate in pounds per day
- k) For each consecutive 12-month period, the monthly NO_x (as NO₂) and CO mass emissions rates in pounds per month and annual NO_x and CO mass emissions rates in pounds per year and tons per year

(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-22 To demonstrate compliance with **AQ-15(f)**, **AQ-18(c)**, **AQ-19(c)**, and **AQ-43(c)** the owner/operator shall calculate and record on a daily basis, the precursor organic compound (POC) mass emissions from each power train. The owner/operator shall use the actual heat input rates measured pursuant to **AQ-21**, 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-25** to calculate these emissions. The owner/operator shall present the calculated emissions in the following format:

- a) For each calendar day, POC mass emissions, summarized for each gas turbine and S-1 and S-2 combined
- b) For each consecutive 12-month period, the cumulative total POC mass emissions for each gas turbine and S-1 and S-2 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-23 To demonstrate compliance with **AQ-20**, 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 combined maximum annual heat input rate of 35,397,277 MMBtu/year for S-1 and S-2 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 or S-2 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-24 Within 90 days of the beginning of the start-up period (as defined in Regulation 2-1-210) of each of the OGS GE 7FA units or as otherwise approved by the APCO, the owner/operator shall conduct a District-approved source test on each corresponding exhaust point P-1 or P-2 to determine the corrected ammonia (NH₃) emission concentration to determine compliance with **AQ-15(e)**. The source test shall determine the correlation between the heat input rates of the gas turbine, A-1 or A-3 SCR System ammonia injection rate, and the corresponding NH₃ emission concentration at emission point P-1 or P-2. 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-15(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-25 Within 90 days of the beginning of the start-up period (as defined in Regulation 2-1-210) of each of the OGS GE 7FA units or as otherwise approved by the APCO and, at a minimum, on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1 and P-2 while each Gas Turbine is operating at maximum load to determine compliance with **AQ-15(a)**, **AQ-15(b)**, **AQ-15(c)**, **AQ-15(d)**, **AQ-15(f)**, and to establish the emissions factors to be used to demonstrate compliance with **AQ-42(d)** and **AQ-42(e)**; and while each Gas Turbine is operating at minimum load to determine compliance with **AQ-15(c)** and **AQ-15(d)**; and to verify the accuracy of the continuous emission monitors required in **AQ-21**. The owner/operator shall test for (as a minimum each year): 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 PM₁₀ emissions including condensable particulate matter. The owner/operator may conduct source tests of individual compounds listed in

this part separately. The owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. The owner/operator may perform up to four tests per year for PM₁₀ emissions including condensable particulate matter. (Basis: BACT, Offsets, Cumulative Increase)

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-26 Within 90 days of the beginning of the start-up period (as defined in Regulation 2-1-210) of each OGS GE 7FA units or as otherwise approved by the APCO, the owner/operator shall conduct District- and CEC-approved source tests for that Gas Turbine to determine compliance with the emission limitations specified in **AQ-16**. The source tests shall determine NO_x, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Thirty working days before the execution of the source tests, the owner/operator shall submit to the District and the CEC Compliance Program Manager (CPM) a detailed source test plan designed to satisfy the requirements of this Part. The District and the CEC CPM will notify the owner/operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The owner/operator shall incorporate the District and CEC CPM comments into the test plan. The owner/operator shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. The owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of the source testing date. (Basis: Regulation 2, Rule 2, Section 419)

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

AQ-27 Within 90 days of the beginning of the start-up period (as defined in Regulation 2-1-210) of the second of the OGS GE 7FA gas turbines or as otherwise approved by the APCO, 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 or P-2 while the Gas Turbine is operating at maximum allowable operating rates to demonstrate compliance with **AQ-20**. 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-23** for any of the compounds are less than 50% of the levels listed in **AQ-20**, then the owner/operator may discontinue future testing for that pollutant. (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-28 Within 90 days of the beginning of the start-up period (as defined in Regulation 2-1-210) of each of the OGS GE 7FA gas turbines or as otherwise approved by the APCO and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on one of the two exhaust points P-1 or P-2 while the gas turbine is operating at maximum heat input rate to demonstrate compliance with the total sulfuric acid mist emission rate for S-1 and S-2 of 6.3 tons per year. The owner/operator shall test for (as a minimum) SO₂, SO₃, and H₂SO₄, and the sulfur content of the fuel. 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-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 The owner/operator shall ensure that the stack height of emission points P-1 and P-2 is each at least 155.5 feet above grade level at the stack base. (Basis: Regulation 2, Rule 5)

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

Auxiliary Boiler (S-3)

AQ-31 The owner/operator shall submit manufacturer's specifications and emissions guarantees for NO_x and CO for the Auxiliary Boiler (S-3) to the District Engi-

neering Division and the CEC CPM at least four weeks prior to first firing of Auxiliary Boiler (S-3). (Basis: Regulation 2, Rule 2, Section 419)

Verification: At least thirty (30) days prior to the installation of the Auxiliary Boiler, the project owner shall provide the District and the CPM the specifications for the boiler.

AQ-32 If Oxidation Catalyst (A-5) is required, the owner/operator shall install, adjust, and operate the A-5 Oxidation Catalyst at the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, to minimize the emissions of carbon monoxide from S-3 Auxiliary Boiler. (Basis: Regulation 2, Rule 2, Section 419)

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

AQ-33 The heat input rate to the Auxiliary Boiler (S-3) shall not exceed 50.6 MMBtu per hour, averaged over any rolling 3-hour period. (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-SC9**).

AQ-34 The heat input rate to the Auxiliary Boiler (S-3) shall not exceed 218,606 MMBtu 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-SC9**).

AQ-35 The owner/operator of the Auxiliary Boiler (S-3) shall meet all of the requirements listed in below.

- a) Nitrogen oxide emissions at P-3 (the exhaust point for the Auxiliary Boiler) shall not exceed 9.8 pounds per day, calculated as NO₂. (Basis: Regulation 2-1-403)
- b) Carbon monoxide emissions at P-3 shall not exceed 9.8 pounds per day. (Basis: Regulation 2-1-403)
- c) POC emissions (as CH₄) at P-3 shall not exceed 2.8 pounds per day.

(Basis: Regulation 2-1-403)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

AQ-36 The owner/operator shall demonstrate compliance with **AQ-35(a)**, **AQ-35(b)** and **AQ-43(a)** and **AQ-43(b)** by using properly operated and maintained continuous monitors (during all hours of operation including auxiliary boiler start-up, tuning, and shutdown periods). The owner/operator shall monitor for all of

the following parameters and record each parameter at least every 15 minutes (excluding normal calibration periods):

- a) Firing Hours and Fuel Flow Rates
- b) Oxygen (O₂) concentration, Nitrogen Oxides (NO_x) concentration, and carbon monoxide (CO) concentration at exhaust point P-3

The owner/operator shall use the parameters measured above and District approved calculation methods to calculate and record the following parameters for the Auxiliary Boiler (S-3):

- c) Corrected NO_x concentration and corrected CO concentration, averaged for each clock hour
- d) Corrected NO_x concentration and corrected CO concentration, averaged for each calendar day

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate and record the following parameters for Auxiliary Boiler (S-3):

- e) For each rolling three hour period, the heat input rate in MMBtu (HHV) per hour
- f) For each calendar day, the average hourly heat input rate in MMBtu (HHV) per hour and total daily heat input rate in MMBtu (HHV) per day
- g) For each consecutive twelve month period, the total heat input rate in MMBtu (HHV) per year
- h) For each clock hour, the NO_x mass emission rate (as NO₂) and CO mass emissions rate in pounds per hour
- i) For each calendar day, the NO_x mass emission rate (as NO₂) and CO mass emissions rate in pounds per day
- j) For each consecutive 12-month period, the monthly NO_x (as NO₂) and CO mass emissions rates in pounds per month and annual NO_x (as NO₂) and CO mass emissions rates in pounds per year and tons per year

(Basis: 1-520.1, 9-7-307, BACT, 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 monitoring and recordkeeping system is properly installed and operational.

AQ-37 To demonstrate compliance with **AQ-35(c)** the owner/operator shall calculate and record on a daily basis, the precursor organic compound (POC) mass emissions from the auxiliary boiler. The owner/operator shall use the actual heat input rates measured pursuant to **AQ-36**, and CEC and District-approved emission factors developed pursuant to source testing under **AQ-38** to cal-

culate these emissions. The owner/operator shall present the calculated emissions in the following format:

- a) For each calendar day, POC mass emissions, summarized for S-3
- b) For each consecutive 12-month period, the cumulative total POC mass emissions for S-3.

(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-38 Within 90 days of start-up of Auxiliary Boiler (S-3), the owner/operator shall conduct a District-approved source test on exhaust point P-3 while the auxiliary boiler is operating at maximum load to determine emission factors for POC, PM₁₀ and SO_x. 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 PM₁₀ emissions including condensable particulate matter. 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 for approval, the source test plan to the District and CPM, thirty (30) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within sixty (60) days of the source testing date.

Conditions for the Fire Pump Diesel Engine (S-4)

AQ-39 The owner/operator shall fire the Fire Pump Diesel Engine (S-4) exclusively on diesel fuel having a sulfur content no greater than 0.0015% by weight. (Regulation 2, Rule 5, Cumulative Increase, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.5(a))

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

AQ-40 The owner/operator shall operate the Fire Pump Diesel Engine (S-4) for no more than 49 hours per year for the purpose of reliability testing and non-emergency operation. (Regulation 2, Rule 5, Cumulative Increase, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.6(a)(4)(A))

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

AQ-41 The owner/operator shall operate the Fire Pump Diesel Engine (S-4) only when a non-resettable totalizing hour meter (with a minimum display capability of 9,999 hours) is installed, operated and properly maintained. (Basis: BAAQMD Regulation 9-8-530, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(e)(1))

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Energy Commission. The project owner shall include a photograph of each totalizing meter in the quarterly operation report (**AQ-SC9**).

AQ-42 The owner/operator shall maintain the following monthly records for Fire Pump Engine (S-4) in a District-approved log for at least 5 years.

- a. Hours of operation for reliability-related activities (maintenance and testing).
- b. Hours of operation for emission testing to show compliance with emission limits.
- c. Hours of operation for emergency use.
- d. For each emergency, the nature of the emergency condition.
- e. Fuel usage.

Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request. (Basis: BAAQMD Regulation 9-8-530, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(g))

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

Conditions for the Combined-Cycle Gas Turbines (S-1 and S-2), Auxiliary Boiler (S-3), and Fire Pump Engine (S-4)

AQ-43 The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1 and S-2), including emissions generated during gas turbine start-ups, combustor tuning, shutdowns, and malfunctions, the auxiliary boiler (S-3), including emissions generated during auxiliary boiler start-ups, tune-ups, shutdowns, and malfunctions, and the fire pump diesel engine (S-4), including

non-emergency and emergency operation, to exceed the following limits during any consecutive twelve-month period:

- a) 98.78 tons of NO_x (as NO₂) (Basis: Offsets)
- b) 98.82 tons of CO (Basis: Cumulative Increase)
- c) 29.49 tons of POC (as CH₄) (Basis: Offsets)
- d) 63.78 tons of PM₁₀ (Basis: Cumulative Increase)
- e) 12.55 tons of SO₂ (Basis: Cumulative Increase)

Compliance with the limits in this part shall be determined using the following procedures:

Emissions of PM₁₀ and SO₂ from each gas turbine shall be calculated by multiplying turbine fuel usage times an emission factor determined by source testing of the turbine conducted in accordance with **AQ-25**. The emission factor for each turbine shall be based on the average of the emissions rates observed during the 4 most recent source tests on that turbine (or, prior to the completion of 4 source tests on a turbine, on the average of the emission rates observed during all source tests on the turbine).

Emissions of PM₁₀, SO₂, and POC from the auxiliary boiler shall be calculated by multiplying auxiliary boiler fuel usage times an emission factor determined by source testing of the auxiliary boiler conducted in accordance with **AQ-38**.

The owner/operator shall calculate emissions from the fire pump diesel engine from the hours of operation recorded in **AQ-42** and the following emission factors:

NO_x: 2.62 g/hp-hr

CO: 0.67 g/hp-hr

POC: 0.14 g/hp-hr

PM: 0.119 g/hp-hr

SO_x: 0.004 g/hp-hr

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC9**).

AQ-44 To demonstrate compliance with **AQ-43**, the owner/operator shall record the total emissions for each consecutive 12-month period. The owner/operator shall calculate emissions of each pollutant listed in **AQ-43(a)** through (e) from the gas turbines, auxiliary boiler, and fire pump diesel engine for each calendar month using the calculation procedures established in **AQ-43**, and shall calculate annual emissions to determine compliance with the limits listed in **AQ-43(a)** through (e) by summing the monthly totals for the previous 12 months. (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 to verify the calculation and recordkeeping system is properly installed and operational.

AQ-45 The owner/operator 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 Compliance and 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-SC9**), are prepared and submitted in compliance with this condition.

AQ-46 The owner/operator shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District and the CEC CPM staff upon request. (Basis: Regulation 2, Rule 1, Section 403, Regulation 2, Rule 6, Section 501)

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

AQ-47 The owner/operator 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 Compliance and 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-SC9**).

AQ-48 The owner/operator 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). (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-49 Within 180 days of the issuance of the Authority to Construct for the OGS, 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-24** through **AQ-28**, and **AQ-38**. 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-50 The owner/operator shall ensure that the OGS 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-SC9**).

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 midnight 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 hours
MMBtu:	million British thermal units
Gas Turbine Cold Start-up	A gas turbine startup that occurs more than 48 hours after a gas turbine shutdown, and is limited in time to the lesser of (i) the first 90 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or (ii) the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves the first of two consecutive CEM data points in compliance with the emission concentration limits of AQ-15(b) and AQ-15(d)
Gas Turbine Hot/Warm Start-up	A gas turbine startup that occurs within 48 hours of a gas turbine shutdown, and is limited in time to the lesser of (i) the first 30 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or (ii) the period of time from Gas Turbine fuel flow initiation until the Gas Turbine

	achieves the first of two consecutive CEM data points in compliance with the emission concentration limits of AQ-15(b) and AQ-15(d)
Gas Turbine Shutdown:	The lesser of the 30-minute period immediately prior to the termination of fuel flow to the Gas Turbine or the period of time from non-compliance with any requirement listed in AQ-15(b) and AQ-15(d) until termination of fuel flow to the Gas Turbine
Gas Turbine Combustor Tuning:	The period of time, not to exceed 6 operating hours per tuning event, in which testing, adjustment, tuning, and calibration operations are performed, as recommended by the gas turbine manufacturer, to ensure safe and reliable steady-state operation, and to minimize NO _x and CO emissions.
Specified PAHs:	<p>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:</p> <p style="margin-left: 40px;">Benzo[a]anthracene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenzo[a,h]anthracene Indeno[1,2,3-cd]pyrene</p>
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, the exhaust of Gas Turbine (S-1), and P-2, the exhaust of Gas Turbine (S-2), the standard stack gas oxygen concentration is 15% O ₂ by volume on a dry basis. For emission point P-3, the exhaust of Auxiliary Boiler (S-3), the standard stack gas oxygen concentration is 3% O ₂ by volume on a dry basis.
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the OGS construction contractor to ensure 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 Commissioning 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 Commissioning Period shall terminate when the plant has completed performance and emissions testing.
Precursor Organic	Any compound of carbon, excluding methane, ethane, car-

Compounds (POCs):	bon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate
CEC CPM:	California Energy Commission Compliance Program Manager
OGS:	Oakley Generating Station
Owner/operator:	The owner/operator of Oakley 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
FDOP	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
NOx	Nitrogen Oxides
NSR	New Source Review

O ₂	Oxygen
LAER	Lowest Achievable Emissions Rate
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

Brewster Birdsall, P.E., QEP

SUMMARY OF CONCLUSIONS

The proposed OGS project is a proposed addition to the state's electricity system. It would be an efficient, new, flexible, and dispatchable natural gas-fired combined-cycle power plant that would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. The power plant would provide a rapid-starting nominal net generating capacity of 624 MW with a maximum energy production of approximately 5,300,000 MWh/yr (AFC Section 2.6, OGS 2009a).

Its addition to the system would displace other less efficient, slower starting, and less flexible plants and facilitate the integration of renewable resources. Because the project will improve the efficiency of existing system resources and provide services needed to integrate renewable generation, the addition of OGS would contribute to a reduction of the California and overall Western Electricity Coordinating Council system GHG³ emissions and GHG emission rate average.

Staff notes that mandatory reporting of the GHG emissions provides the necessary information for the California Air Resources Board (ARB) to develop greenhouse gas regulations and/or trading markets required by the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.). The facility will also be required to report GHG emissions to the federal government. The project may be subject to additional reporting requirements and GHG reductions or trading requirements as these regulations are 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, and at this time, "prudent use" of natural gas for electricity generation will serve to optimize the system (for integrating intermittent renewable generation and providing reliability). 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). New information and policy direction from the Energy Commission and other agencies including ARB may trigger refining this method of GHG impact analysis, and the Energy Commission is committed to evaluating this and refinements as part of the *2011 Integrated Energy Policy Report* (CEC 2010b).

³ 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.

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

- OGS would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- OGS would displace some less efficient and less flexible local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in California and the overall Western Electricity Coordinating Council electric transmission system.
- OGS 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.
- OGS would facilitate the replacement of generation provided by power plants that are aging and/or using once-through cooling.

The proposed OGS would be designed to provide flexible, dispatchable power with units that are short-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 comply with the limits of the Greenhouse Gas Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.; SB 1368) that applies to utility purchases of base load power from power plants.

INTRODUCTION

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

Federal rules that became effective December 29, 2009 (40 CFR 98) already require federal reporting of GHG emissions. As federal rulemaking evolves, Energy Commission 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,⁴ and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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

Applicable Law	Description
Federal	
Mandatory Reporting of Greenhouse Gases (40 CFR 98, Subpart D)	The mandatory reporting rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tonnes of CO ₂ -equivalent emissions per year.
Prevention of Significant Deterioration Program (40 CFR 51 & 52)	Any new source of GHG exceeding 100,000 tons per year CO ₂ -equivalent and commencing construction after July 1, 2011 would be considered to be a major stationary source and subject to PSD permitting requirements including review of Best Available Control Technology.
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). Known as SB 1368 (Perata, Chapter 598, Statutes of 2006) Emission Performance Standard.

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

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

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 change⁵ 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 2020.⁶ To achieve this, ARB has a mandate to define the 1990 emissions levels and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. On December 16, 2010 ARB adopted structural requirements for a GHG cap and trade program and by October 2011 must adopt all enabling regulations, including several provisions that will affect new power plants. These regulations must be submitted to California’s Office of Administrative Law for approval so that they could become operational by January 2012. ARB is developing the rules and regulations to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures. Many of the regulations implementing the scoping plan are already effective. 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 was June 1, 2009.

Examples of strategies that the state is pursuing 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).

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

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

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 for a multi-sector cap-and-trade system.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addresses climate change within the electricity, natural gas, and transportation sectors (CEC 2007a). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% Renewables Portfolio Standard. The Energy Commission's *2009 Integrated Energy Policy Report* continued to emphasize the importance of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as phasing out use of once-through cooling in coastal California power plants (CEC 2009d). The *2011 Integrated Energy Policy Report* will examine the Energy Commission's process for satisfying CEQA requirements for evaluating GHG emissions in power plant cases (CEC 2010b).

SB 1368,⁷ also enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit California utilities from entering into long-term commitments with any base load facilities that exceed the Greenhouse Gas Emission Performance Standard of 0.500 metric tonnes CO₂ per megawatt-hour⁸ (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.

⁷ California Code of Regulations, Title 20 § 2900 and Public Utilities Code § 8340 et seq.

⁸ The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

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 services⁹ 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
2. Local capacity requirements
3. Grid operations support
4. Extreme load and system emergency
5. General energy support.

The Energy Commission staff-sponsored report 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 (N₂O, not NO or NO₂, which are commonly known as NO_x or oxides of nitrogen), and methane (CH₄ – often from unburned natural gas). Also included are sulfur hexafluoride

⁹ See CEC 2009b, page 95.

(SF₆) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO₂ emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO₂e) metric tonnes (MT) for ease of comparison.

CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of a variety of equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of OGS would involve 33 months of activity and GHG emissions (CH2MHILL2010d). The GHG emissions estimate, presented below in **Greenhouse Gas Table 2**, includes the total emissions for construction activity in terms of CO₂-equivalent.

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

Construction Source	Construction-Phase GHG Emissions (MTCO₂e)^a
Onsite construction equipment	10,524
Worker travel to/from construction site ^b	1,013
Deliveries to construction site ^b	806
Rail deliveries to construction site	44
Construction Total	12,387

Source: AFC Appendix 5.1E (CH2MHILL2010d); DR32, DR33 (CH2MHILL2010a); WSQ4-1 (CH2MHILL2010m).

Notes:

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

b. Motor vehicle emissions of CO₂-equivalent are approximately 95% CO₂.

OPERATIONS

The proposed OGS would be a combined-cycle power plant providing a nominal capacity of 624 megawatts (MW) through two stationary combustion turbine-generators and a steam turbine generator. The OGS would be available for either base-load or load-following duty, but to provide maximum flexibility it would be permitted to operate at an annual capacity factor of up to 97%. The actual operational profile of this power plant will depend on the variable demand for electricity, the supply of other generation including intermittent renewable resources, and the need to provide year-round electricity reliability.

The primary sources of GHG emissions would be the natural gas fired combustion turbines. There would also be a small amount of GHG emissions from sulfur hexafluoride (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 annually if it operated at its maximum permitted capacity factor of 97%. 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
OGS, Estimated Potential Greenhouse Gas (GHG) Emissions

Emissions Source	Operational GHG Emissions (MTCO₂e/yr) ^a
Combustion Turbine Generators (Two CTGs) ^c	1,873,220
Auxiliary Boiler	11,569
Diesel Fire Water Pump Engine	10
Worker Commutes (Off-Site) ^b	58
Material Deliveries (Off-Site) ^b	20
Equipment Leaks (SF ₆)	11
Total Project GHG Emissions, excluding Off-Site Emissions (MTCO₂e/yr)	1,884,810
Estimated Annual Energy Output (MWh/yr) ^c	5,281,000
Estimated Annualized GHG Performance (MTCO₂/MWh) ^d	0.357

Sources: AFC Supplement Table 5.1A-11 (CH2MHILL2010d); Response to DR28 (CH2MHILL2010a); (BAAQMD 2011a).

Notes:

- a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
- b. Motor vehicle emissions of CO₂-equivalent are approximately 95% CO₂.
- c. Based on maximum permitted capacity of up to 624 MW at 8,463 hours annually (97% annual capacity factor).
- d. This rate does not depend on capacity factor or hours of operation per year.

The proposed project would be permitted, on an annual basis, to emit nearly 1,885,000 metric tonnes of CO₂-equivalent per year (MTCO₂e/yr) if operated at its maximum permitted level (BAAQMD 2011a). The proposed OGS, at 0.357 MTCO₂/MWh, would easily meet the limits of SB 1368 and the Greenhouse Gas Emission Performance Standard of 0.500 MTCO₂/MWh, regardless of the hours of operation per year.

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 OGS is analyzed here for its role in providing local capacity and generation, intermittent generation support, and general energy support for expected generation retirements or replacements.

CONSTRUCTION IMPACTS

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

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

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

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

Thus, in the context of the Energy Commission’s *Integrated Energy Policy Report*, the OGS 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 OGS in Local Generation Displacement

The proposed OGS would have a net heat rate of approximately 6,779 Btu/kWh¹⁰, which leads to a maximum estimated GHG performance factor of 0.36 MTCO₂/MWh. The heat rate, energy output and GHG emissions of other local generation resources are listed in **Greenhouse Gas Table 4**.

The OGS would be available to compete as a provider of efficient base-load power and load-following power along with other existing and planned 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 OGS would be likely to displace, the proposed OGS would be more efficient, and emit fewer GHG emissions during any hour of operation. **Greenhouse Gas Table 4** shows that OGS would have a lower heat rate than many of the existing generating facilities currently used for base load capacity in the Greater Bay Area. As such, the OGS would not increase the overall system heat rate for natural gas-fired power plants.

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

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

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

Plant Name	Heat Rate (Btu/kWh) ^a	2009 Energy Output (GWh)	GHG Performance (MTCO ₂ /MWh)
Gateway Generating Station (became commercial in 2009)	7,123	2,490.2	0.378
Los Medanos Energy Center	7,184	3,394.7	0.381
Delta Energy Center	7,308	5,013.5	0.387
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	103.3	0.608
Pittsburg Power Plant, Unit 6	11,918	84.4	0.632
Pittsburg Power Plant, Unit 7	14,629	29.3	0.776
Proposed OGS (at permitted limit)	6,779	5,300 (max est.)	0.357

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); shows the proposed OGS capacity of up to 624 MW at 8,463 hours annually (97% annual capacity factor).

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

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

The Role of OGS in the Integration of Renewable Energy

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

OGS would provide flexible, highly dispatchable power. The “Rapid Response” capability of OGS allows each of the combustion turbine generators to start up and reach full load in less than 90 minutes for all cases, and hot/warm startups would occur in less than 30 minutes (AFC 4/10 supplement Table 5.1-6). OGS would provide short-starting¹¹ and fast-ramping¹² power under the CAISO use of these terms, which set a fast start as under 10 minutes. OGS would also provide a wide range of turndown operation, and it would be considered as fast starting for this Energy Commission staff assessment because of its ability to come to full load in less than two hours. OGS would

¹¹ Energy Commission staff identified facilities with startup times less than 2 hours as *fast-start* in the report Expected Roles for Gas-Fired Generation (CEC2009b). The CAISO categorizes units with startup times less than 10 minutes as *fast-start* and units with startup times less than 2 hours as *short-start* in the report for 2010 Integration of Renewable Resources (CAISO 2010).

¹² The CAISO categorizes *fast-ramping* as a generator capable of going from lowest power to highest in under 20 minutes, or greater than 10 MW per minute.

not obstruct penetration of renewable energy due to its ability to turn down to low loads and to achieve startups in less than two hours. OGS is likely to serve as an important firming source for intermittent renewable resources in support of California's RPS and GHG goals. The short starting units would support the CAISO need for flexible and dispatchable resources. OGS also would have relatively low minimum operating times, which means that it can be started and ramped up quickly, then shutdown after a short duration to enhance the integration and backup of intermittent renewable deliveries.

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

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

The OGS would not interfere with generation from existing renewable facilities nor with the integration of new renewable generation. The OGS is designed to operate either for reliability, which provides backup and renewable integration purposes or for base load purposes (AFC Section 2, OGS 2009a). OGS would be much more likely to foster integration of renewable energy than comparable non-renewable base load or intermediate energy resources.

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

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

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

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

Source: Energy Commission staff 2010.

Notes:

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

The Role of OGS in Retirements/Replacements

OGS would be permitted to provide about 5,300 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 adder¹⁵, 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

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

approximate 500 MW of in-state coal and petroleum coke-fired capacity that may not be able to enter into long-term contracts with California utilities due to the SB 1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. New generation resources like OGS 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 OGS 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 opt to install new cooling systems, 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 (MTCO ₂ /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:

- OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled) enters commercial operation (late-2010).
- Units are aging but are not OTC.
- 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 averages 0.6 to 0.7 MTCO₂/MWh, which is substantially higher than the emission rate for OGS. When a project provides energy and capacity, depending on its location, it can provide a significant net reduction in GHG emissions from the electricity sector. The OGS would provide improved efficiency and flexibility when compared with these aging and OTC facilities. Given the proposed transmission line connection, the OGS would be located in the Greater Bay Area Local Capacity Area, which is a major load pocket, and as such would provide local reliability support as well as potentially facilitate the retirement of aging and/or OTC power plants.

CUMULATIVE IMPACTS

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

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

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. The ARB's mandatory GHG emissions reporting requirements do not indicate whether the project, as defined, would comply with the potential GHG emissions reduction regulations being formulated under AB 32. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB. Similarly, this project would be subject to federal mandatory reporting of GHG.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any applicable EPS that could be enacted in the next few years. The OGS project would comply with the limits of the Greenhouse Gas Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.; SB 1368) that applies to utility purchases of base load power from power plants.

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

NOTEWORTHY PUBLIC BENEFITS

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

- OGS would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- OGS would displace some less efficient and less flexible local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in California and the overall Western Electricity Coordinating Council electric transmission system.
- OGS 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.
- OGS would facilitate the replacement of generation provided by power plants that are aging and/or using once-through cooling.

The project would likely lead to a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, would not increase the overall system heat rate for natural gas-fired power plants, and would thus not result in impacts that are cumulatively significant. Moreover, it would be consistent with AB 32 goals.

The energy displaced by the proposed OGS would result in a reduction in GHG emissions from the electricity system compared to other comparable non-renewable base load or intermediate energy resources. In other system roles, as described in **Greenhouse Gas Table 8**, the proposed OGS 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
OGS, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, Oakley Generating Station
Integration of Renewable Energy	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Would provide fast startup capability (within 2 hours). • Would have low minimum load levels. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves. • <i>Would not</i> provide black start capability.
General Energy Support	<ul style="list-style-type: none"> • 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

OGS would be an efficient, new, highly dispatchable natural gas-fired combined-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 base-load

generation that the project would displace, and it offers superior operating flexibility and, thus, the OGS 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 federal and Air Resources Board greenhouse gas regulations would occur. This enables the ARB to gather the information needed to regulate the OGS 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 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 OGS project would comply with the limits of the Greenhouse Gas Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.; SB 1368) that applies to utility purchases of base load power from power plants.

The OGS project would be consistent with the precedent decision regarding GHG emissions established by the Avenal Energy Project's Final Commission Decision (CEC 2009e).

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 Ann Crisp and Heather Blair

SUMMARY OF CONCLUSIONS

The proposed Oakley Generating Station (OGS), formerly known as Contra Costa Generating Station, would occupy a 21.95 acre parcel of which 16.7 acres would be permanently disturbed. The project site is located in an area primarily surrounded by heavy industry including a former DuPont manufacturing site to the north, the Burlington Northern Santa Fe railroad to the south, and the PG&E Antioch Terminal to the west. The potential for the project area to support sensitive biological resources is moderate; the immediate vicinity supports wildlife that is likely habituated to frequent disturbance.

Participation in the East Contra Costa Habitat Conservation Plan and Natural Community Conservation Plan (ECCC HCP/NCCP) would provide take authorization of covered species under the federal Endangered Species Act and the Natural Community Conservation Planning Act for impacts associated with development of the project. The project would mitigate for 16.7 acres of permanent impacts and 38.4 acres of temporary impacts (i.e. temporary and permanent habitat loss) through the ECCC HCP/NCCP. The ECCC HCP/NCCP utilizes a mitigation fee that serves to offset losses of land cover types, covered species habitat, and other biological values. Mitigation fees for permanent impacts and temporary impacts include payment of development fees to the East Contra Costa County Habitat Conservancy (Conservancy). Mitigation fees are assessed based on the acreage of land permanently and temporarily disturbed as well as the duration of temporary impacts. The one-time development fee for this project would be approximately \$227,408, or as adjusted by the Conservancy pending the Annual Adjustment of mitigation fees (CH2MHILL 2010s). As a Participating Special Entity (PSE), the applicant would make a \$200,000 contribution to recovery of endangered and threatened species. The applicant would also make a contribution to complementary conservation planning for that portion of the transmission line that is located within the City of Antioch. The amount of the contribution to complimentary conservation planning will be finalized during the Governing Board meeting in March 2011. Areas categorized as urban as well as areas which will be protected by wildlife exclusion fencing and silt fencing during construction are exempt from paying mitigation fees. The one-time payment to the Conservancy would mitigate for loss of vegetation as the fees go toward purchasing land/habitat for all species covered under the ECCC HCP/NCCP permit, as part of the core conservation strategy of the ECCC HCP/NCCP. The one-time payment to the Conservancy is the primary mitigation fee for the development of areas which are removed from an undeveloped or habitat-providing state (CH2MHILL 2010k).

Staff received a copy of the Revised Planning Survey Report (PSR) from the applicant that was prepared in coordination with the Conservancy (CH2MHILL 2010ac). Energy Commission staff have reviewed and incorporated relevant technical information from the Revised PSR into this Final Staff Assessment (FSA), as appropriate. Energy Commission staff agree with the proposed mitigation for species to be covered under the ECCC HCP/NCCP and have incorporated the Conservancy's measures into staff's proposed conditions of certification.

Impacts to special-status species associated with the OGS, beyond temporary and permanent habitat loss, include but are not limited to potential loss of dens and nesting habitat on the OGS site and linear routes, disturbance to breeding or nesting animals in habitat adjacent to the OGS site and linear routes, and disturbance impacts from construction and operation noise and lighting. Direct impacts to the majority of special-status species would be avoided and minimized by conducting comprehensive pre-construction surveys, erecting wildlife exclusion fencing before site mobilization, and implementing the required impact avoidance and minimization measures required as part of participation in the ECCC NCP/HCCP. Impact avoidance and minimization measures described in staff's analysis and included in the proposed conditions of certification would help reduce impacts to sensitive biological resources, including special-status species and habitats. With implementation of applicant-proposed impact avoidance and minimization measures, impact avoidance and minimization measures required as a Participating Special Entity in the ECCC HCP/NCCP, and staff's proposed conditions of certification, direct impacts to biological resources would likely be less than significant. These measures along with the mitigation provided by participation in the ECCC HCP/NCCP would offset project related losses to biological resources to less-than-significant levels.

Indirect impacts to the nearby Antioch Dunes National Wildlife Refuge (NWR) would result from nitrogen deposition caused by OGS 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 deposition and fertilization, additional nitrogen deposition from OGS at this already stressed ecosystem would be a significant impact.

Recognizing that the proposed OGS would not be the only contributor of nitrogen at Antioch Dunes NWR, staff recommends that the applicant remit annual payment toward the operating budget of Antioch Dunes NWR that is proportional to the project's share of total nitrogen deposition. It is staff's conclusion that implementation of the management activities funded by this annual payment toward the operating budget of Antioch Dunes NWR (as described in **BIO-20** (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 OGS's contribution to nitrogen deposition. Indirect and cumulative impacts would be less than significant with mitigation.

Staff concludes that the proposed project would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to protection of biological resources and with implementation of staff's proposed conditions of certification would not result in any significant impacts addressed by 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 OGS. 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 OGS Application for Certification – Volumes 1 and 2 (OG 2009a), responses to data requests (CH2MHILL 2010d; CH2MHILL 2010gRevised ECCC HCP/NCCP Planning Survey Report (CH2MHILL 2010ac), staff's observations during field visits on December 18, 2009 and June 10, 2010, supplemental information filed by the applicant (CH2MHILL 2010t), and ongoing discussions with U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and the East Contra Costa County Habitat Conservancy (Conservancy).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant would 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

<u>Applicable Law</u>	<u>Description</u>
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 National Marine Fisheries Service.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act. The administering agency is USFWS.
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.
Migratory Bird Treaty Reform Act (70 F.R. 12710-12716 (March 15, 2005))	This Migratory Bird Treaty Reform Act includes a significant change to the Migratory Bird Treaty Act (MBTA). The law now excludes those species considered to be not native to the United States. The Secretary of the Interior published in the Federal Register the final list of bird species to which the MBTA does not apply. 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 California Native Plant Society (CNPS). The administering state agency is CDFG.
Natural Communities Conservation Planning Act (NCCPA) of 2002 (Fish and Game Code, sections 2800 through 2835)	Established the NCCPA program, which is a cooperative effort 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,	Designates certain species as fully protected and prohibits take of such species. The administering agency is CDFG.

Applicable Law	Description
sections 3511, 4700, 5050, and 5515)	
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 MBTA 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; provides take authorization under the federal Endangered Species Act and Natural Community Conservation Planning Act (NCCPA) for covered species; and provides for species, wetland, and ecosystem conservation contributing to endangered species recovery. The OGS project is a covered activity eligible to seek take coverage through the ECCC HCP/NCCP. Not all state and federally listed species that could be impacted by the OGS project are covered by the ECCC HCP/NCCP (i.e. state and federally listed species which occur at the Antioch Dunes NWR are not covered under the ECCC HCP/NCCP).
City of Oakley General Plan	Provides a planning framework for preservation of important ecological and biological resources in consideration of providing adequate resources and infrastructure for projected population growth. The OGS site is within the jurisdiction of the City of Oakley, however 1.4 miles of the 2.4-mile proposed transmission line route is within the City of Antioch.
City of Oakley Tree Preservation Ordinance	Provides for the preservation of certain protected trees in the City of Oakley. Provides for the protection of trees on private property by controlling tree removal while allowing for reasonable enjoyment of private property rights and property development.
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 projected population growth. The OGS site is not within the jurisdiction of

<u>Applicable Law</u>	<u>Description</u>
	the City of Antioch, however 1.4 miles of the 2.4-mile proposed transmission line route is within the City of Antioch.
City of Antioch Tree Preservation Ordinance	Provides for the preservation of certain protected trees in the City of Antioch. Provides for the protection of trees with the goal of retaining as many trees as possible while recognizing individuals' property rights.

SETTING

REGIONAL SETTING

The proposed OGS project site is located in the northwestern corner of the City of Oakley, Contra Costa County, California, immediately northeast of the City of Antioch and just east of State Route 160. The proposed project is also located within the East Contra Costa County HCP/NCCP (ECCC HCP/NCCP) Planning Area which covers approximately 175,000 acres in eastern Contra Costa County (ECCCCHCPA 2006). As proposed, OGS will be located approximately 0.6 mile from the southern bank of the San Joaquin River, approximately six miles southeast 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 percent 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 OGS include the following (CCCCDD 2005; OG 2009a):

- **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 including riverine aquatic bed, riparian forest, tidal perennial marsh, and 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 deltooides* ssp. *howellii*), and Contra Costa wallflower (*Erysimum capiatum* var. *angustatum*).

- **Big Break.** This emergent marsh supports the federal and state endangered California black rail (*Laterallus jamaicensis coturniculus*).
- **East Bay Regional Park District Legless Lizard Preserve.** Comprises a 7.5-acre site which includes disturbed tree-covered inland dune habitat. Supports silvery legless lizard (*Anniella pulchra pulchra*), a state species of special concern.

PROJECT AREA AND VICINITY DESCRIPTION

The project area consists of the proposed OGS power plant site (OGS site), laydown area, stockpile areas, and all associated linear facilities (i.e., electrical transmission lines, sanitary sewer force main, and gas supply pipeline). The OGS site would occupy approximately 21.95 acres. An existing 1.60-acre conservation easement area with a 0.62-acre wetland occurs in the OGS project area but would not be disturbed. An approximately 0.6-acre linear area of mature Tasmanian blue gum trees (*Eucalyptus globulus*) occurs along the northern boundary of the OGS site of which 0.52 acres would not be disturbed. Six Tasmanian blue gums trees that occupy approximately 0.08 acre would be removed to incorporate a roadway between the project site and the construction laydown area (CH2MHILL 2010ac). Several native and ornamental trees would also be removed from the project site and along the proposed transmission line corridor. The 20.31-acre construction laydown area is adjacent to and east of the OGS site. Three temporary soil stockpiles totaling 7.2 acres would be located at varying distances within 1,500 feet north of the OGS site. One of these soil stockpiles, totaling 2.22 acres, would be located on an existing paved surface. The remaining two soil stockpiles, 2.68 and 2.32 acres respectively, would be located in ruderal (non-native) grassland.

The proposed OGS site is bounded to the south by the Burlington Northern Santa Fe railroad, to the west by the Pacific Gas and Electric (PG&E) Antioch Terminal (a natural gas transmission hub) and Bridgehead Road, to the north by industrial or vacant industrial property owned by DuPont, and to the east by DuPont's titanium dioxide landfill area.

PROPOSED PROJECT

The OGS project consists of various components related to the generation and transmission of electricity, including those described below. With the exception of the 2.4-mile long transmission line, the 0.44-mile long sanitary sewer force main route, and a portion of the 300-foot long natural gas pipeline connected to the adjacent PG&E Antioch Terminal, the following proposed project components would be within the proposed OGS site:

- **An Expedited Rapid Response Engineered Equipment Package** consisting of two combustion turbine-generators (each with a 155-foot-tall exhaust stack), two heat recovery steam generators, and a single condensing steam turbine generator.
- **A new OGS 230-kV switchyard** that would be connected to the 230-kV PG&E Contra Costa Substation via a proposed 2.4-mile transmission line.

- **Natural gas metering station and pipeline connection** (6- to 10-inch-diameter, approximately 300 feet long) from OGS to the adjacent PG&E gas metering yard to tap Line 303. A secondary natural gas supply pipeline would connect to PG&E's Line 400 (6- to 10- inch diameter, approximately 410 feet long), also within the adjacent PG&E gas metering yard. The metering station would be required at the OGS site to measure and record gas volumes.
- **Water supply and discharge connections** to existing onsite potable water line and new sanitary sewer pipeline. Potable water supply would be provided by Diablo Water District for process and potable uses through a tap from an existing 27-inch diameter distribution pipeline that runs north-south through the OGS site just east of the PG&E Antioch Terminal. Process and sanitary wastewater would be discharged to a new sanitary sewer force main that would extend south along Bridgehead Road from a point adjacent to the plant entrance road for 0.33 mile to Main Street. It would then turn eastward and run for 0.11 mile to the interconnection point with Ironhouse Sanitation District's gravity main.

SPECIAL MANAGEMENT AREAS

East Contra Costa County HCP/NCCP Planning Area

The proposed OGS project is within the plan area for the East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan (ECCC HCP/NCCP). The East Contra Costa County Habitat Conservancy (Conservancy), the implementing entity for the ECCC HCP/NCCP, is a joint exercise of powers authority formed by the cities of Brentwood, Clayton, Oakley, and Pittsburg and Contra Costa County (collectively known as the Permittees). The ECCC HCP/NCCP provides a coordinated, regional permitting approach to conservation and regulation. The Final ECCC HCP/NCCP was published in October 2007; implementation of the ECCC HCP/NCCP allows the Permittees to control endangered species permitting for activities and projects in their jurisdictional permit area while providing comprehensive species, wetlands, and ecosystem conservation. The proposed OGS site and a portion of the transmission line lies within the City of Oakley, however, approximately 1.4 miles, including 12 of the 18 transmission towers are within the City of Antioch, which is not a Permittee. The ECCC HCP/NCCP utilizes a mitigation fee that serves to offset losses of land cover types, covered species habitat, and other biological values. Mitigation fees for permanent impacts and temporary impacts include payment of development fees to the Conservancy. In addition to the one-time payment of mitigation fees, participants make a one-time Contribution to Recovery payment which is a contribution to recovery of endangered and threatened species. Participants may also make a Contribution to Complementary Conservation Planning dependent on whether project activities take place in an area not controlled by the Permittees (e.g. City of Antioch). This contribution is used to fund additional conservation planning in or near the ECCC HCP/NCCP area that will complement the ECCC HCP/NCCP and benefit species covered by the ECCC HCP/NCCP.

The City of Oakley recommended conditions of approval for the OGS project that, but for the exclusive jurisdiction of the Energy Commission, the City of Oakley would apply which include compliance with the ECCC HCP/NCCP (COO 2010a). The Conservancy has confirmed that the project is an eligible covered activity under the ECCC

HCP/NCCP and the applicant may apply as a Participating Special Entity for the entire project, including the portion of the transmission line route within the City of Antioch (ECCC 2010a). A Participating Special Entity (PSE) is an entity not subject to the authority of a local jurisdiction. Such entities may include school districts, water districts, irrigation districts, transportation agencies, local park districts, geologic hazard abatement districts, or other utilities or special districts that own land or provide public services (CH2MHILL 2010s). The OGS project is anticipated to be presented by Conservancy staff to the Governing Board in early 2011 for conditional approval. Staff is continuing to coordinate with Conservancy staff throughout each agency's process. Not all state and federally listed species that could be impacted by the OGS project are covered by the ECCC HCP/NCCP (i.e. state and federally listed species which occur at the Antioch Dunes NWR are not covered under the ECCC HCP/NCCP).

Existing Vegetation and Wildlife

The applicant conducted biological field surveys within the proposed project area, which includes the OGS site, laydown area, stockpile areas, and all associated linear facilities on March 4 and April 13, 2009 and January 15, February 17, April 22, and August 5, 2010. Focused botanical surveys of the project site were conducted on March 4, 2009 and April 22 and October 22, 2010. The applicant's survey of the proposed OGS site included an inventory of all plant and wildlife species observed and an assessment of potential habitat suitability for special-status species. Special-status plant surveys were conducted during the appropriate blooming season for plants potentially occurring in the OGS project area (CH2MHILL 2010ac). This is also a requirement of participation in the ECCC HCP/NCCP for all species covered under the ECCC HCP/NCCP. Various biological resource site surveys of the DuPont Oakley site, which encompasses the entire DuPont property including the proposed OGS site, were conducted in 2000, 2002, 2006, and 2010 by DuPont to aid the decision-making process for DuPont during site remediation, future land use, and development of potential conservation strategies (DuPont 2010a). The following description of biological resources presents the results of surveys of the OGS project area and vicinity (OG 2009a) as well as observations from staff's site visit on December 18, 2009 and June 10, 2010.

Project Site, Construction Laydown Areas, and Project Linear Routes

The proposed OGS site, construction laydown area, and soil stockpile areas are contained within a former DuPont manufacturing facility and are highly disturbed or developed due to former manufacturing operations and agricultural production as a vineyard. The 2.4-mile long transmission line would be located within an existing 80-foot-wide PG&E 60-kV right-of-way. The 0.44-mile-long sanitary sewer force main route would extend south along Bridgehead Road from a point adjacent to the plant entrance road for 0.33 mile to Main Street. It would then turn eastward and run for 0.11 mile to the interconnection point with the Ironhouse Sanitary District's gravity main (CH2MHILL 2010t). The project sanitary sewer force main would be installed within or adjacent to existing roads and interconnect with the existing force main located under the existing road.

The proposed OGS site is currently in agricultural production as a vineyard with a cluster of interior live oaks (*Quercus wislizenii*). The project parcel is bordered to the north by a narrow row of mature Tasmanian blue gum (*Eucalyptus globulus*) trees that

separates the OGS site from the rest of the former DuPont manufacturing site with intermittent strips of ruderal grassland surrounding the OGS site. Approximately 18 trees located within the OGS site would be removed. This includes the six interior live oak located within the vineyard, six Tasmanian blue gum located along the northern boundary of the site, and six almond trees (*Prunus dulcis*) located along the main access road (CH2MHILL 2011ac).

The isolated wetland, known as Wetland E, is on the western end of the OGS site. The 0.62-acre wetland is within a 1.6-acre conservation easement area. The conservation easement and associated Wetland E was created in 1996 as mitigation for offsite impacts related to the fill of an isolated pond located in the parking area of the adjacent Lauritzen Yacht Harbor. The hydrology for this wetland is supported by direct precipitation and runoff from the vineyard, Bridgehead Road, and portions of the DuPont property. Based upon a review of historical aerial photographs taken between 1939 and 2005 as well as the lack of hydric soils it appears this mitigation wetland was constructed in upland habitat (CH2MHILL 2009a). The wetland is dominated by wetland species including broadleaf cattail (*Typha latifolia*) and a decadent stand of common tule (*Schoenoplectus acutus*) with arroyo willow (*Salix lasiolepis*) on the slope between the water and top of the bank. Red-winged blackbirds (*Agelaius phoeniceus*) have been observed nesting in Wetland E (Davis, pers. comm.). Wetland E is likely excavated below the water table and holds water year round. However based on recent information provided by the applicant, Wetland E was dry during October 2010 (GB 2011a). During the winter, water levels increase during periods of significant rainfall.

The proposed laydown area would be approximately 20.31 acres and located east of the proposed OGS site. The proposed laydown area consists of a 6.48-acre area that is paved, 0.61 acres of non-native woodland, and a 13.22-acre ruderal grassland dominated by ripgut brome (*Bromus diandrus*) and red-stemmed filaree (*Erodium cicutarium*), which was formerly a titanium dioxide disposal site for DuPont. A row of approximately 24 mature Tasmanian blue gum trees separates these two sections of the proposed laydown area. Approximately 6 trees would be removed to accommodate an access road to the OGS site (CH2MHILL 2010s). These plantings of mature eucalyptus trees are of sufficient canopy cover and height to potentially support nesting and roosting raptors and other birds such as white-tailed kite (*Elanus leucurus*) as well as bats such as the western red bat (*Lasiurus blossevillei*).

Three temporary soil stockpile areas totaling 7.22 acres would be located north of the OGS site. Stockpile area 1 would be 2.22 acres and would be located closest to the project site on an existing paved surface near the southeast corner of Bridgehead Road and Wilbur Avenue. Stockpile area 2 would be 2.68 acres and Stockpile 3 would be 2.32 acres and would be located further north between Wilbur Avenue and Lauritzen Lane east of Bridgehead Road in ruderal grassland, separated by a row of sheoaks (*Casuarina equisetifolia*). The ruderal grassland is dominated by rattail fescue (*Vulpia myuros*) and also contains species such as red maids (*Calandrinia ciliata*) and common groundsel (*Senecio vulgaris*). The ruderal grasslands may provide nesting and/or foraging habitat for sensitive species such as silvery legless lizard (*Anniella pulchra pulchra*), white-tailed kite, Swainson's hawk (*Buteo swainsoni*), and golden eagle (*Aquila chrysaetos*).

A single-circuit 230-kilovolt (kV) transmission line would directly interconnect the proposed OGS switchyard to the existing 230-kV PG&E Contra Costa Substation. The combined length of the proposed transmission line is approximately 2.4 miles and would be placed within the existing 80-foot-wide PG&E 60-kV right-of-way. The transmission line would be supported by 95-foot-tall steel poles and would require the active replacement of 17 existing steel-lattice 60-kV towers with 20 tubular steel-pole structures and the extension of one existing 230-kV transmission tower. The existing 60-kV towers are located in a variety of land uses including industrial, vacant industrial, agricultural, commercial, residential, recreational, and ruderal grassland in vacant lots (CH2MHILL 2010s). Of the 2.4 miles total, 1.4 miles of the proposed transmission line east from the PG&E Contra Costa Substation (12 of the 18 transmission tower replacements) would be within the City of Antioch, which is not a Permittee of the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCC HCP/NCCP). However, the applicant is applying for coverage under the ECCC HCP/NCCP for the 230-kV transmission line located within the City of Antioch as a PSE (ECCC 2010a). Construction would require approximately 400 square feet of temporary vegetation clearance in each area where a transmission tower would be located. The applicant has proposed to mitigate for temporary impacts to the entire existing 80-foot right-of-way to allow flexibility during the final installation design (CH2MHILL 2010ac). Tree removal would include two interior live oak, one almond, one arroyo willow, one Northern California walnut (*Juglans hindsii*), and one walnut hybrid (*Juglans nigra x hindsii*) located in ruderal habitat and two almond and one ponderosa pine (*Pinus ponderosa*) located in a vineyard along the transmission line right-of way (CH2MHILL 2011c). The ruderal grassland may provide suitable habitat for the special-status species such as white-tailed kite, silvery legless lizard, western burrowing owl (*Athene cunicularia hypugaea*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Trees located along the transmission line right-of way may provide suitable nesting habitat for a variety of birds.

Though the proposed OGS site is mainly disturbed habitat, there is habitat onsite and in the project area that is capable of supporting a diverse assemblage of wildlife. Observations in the project area included various non-sensitive wildlife species such as black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), western fence lizard (*Sceloporus occidentalis*), and a variety of bird species typically found in disturbed/developed areas such as house finch (*Carpodacus mexicanus*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaidura macroura*), rock dove (*Columba livia*), killdeer (*Charadrius vociferus*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), western scrub-jay (*Aphelocoma californica*), and American crow (*Corvus brachyrhynchos*). Other bird species include great blue heron (*Ardea herodias*), red-winged blackbird, cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), northern flicker (*Colaptes auratus*), Bullock's oriole (*Icterus bullockii*), meadowlark (*Sturnella neglecta*), red-shouldered hawk (*Buteo lineatus*), and red-tailed hawk (*Buteo jamaicensis*).

Special-Status Species

Special-status species are plant and wildlife species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique

habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Listed as threatened or endangered or candidates for future listing as threatened or endangered under the California Endangered Species Act or Federal Endangered Species Act;
- Protected under other regulations (e.g. Migratory Bird Treaty Act);
- Listed as species of concern by CDFG;
- A plant species considered by the CNPS to be “rare, threatened, or endangered in California” (CNPS List 1A, 1B, and 2);
- Plants listed as rare under the California Native Plant Protection Act;
- Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
- Any other species receiving consideration during environmental review under CEQA.

Special-status plant species were not observed within the OGS project area during biological surveys and the proposed project site does not provide suitable habitat for special-status plant species. This is primarily due to the high level of disturbance and lack of natural habitats in and around the OGS project site. However, Swainson’s hawk (State Threatened), was observed foraging above grasslands located near the soil stockpile areas during field surveys (OG 2009a) and a white-tailed kite nest (State Fully Protected) was detected approximately 350 feet north of the transmission line corridor during spring 2010 surveys (CH2MHILL 2010s).

Biological Resources Table 2 identifies the special-status species that were reported to occur 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). The CNDDB is a program that inventories the status and locations of rare plants and animals in California. A lack of suitable, natural habitat in the project area reduces the likelihood of occurrence of the majority of these species. Reasons for their inclusion in Biological Resources Table 2 are provided in the table. Species with a moderate to high potential to occur in the proposed project area are discussed in more detail below **Biological Resources Table 2**. Species which were identified in the AFC as potentially occurring in the proposed project area were excluded from discussion in the PSA if it was determined that the OGS project area was not within the known range of the species.

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

Species	Status¹	Habitat	Potential to Occur
Plants			
Large-flowered fiddleneck <i>Amsinckia grandiflora</i>	FE;SE;1B.1	Cismontane woodland, valley and foothill grassland; elevation 900–1,800 feet; blooms April–May	Absent: Suitable habitat does not occur on site or adjacent to project area
Mt. Diablo manzanita <i>Arctostaphylos auriculata</i>	1B.3;HCP	Inland dunes; elevation 440–2,130 feet; blooms March–September	Absent: Suitable habitat does not occur on site or adjacent to project area.
San Joaquin spearscale <i>Atriplex joaquiniana</i>	1B.2	Alkaline areas within playas, chenopod scrub, meadow and seep, and valley and foothill grassland; elevation 0–2,130 feet; blooms April–October	Absent: Suitable habitat does not occur on site or adjacent to project area.
Big tarplant <i>Blepharizonia plumosa</i>	1B.1;HCP	Valley and foothill grassland; elevation 100–1,660 feet ; blooms July–October	Absent: Marginal habitat occurs onsite; not observed during surveys
Soft bird's-beak <i>Cordylanthus mollis</i> ssp. <i>mollis</i>	FE;SR;1B.2	Coastal salt marshes and swamps; elevation 0–10 feet; blooms July–November	Absent: Suitable habitat does not occur on site or adjacent to project area.
Hoover's cryptantha <i>Cryptantha hooveri</i>	1A	Inland dunes and sandy areas within valley and foothill grasslands; elevation 30–490 feet; blooms April–May	Low: Marginal habitat occurs onsite; nearest record is from 1908 and located 3 miles from site; presumed extinct in California.
Mt. Diablo buckwheat <i>Eriogonum truncatum</i>	1B.1	Sandy areas within chaparral, coastal scrub, valley and foothill grassland; elevation 0–1,150 feet; blooms April–September	Low: Marginal habitat occurs onsite; not observed during surveys
Antioch Dunes buckwheat <i>Eriogonum nudum</i> var. <i>psychicola</i>	1B.1	Inland dune habitat within coastal grassland communities; elevation 10–65 feet; blooms July–October	Absent: Suitable habitat does not occur onsite or adjacent to project area; currently only know from Antioch Dunes NWR
Round-leaved filaree <i>California macrophylla</i> (= <i>Erodium macrophyllum</i>)	1B.1;HCP	Cismontane woodland, valley and foothill grassland; friable clay soils; elevation 50–3,940 feet; blooms March–May	Absent: Marginal habitat occurs onsite; not observed during surveys
Contra Costa wallflower <i>Erysimum capitatum</i> var. <i>angustatum</i>	FE;SE;1B.1	Inland dunes; elevation 0–70 feet; blooms March–July	Absent: Suitable habitat does not occur onsite or adjacent to project area; currently only know from Antioch Dunes NWR ²
Diamond-petaled California poppy <i>Eschscholzia rhombipetala</i>	1B.1	Valley and foothill grassland; 0–3,200 feet; blooms March–April	Low: Marginal habitat occurs onsite; not observed during surveys
California black walnut <i>Juglans hindsii</i>	1B.1	Riparian forest and woodland; 0–1,440 feet; blooms April–May	Present: One tree detected in ruderal habitat along transmission line right-of way. This location is not considered a native stand and therefore not protected under any applicable LORS.

Species	Status ¹	Habitat	Potential to Occur
Brewer's western flax <i>Hesperolinon breweri</i>	1B.2;HCP	Chaparral, cismontane woodland, ultramafic, valley and foothill grassland; dry hill or canyon sides, grassy opens amongst oaks or brush; elevation 100–2,950 feet; blooms May–July	Absent: Marginal habitat occurs onsite; not observed during surveys
Wooly rose-mallow <i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	1B.2	Freshwater marsh and swamps; in California, known from the Delta watershed; elevation 0–390 feet; blooms June–September	Absent: Suitable habitat does not occur onsite or adjacent to project area
Contra Costa goldfields <i>Lasthenia conjugens</i>	FE; 1B.1	Mesic areas within cismontane woodland, valley and foothill grassland, vernal pool, wetland; elevation 0–1,540 feet; blooms March–June	Absent: Suitable habitat does not occur onsite or adjacent to project area
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	1B.2	Freshwater and brackish marshes and swamps; elevation 0–10 feet; blooms May– July	Absent: Suitable habitat does not occur onsite or adjacent to project area; Detected offsite adjacent to the San Joaquin River during 2002 rare plant surveys conducted by DuPont (DuPont 2010a)
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	SR; 1B.1	Brackish or freshwater marshes and swamps; elevation 0–330 feet; blooms April–November	Absent: Suitable habitat does not occur onsite or adjacent to project area. Detected offsite adjacent to the San Joaquin River during 2002 rare plant surveys conducted by DuPont (DuPont 2010a).
Delta mudwort <i>Limosella subulata</i>	2.1	Brackish and freshwater marshes and swamps; elevation 0–10 feet; blooms May–August	Absent: Suitable habitat does not occur onsite or adjacent to project area; Detected offsite adjacent to the San Joaquin River during 2002 rare plant surveys conducted by DuPont (DuPont 2010a)
Antioch Dunes evening-primrose <i>Oenothera deltoides</i> ssp. <i>howellii</i>	FE; SE; 1B.1	Inland dunes; elevation 0–100 feet; blooms March–September	Absent: Suitable habitat does not occur onsite or adjacent to project area; currently only know from Antioch Dunes NWR ² ; This species was not detected during 2009 or 2010 surveys. This species was not detected during any rare plant surveys conducted by DuPont (DuPont 2010a)
Suisun marsh aster <i>Symphyotrichum lentum</i>	1B.2	Brackish and freshwater marsh; elevation 0–10 feet; blooms May–November	Absent: Suitable habitat does not occur onsite or adjacent to project area; Detected offsite adjacent to the San Joaquin River during 2002 rare plant surveys conducted by DuPont (DuPont 2010a)
Invertebrates			
Lange's metalmark butterfly <i>Apodemia mormo langei</i>	FE	Stabilized dunes along the San Joaquin River; endemic to Antioch Dunes	Absent: Suitable habitat does not occur onsite or adjacent to site; currently only know from Antioch Dunes NWR ²
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FT; HCP	Vernal pools; also may occur in manmade seasonal water sources	Absent: Suitable habitat does not occur onsite or adjacent to

Species	Status ¹	Habitat	Potential to Occur
		such as road side ditches and stock ponds	site
valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT	Elderberry shrubs throughout the Central Valley and foothills below 3,000 feet elevation	Absent: Suitable habitat does not occur onsite or adjacent to site
Antioch efferian robberfly <i>Efferia antiochi</i>	—	Interior sand dunes; known only from Fresno and Contra Costa Counties	Absent: Suitable habitat does not occur onsite or adjacent to site
Curved-foot hygrotus diving beetle <i>Hygrotus curvipes</i>	—	Alkali vernal pools and other seasonal wetlands or slow-moving streams with pools and fringed with alkali vegetation	Absent: Suitable habitat does not occur onsite or adjacent to site
Middlekauff's shieldback katydid <i>Idiostatus middlekauffi</i>	—	Interior sand dunes, known only from Antioch Dunes	Absent: Suitable habitat does not occur onsite or adjacent to site
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE; HCP	Vernal pools and ephemeral wetland habitats with clear to highly turbid water	Absent: Suitable habitat does not occur onsite or adjacent to site
Antioch andrenid bee <i>Perdita scitula antiochensis</i>	—	Interior sand dunes, known only from Antioch Dunes and Oakley	Absent: Suitable habitat does not occur onsite or adjacent to site
Fish			
Green sturgeon <i>Acipenser medirostris</i>	FT; CSC	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters	Absent: Suitable habitat does not occur onsite or adjacent to project area
Sacramento perch <i>Archoplites interruptus</i>	CSC	Aquatic, sloughs, slow-moving rivers, lakes of central valley	Absent: Suitable habitat does not occur onsite or adjacent to project area
Delta smelt <i>Hypomesus transpacificus</i>	FT; ST	Aquatic, Estuary	Absent: Suitable habitat does not occur onsite or adjacent to project area
Central Valley steelhead <i>Oncorhynchus mykiss irideus</i>	FT	Aquatic, Sacramento/San Joaquin flowing waters	Absent: Suitable habitat does not occur onsite or adjacent to project area
Central Valley spring-run, winter-run chinook salmon <i>Oncorhynchus tshawytscha</i>	FT; FE/ST; SE	Aquatic, Sacramento/San Joaquin flowing waters	Absent: Suitable habitat does not occur onsite or adjacent to project area
Longfin smelt <i>Spirinchus thaleichthys</i>	ST; CSC	Aquatic, San Francisco Estuary and the Sacramento-San Joaquin Delta north to near Oregon border	Absent: Suitable habitat does not occur onsite or adjacent to project area
Amphibians			
California tiger salamander <i>Ambystoma californiense</i>	FT; CSC; ST; HCP	Prefer natural ephemeral pools or ponds that mimic them (stock ponds that are allowed to go dry). They may use permanent ponds with no fish predators. Need underground refuges, especially ground squirrel burrows	Moderate: Seasonal wetlands near soils stockpiles and Wetland E may provide marginal habitat.
California red-legged frog <i>Rana draytonii</i>	FT; CSC; HCP	Permanent and semi-permanent aquatic habitats; may aestivate in rodent burrows or cracks	Moderate: May occur in East Antioch Creek, project site does not support appropriate habitat
Reptiles			
Western pond turtle <i>Actinemys marmorata</i>	CSC; HCP	Occurs in perennial wetlands and slow moving creeks and ponds that support overhanging	Moderate: East Antioch Creek may provide suitable movement habitat for the

Species	Status ¹	Habitat	Potential to Occur
		vegetation and rock outcrops or floating debris for basking	species across the project site
Silvery legless lizard <i>Anniella pulchra pulchra</i>	CSC; HCP	Sandy or loose loamy soils under sparse vegetation of beaches, chaparral, or pine-oak woodland; soil moisture is essential; rocky soils or areas disturbed by agriculture, sand mining, or other human uses are not suitable	Moderate: Ruderal grassland areas on project site provide low to moderate suitable habitat for the species; This species was not detected during biological resource surveys conducted by the applicant or focused reconnaissance-level surveys conducted by DuPont in 2010 (DuPont 2010a)
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	FT;CT;HCP	Mixed chaparral, coastal scrub, and annual grassland and oak woodlands that are adjacent to scrub habitats, require rock outcrops with deep crevices or abundant rodent burrows	Absent: Suitable habitat does not occur onsite or adjacent to project area
Coast horned lizard <i>Phrynosoma coronatum</i> (frontale population)	CSC	Grasslands, coniferous forests, woodlands, and chaparral on exposed sandy gravelly substrate with scattered shrubs, and clearings	Low: Marginal suitable habitat occurs onsite however the species is not known from project area or vicinity; not observed onsite
Giant garter snake <i>Thamnophis gigas</i>	FT; ST;HCP	Marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, and rice fields; use upland habitat with grassy banks and openings to waterside vegetation for basking	Moderate: Suitable upland habitat occurs along East Antioch Creek where creek intersects with the transmission line right-of-way; This species was not detected during biological resource surveys conducted by the applicant or focused reconnaissance-level surveys conducted by DuPont in 2010 (DuPont 2010a)
Birds			
Tricolored blackbird <i>Agelaius tricolor</i>	CSC; HCP	Breeds near freshwater, preferably in emergent wetland with tall dense cattails or tules, but also in willow, blackberry, wild rose, and tall herbs in general with a minimum patch size of 40 acres; forages in grassland and cropland in the Central Valley and on the coast.	Low: Marginal suitable habitat occurs onsite; not known from project area or vicinity
Grasshopper sparrow <i>Ammodramus savannarum</i>	CSC	Occurs in dry, dense grasslands, with a variety of grasses and tall forbs and scattered shrubs for singing perches; prefers native grasslands	Low: Marginal suitable habitat occurs onsite; not known from project area or vicinity
Golden eagle <i>Aquila chrysaetos</i>	BGEPA;FP; HCP	Forage in grassy and open shrub habitats; nest primarily on cliffs, secondarily in large trees	Moderate: Suitable foraging habitat occurs throughout project area; not known to nest in project vicinity
Burrowing owl <i>Athene cunicularia hypugaea</i>	CSC;HCP	Sparse grassland, open desert scrub, and agriculture lands; strongly associated with ground squirrel burrows	Moderate: Not observed in project area; suitable habitat for foraging and nesting (ground squirrel burrows) occurs along transmission line

Species	Status ¹	Habitat	Potential to Occur
			route; known to occur in vicinity of transmission line corridor
Swainson's hawk <i>Buteo swainsoni</i>	ST;HCP	Occur in wide variety of open habitats; suitable habitat consists of suitable nest trees and proximity to high-quality foraging habitat	Present: Nesting trees (eucalyptus trees) and foraging habitat present onsite; observed foraging in grasslands near soil stockpiles during surveys conducted by the applicant; This species was also detected flying over the DuPont site during focused reconnaissance-level surveys conducted by DuPont in 2010. No evidence of nesting was detected during surveys conducted by DuPont in 2010 (DuPont 2010a)
Northern harrier <i>Circus cyaneus</i>	CSC	Meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands	Moderate: Suitable foraging habitat occurs throughout project area; not known to nest in project vicinity; Single female observed foraging along shore of San Joaquin River during surveys conducted by DuPont in 2010 (DuPont 2010a).
Yellow warbler <i>Dendroica petechia</i>	CSC	Breeds in riparian woodlands from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada. Also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush.	Moderate: : Marginal habitat occurs onsite at Wetland E Conservation Easement; Detected in willow thickets offsite near Little Break during surveys conducted by DuPont in 2010 (DuPont 2010a)
White-tailed kite <i>Elanus leucurus</i>	FP	Open woodland, marshes, partially cleared lands and cultivated fields, mostly in lowland situations.	Present: Nest observed approximately 300 feet from transmission line corridor during surveys
Peregrine falcon <i>Falco peregrinus</i>	SE;FP	Breeds in woodlands, forests, coastal habitats and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds.	Low: Marginal suitable habitat occurs onsite; not known from project area or vicinity
Salt marsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	CSC	Inhabits emergent wetland. Resident and summer visitant in San Francisco Bay area, and winters south along coast to San Diego Co.	Moderate: : Marginal habitat occurs onsite at Wetland E Conservation Easement; Detected in willow thickets offsite near Little Break during surveys conducted by DuPont in 2010. Assumed subspecies present however, identification to subspecies not confirmed by morphological data (DuPont 2010a).
Bald eagle <i>Haliaeetus leucocephalus</i>	BGEPA;FP	Nests in large, old-growth, or dominant live tree with open branchwork, especially ponderosa pine. Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches.	Low: Marginal foraging habitat occurs onsite; not known from project area or vicinity

Species	Status ¹	Habitat	Potential to Occur
Yellow-breasted chat <i>Icteria virens</i>	CSC	Riparian thickets of willow and tangled brush, such as blackberry.	Low: Marginal suitable habitat along East Antioch Creek; not known from project area or vicinity
California black rail <i>Laterallus jamaicensis coturniculus</i>	ST;FP	Saline, brackish, and fresh emergent marshes usually dominated by dense pickleweed; away from tidal areas marshes are characterized by water depths of less than 1.2 inches that do not fluctuate during the year	Low: Marginal suitable habitat occurs onsite; Wetland E does not provide suitable aquatic habitat as water depths fluctuate with rainfall and the average depth is 1 foot; This species was not detected during biological resource surveys conducted by the applicant or focused reconnaissance-level surveys conducted by DuPont in 2010 (DuPont 2010a)
Loggerhead shrike <i>Lanius ludovicianus</i>	CSC	Shrublands and open woodland with bare ground or sparse herbaceous cover; require tall trees or shrubs for hunting perches (also use power lines or fences)	Known: Nesting pair detected near proposed construction laydown area during surveys conducted by DuPont of the DuPont Oakley Site in 2010 (DuPont 2010a). Suitable nesting and foraging habitat occurs onsite
Song sparrow "Modesto" population <i>Melospiza melodia</i>	CSC	Emergent freshwater marshes dominated by tules and cattails and riparian areas.	Moderate: Marginal habitat occurs onsite at Wetland E Conservation Easement and along East Antioch Creek
Suisun song sparrow <i>Melospiza melodia maxillaris</i>	CSC	Tidal marshes of Suisun Bay; requires dense vegetation for nesting and cover.	Absent: Suitable habitat does not occur onsite or adjacent to project area
California least tern <i>Sternula antillarum browni</i>	FE; SE; FP	Colonial breeder on bare or sparsely vegetated, flat, substrates including sand beaches, alkali flats, landfills, or pave areas.	Low: Marginal suitable habitat occurs onsite; not observed onsite
Yellow-headed blackbird <i>Xanthocephalus xanthocephalus</i>	CSC	Fresh emergent wetland with dense vegetation and deep water, often along borders of lakes or ponds.	Low: Marginal suitable habitat occurs onsite; not observed onsite
Mammals			
Pallid bat <i>Antrozous pallidus</i>	CSC	Inhabits grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. Typically roosts in caves, crevices, or mines.	Moderate: Suitable roosting and foraging habitat occurs onsite
Western red bat <i>Lasiurus blossevillii</i>	CSC	Roosts primarily in trees, less often in shrubs; often in edge habitats adjacent to streams, fields, or urban areas.	Moderate: Suitable roosting and foraging habitat occurs onsite
San Joaquin pocket mouse <i>Perognathus inornatus inornatus</i>	—	Shrubby ridge tops and hillsides within coastal scrub and valley and foothill grassland.	Low: Marginal suitable habitat occurs onsite; not observed onsite
Salt-marsh harvest mouse <i>Reithrodontomys raviventris</i>	FE;SE;FP	Saline emergent wetlands of San Francisco Bay and its tributaries. Pickleweed is primary habitat, requires higher upland areas to escape flood waters	Absent: Suitable habitat does not occur onsite or adjacent to project area

Species	Status ¹	Habitat	Potential to Occur
American badger <i>Taxidea taxus</i>	CSC	Open arid habitats, grasslands, savannas, mountain, meadows, and open areas of desert scrub with friable soils and relatively open, uncultivated ground.	Moderate: Suitable habitat occurs on site; nearest record is 5 miles south of project area
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	FE;ST;HCP	Grasslands, scrublands, vernal pool areas, alkali meadows and playas, and agricultural areas and grazed annual grasslands; prefer habitats with loose-textured soils.	Moderate: Suitable habitat occurs onsite; project site within the known range; potential burrow observed near laydown area

¹ **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; **BGEPA** = Bald and Golden Eagle Protection Act; **SE** = State-listed Endangered; **ST** = State-listed Threatened; **SCE** = State Candidate Endangered; **CSC** = California Species of Concern; **FP** = Fully Protected; **SR** = State Rare; **CNPS List 1A** = Plant presumed extinct in California; **CNPS 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: OG 2009a; CDFG 2010; CNPS 2010; ECCHCPA 2006).

² These Antioch Dunes NWR species are analyzed in the indirect impacts section of this PSA despite not occurring in the area of direct impact.

‡Definitions Regarding Potential Occurrence:

Present: Species or sign of its presence observed on the site
High: Species or sign not observed on the site, but reasonably certain to occur on the site
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence
Low: Species or sign not observed on the site, conditions marginal for occurrence
Absent: Species or sign not observed on the site, conditions unsuitable for occurrence

Special-status Plants

Special-status plants were not detected in the proposed project area. Several special-status plants are known to occur within the vicinity of the project, but only marginally suitable habitat exists for these species at the OGS site or along the transmission line or sanitary sewer force main route. Focused rare plant surveys conducted in March 2009 as well as April and October 2010 did not identify any special-status plants in the project area. Although Northern California black walnut (*Juglans hindsii*) trees occur in the project area and one would be removed along the transmission line right-of-way these are not considered a native occurrence as the trees do not occur within a native stand. Mature native stands of Northern California black walnut are considered a sensitive plant community by CDFG; however, black walnut seedlings or trees that are interspersed within other habitats are not considered a special-status species. There are only 3 locations where Northern California black walnuts are considered indigenous, and as such, a sensitive plant community (CH2MHILL 2011c). These locations are outside of the OGS project area (CH2MHILL 2011c). Special-status plants occurring at the Antioch Dunes NWR, including Contra Costa wallflower and Antioch Dunes evening-primrose, would be indirectly impacted by the OGS project's NO_x emissions, as well as other sources of NO_x emissions, and resultant noxious weed proliferation resulting from nitrogen deposition.

Special-status Wildlife

The applicant conducted several site visits and surveys, including biological resource surveys in March and April 2009 and January, February, April, and August 2010 for

general wildlife resources, habitat and plant community mapping, and botanical resources. The proposed project area currently provides habitat for several special-status wildlife species. Special-status species are known, presumed, or highly likely to use the project site for foraging, breeding, cover, or dispersal. By participating in the ECCC HCP/NCCP the applicant assumes presence of California tiger salamander, California red-legged frog, giant garter snake, western burrowing owl, and San Joaquin kit fox in suitable habitat and would implement the necessary impact avoidance and minimization measures to reduce impacts to these special-status species. No suitable aquatic habitat for California red-legged frog or California tiger salamander occurs in the OGS site or along the project linear routes where direct impacts would occur, however the suitable upland dispersal habitat is present. In addition, because of observations of foraging Swainson's hawk in the grasslands adjacent to the soil stockpiles during field surveys, the project site is presumed foraging habitat for this species. Suitable nesting habitat for Swainson's hawk is also present in the large trees on the OGS site and along the transmission line route. These species, as well as those observed during surveys and site visits, are discussed below.

California tiger salamander (Federally Threatened, California Threatened, California Species of Special Concern, ECCC HCP/NCCP

The California tiger salamander historically inhabited grasslands throughout much of the state. Presently, they are distributed in remaining grassland/wetland habitats in the Central Valley, the Sierra Nevada foothills (below approximately 1,500-foot elevation), and the coastal region (Sonoma County south to Santa Barbara County) (ECCC HC 2007; Zeiner et al.1990). Conversion of valley and foothill grassland habitats to agricultural and urban uses has resulted in population declines for this species. The introduction of non-native predators, such as bullfrogs (*Rana catesbeiana*), has also been detrimental to this amphibian species (USFWS 2004).

Adult California tiger salamanders breed in vernal pools and ponds, and spend much of the year in subterranean burrows or soil crevices (Zeiner et al.1990). This species may also breed in artificial impoundments that do not contain fish and rarely in slow-moving streams. Breeding ponds must remain wet for a minimum of 10 weeks (generally until mid-May) to allow sufficient time for breeding and metamorphosis (Zeiner et al.1990). Other habitats used by this species include grasslands and oak woodlands (Zeiner et al.1990). Adults migrate at night during rain events, and may disperse up to one mile (1.6 km) between upland and aquatic breeding sites, depending on topography and vegetation, the distribution of ground squirrel or other rodent burrows, and climatic conditions (USFWS 2004; Zeiner et al.1990). At least 75 percent of historical California tiger salamander habitat has been lost, and its current distribution is discontinuous and fragmented (USFWS 2004).

Eight California Natural Diversity Database (CNDDDB) occurrences exist for tiger salamander within 5 miles of the proposed project area; however none of these known occurrences are within 1 mile of the proposed project site (CDFG 2010). No California tiger salamander were detected during the biological surveys of the project site or linears. The applicant is participating in the ECCC HCP/NCCP and as a requirement is assuming presence in suitable habitat. The project area is in the range of the California

tiger salamander and the seasonal wetlands in the project area provide marginal aquatic habitat.

California red-legged frog (Federally Threatened, California Species of Special Concern, ECCC HCP/NCCP)

California red-legged frog breeds in ponds and still waters in the coastal foothills and agricultural areas in the proposed project area (Zeiner et al.1990). California red-legged frogs are locally abundant in some portions of the San Francisco Bay area and the Central Coast, and there are isolated occurrences in the Sierra Nevada, along the northern coast, and northern Transverse Ranges. Population declines of this species have been caused by alteration of stream and wetland habitats, use of pesticides, habitat destruction, and competition and predation of introduced species such as fish and bullfrog (Davidson et al. 2001; USFWS 2002).

California red-legged frogs require various aquatic, riparian, and upland habitats including ephemeral ponds, intermittent streams, seasonal wetlands, springs, seeps, permanent ponds, perennial creeks, manmade aquatic features, marshes, dune ponds, lagoons, riparian corridors, blackberry thickets, non-native annual grasslands, and oak savannas (USFWS 2002; Zeiner et al.1990). The presence of willows, cattails, and woody riparian vegetation are indicators of higher quality breeding habitat (USFWS 2001b; USFWS 2005). Long-term populations survival is also linked to the spatial proximity of breeding habitats so that inter-patch migration can be achieved (USFWS 2001b).

Three California Natural Diversity Database (CNDDDB) occurrences exist for California red-legged frog within 5 miles of the proposed project area; however none of these CNDDDB occurrences are within 1 mile of the proposed project site (CDFG 2010). This species is associated with the ECCC HCP/NCCP land cover types identified as occurring in the project site. No California red-legged frogs were detected during the biological surveys of the project site. The applicant is participating in the ECCC HCP/NCCP and as a requirement is assuming presence in suitable habitat. The project area is in the range of the California red-legged frog and the project site provides suitable dispersal and upland habitat. Based on the availability of habitat and proximity to known occurrences, this species is presumed present in the vicinity of the transmission line route at East Antioch Creek.

Western pond turtle (California Species of Special Concern; ECCC HCP/NCCP)

Western pond turtles are found throughout western California, and are associated with permanent or nearly permanent water in a variety of habitat types (Zeiner et al. 1988-1990). They require slack or slow-water aquatic habitat, both water and aerial basking sites, and shallow water with dense submergent or short emergent vegetation for hatchlings (Jennings and Hayes 1994). In addition, western pond turtles require an upland nest site for egg-laying, in the vicinity of aquatic habitat.

There are no CNDDDB occurrences for this species within 1 mile of the proposed disturbance area, however there are six occurrences within 5 miles. No western pond turtles were observed during the biological surveys of the project area. This species was not associated with the ECCC HCP/NCCP land cover types identified as occurring in

the project area. However, the ECCC HCP/NCCP modeled habitat distribution for western pond turtle identifies East Antioch Creek in the vicinity of the transmission line route as movement habitat and Wetland E as core habitat (ECCHCPA 2006). Based on staff's site visit, suitable aquatic habitat for western pond turtle is not present at the Wetland E conservation easement. Average water depths are too shallow and appropriate basking sites or overhanging vegetation is not present at Wetland E. However, based upon the availability of habitat and proximity to known occurrences, this species may be present at East Antioch Creek in the vicinity of the proposed transmission line route.

Silvery legless lizard (California Species of Special Concern, ECCC HCP/NCCP)

The silvery legless lizard is found from Contra Costa County south to Baja California. They occur primarily in areas with sandy or loose loamy soils such as under sparse vegetation of beaches, chaparral, or pine-oak woodland; or near sycamores, cottonwoods, or oaks that grow on stream terraces. The species requires adequate soil moisture and rocky soils or areas disturbed by agriculture, sand mining, or other human uses are not suitable.

There are seven CNDDDB occurrences for this species within 5 miles of the proposed disturbance area; three of these occurrences are within 1 mile of the proposed project site. Two of these occurrences within 1 mile are historical, one of which was last seen in 1975 and appears to be within the proposed transmission line corridor. No silvery legless lizards were detected during the biological surveys of the project site, however, this species is cryptic and generally difficult to find. This species was not detected during focused reconnaissance-level surveys conducted by DuPont in 2010 (DuPont 2010a). This species is associated with the ECCC HCP/NCCP land cover types identified as occurring in the project area. The East Bay Regional Park District Legless Lizard Preserve is located approximately 1 mile southeast of the project site. The ruderal areas within the project site and in ruderal grassland areas along the transmission line route may provide only marginally suitable habitat for this species due to the level of prior human disturbance.

Giant garter snake (Federally Threatened, State Threatened, ECCC HCP/NCCP)

The giant garter snake is found in agricultural wetlands, canals, freshwater lakes, and low-gradient streams in the Central Valley of California. Giant garter snakes are essentially aquatic during their active period (April to October) (USFWS 2009). Between November and March, they typically hibernate in small mammal burrows or soil cracks on the banks of streams, rivers, or canals. Giant garter snakes feed on small fish and amphibians. The breeding season is typically March through April and young are born from July through September (USFWS 2009).

There is one CNDDDB occurrence for this species within 5 miles of the proposed project site (CDFG 2010). No giant garter snakes were observed during the biological surveys for the project area (OGS 2009a). This species was not detected during focused reconnaissance-level surveys conducted by DuPont in 2010 (DuPont 2010a). This species is associated with the ECCC HCP/NCCP land cover types identified as occurring in the project area. East Antioch Creek is hydrologically connected to the San Joaquin River. Suitable giant garter snake upland habitat was identified within the 200

foot buffer of East Antioch Creek in the vicinity of transmission line route (CH2MHILL 2010s).

Golden Eagle (Bald and Golden Eagle Protection Act, State Fully Protected), Loggerhead Shrike (California Species of Special Concern), Northern Harrier (California Species of Special Concern)

The golden eagle, loggerhead shrike, and northern harrier are all protected under the federal Migratory Bird Treaty Act. These birds of prey forage in ruderal areas or open agricultural lands, which occur within the project site and portions of the transmission line routes. Trees and shrubs, including those in the riparian habitat along East Antioch Creek, provide suitable nesting habitat for golden eagles and loggerhead shrikes. Ground-nesting habitat for northern harriers occurs in ruderal areas within the project site and in ruderal grassland areas along the transmission line route.

There is one CNDDDB record for golden eagle within 10 miles. This species is associated with the ECCC HCP/NCCP habitat elements (e.g. large trees) identified as occurring on the project site. There is one CNDDDB record for loggerhead shrike within 5 miles. During surveys of the entire DuPont Oakley site, conducted by DuPont in 2010, an active loggerhead shrike nest was detected in a coyote brush (*Baccharis pilularis*) along the southern boundary of the proposed construction laydown area (DuPont 2010a). There are no CNDDDB occurrences for northern harrier within 10 miles of the project site; however the project site is within the species known range. A single female northern harrier was observed foraging along shore of San Joaquin River during surveys conducted by DuPont in 2010 (DuPont 2010a). None of these species were detected during biological surveys of the project site.

Swainson's Hawk (State Threatened, ECCC HCP/NCCP)

The Swainson's hawk, a state threatened species, requires large areas of open landscape for foraging, including grasslands and agricultural lands that provide low-growing vegetation for hunting and high rodent prey populations. The Swainson's hawk typically nest in large native trees such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), walnut (*Juglans hindsii*), and willow (*Salix* spp.), and occasionally in non-native trees, such as eucalyptus (*Eucalyptus* spp.) within riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands (CDFG 1993). Foraging habitat occurs in ruderal grasslands as within the proposed OGS project site and transmission line route. Suitable nest trees (e.g., mature trees) are present along the transmission line route and adjacent to the OGS project site.

There are 10 CNDDDB occurrences for Swainson's hawk within 10 miles of the site (CDFG 2010), six of these occurrences are nests located within 5 miles of the project site. This species is associated with the ECCC HCP/NCCP habitat elements (e.g. trees within the species range below 200 feet in elevation) identified as occurring on the project site. One Swainson's hawk was observed during the applicant's biological surveys foraging over grasslands near the soil stockpile areas north of the proposed project site. This species was also detected flying over the DuPont site during focused reconnaissance-level surveys conducted by DuPont in 2010 (DuPont 2010a)

Burrowing owl (California Species of Special Concern, ECCC HCP/NCCP)

The burrowing owl is a yearlong resident of open, dry grassland, prairie, or desert floor habitats. Burrowing owls may be diurnal, crepuscular, or nocturnal, although hunting typically occurs at night. The burrowing owl is known to occur in urban, disturbed areas, and at the edges of agricultural fields, including orchards, and typically hunts from a perch or hops after prey on the ground. It typically nests in the vacant burrow of a ground squirrel or other small mammal although it is also known to occupy manmade structures including culverts, pipes, nest boxes, and piles of debris (CDFG 1995).

Multiple CNDDDB occurrences exist within 10 miles of the proposed project site. This includes two occurrences for active burrow sites, recorded between 2004 and 2008 located north and south of the proposed transmission line route. This species is associated with the ECCC HCP/NCCP land cover types identified as occurring in the project site. While this species was not observed during surveys for the proposed project, the ruderal grasslands within the project site, including the soil stockpile locations and along the proposed transmission line routes support prey for this species including insects, small mammals, lizards, and other birds. In addition, ground squirrel burrows located on along the transmission line route provide suitable nesting opportunities (CH2MHILL 2010s).

White-tailed kite (State Fully Protected)

The white-tailed kite is a yearlong resident in Central Valley lowlands and is often found near agricultural fields where it preys on small mammals, birds, and insects. It forages in open grasslands, meadows, and open agricultural fields. Kites nest in the tops of oaks, willows, or other trees near foraging habitat (Zeiner et. al. 1988). One white-tailed kite nest was observed during the biological resource surveys approximately 350 feet north of the transmission line corridor right-of-way (CH2MHILL 2010s). The agricultural fields adjacent to the project site also provide suitable foraging habitat for this species and there are additional suitable nesting trees directly adjacent to the project site.

Song sparrow "Modesto" population (California Species of Special Concern) The song sparrow "Modesto" population is a year-round resident in California where it resides only in the north-central portion of the Central Valley. It is found in emergent freshwater marshes dominated by tules and cattails and riparian areas. There are no occurrences for this species in CNDDDB; however the project area is within the species known range. The Wetland E conservation easement area and associated wetland and riparian area along East Antioch Creek provide suitable breeding habitat for this species. This species was not detected during biological surveys of the project site.

Yellow warbler (California Species of Special Concern)

The yellow warbler is summer migrant in California from April to October which breeds in riparian woodlands from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada. It also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush. There are no occurrences for yellow warbler in CNDDDB within 10 miles of the OGS project site and the project area is not within the species known range. Yellow warbler were detected outside the OGS project area in willow thickets along several access roads to the shoreline of Little Break during surveys conducted by DuPont in 2010 (DuPont 2010a). The Wetland E conservation

easement area and associated wetland and riparian area along East Antioch Creek provide suitable breeding habitat for this species. This species was not detected during biological surveys of the project site.

Salt Marsh Common Yellowthroat (California Species of Special Concern)

The salt marsh common yellowthroat inhabits emergent wetlands and is a resident or summer migrant in the San Francisco Bay area, and winters south along coast to San Diego County. There are two CNDDDB occurrences for salt marsh common yellowthroat within 10 miles and the project area is within the species known range. Several common yellowthroat were detected outside the OGS project area in bulrushes located west of Little Break during surveys conducted by DuPont in 2010 (DuPont 2010a). It is impossible to identify common yellowthroat to subspecies without collecting specimens to take measurements of body parts. Without morphological data from the birds, the surveyors assumed it was salt marsh common yellowthroat (DuPont 2010a). The Wetland E conservation easement area and associated wetland and riparian area along East Antioch Creek provide suitable breeding habitat for this species. This species was not detected during biological surveys of the project site.

American badger (California Species of Special Concern)

American badgers were once fairly widespread throughout open grassland habitats of California but now are an uncommon permanent resident with a wide distribution across California, except from the North Coast area where they are absent. American badger is most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and cold desert areas (Zeiner et al. 1990). Badgers inhabit burrows and often predate and forage on other small mammal burrows as evidenced by claw marks along the edges of existing burrows.

Two CNDDDB occurrences exist for American badger within 5 miles of the proposed project area. While this species was not observed during surveys for the proposed project, the project area contains potential habitat in the ruderal grasslands located along the transmission line route and this species could use the large burrows detected in the proposed construction laydown area during biological resource surveys.

San Joaquin kit fox (Federal Endangered, State Threatened, ECCC HCP/NCCP)

The San Joaquin kit fox (SJKF), a federally endangered and state-threatened species, is primarily nocturnal, but are commonly seen during the day in late spring and early summer (Orloff et al. 1986). This species typically occurs in valley and foothill grassland, or mixed shrub/grassland habitats throughout low, rolling hills and valleys and also use habitats that have been altered by humans (e.g., agricultural land, oil fields). San Joaquin kit foxes can inhabit the margins and fallow lands near irrigated row crops, orchards, and vineyards, and may forage occasionally within in these agricultural areas (Cypher et al 2007). Warrick et al. (2007) found that San Joaquin kit foxes in an agricultural setting typically denned in small patches of grassland but that 40-50% of their nocturnal locations were in row crops or orchards. Kit foxes change dens frequently, sometimes only using a den for two or three days. They often enlarge ground squirrel burrows for use as a den and may use vacant badger dens for shelter

(USFWS 1998). Ground squirrel and other large burrows occur within the proposed project area. Loss and degradation of habitat by agricultural, industrial, and urban development and associated practices continue to decrease available habitat. Hunting, road kill, and reduction of prey populations by poisoning have contributed to the species decline (USFWS 1998). One potential kit fox burrow was found during surveys conducted in 2009 in a berm associated with the row of Tasmanian blue gum trees located near the eastern edge of the laydown area (CH2MHILL 2010s). Other large burrows were identified in the ruderal areas located adjacent to the transmission line right-of-way (CH2MHILL 2010s).

Seven CNDDDB occurrences exist for SJKF within 10 miles of the proposed project area; however none of these occurrences are within 5 miles of the proposed project area (CDFG 2010). This species is associated with the ECCC HCP/NCCP land cover types identified as occurring in the project site. The project site is located near the northern end of the species range. However, the ECCC HCP/NCCP modeled habitat distribution for San Joaquin kit fox does not identify the OGS site as core habitat. While this species was not observed during surveys for the proposed project, the project area contains potential habitat in the ruderal grasslands located at the project site and along the transmission line route where this species could use the large burrows detected during biological resource surveys of the eastern edge of the proposed laydown area.

Pallid bat (California Species of Special Concern)

Pallid bats range throughout western North America, inhabiting low elevation rocky arid deserts and canyonlands, shrub-steppe grasslands, and higher elevation coniferous forests (WBWG 2005a). They are most abundant in xeric (extremely dry) ecosystems, including the Great Basin and the Mojave and Sonoran deserts. This species can be a solitary rooster, or can occupy small or large roost groups; day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, hollow trees or bark, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG 2005a). Pallid bats are opportunistic generalists that glean a variety of arthropod prey from surfaces, but also capture insects on the wing (WBWG 2005a).

One CNDDDB occurrence exists for pallid bat within 10 miles of the proposed project area. No pallid bats were observed during the surveys, but no surveys were specifically conducted for this species or any other bats. Pallid bats are known to forage over vineyards and water features and suitable roosting sites (e.g. trees) are present on site.

Western red bat (California Species of Special Concern)

The western red bat is a solitary, foliage-roosting bat locally common in some areas of California, and found from British Columbia to Central and South America. In California, this species is known to roost in cottonwood trees and willows, but is commonly detected in a variety of habitats, including chaparral. The western red bat is also known to use eucalyptus trees as day roosts (Pierson et al 2006). This species is typically solitary, roosting primarily in the foliage of trees or shrubs and may hibernate under the leaf-litter of trees during the winter (WBWG 2005b). Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas (WBWG 2005b). Western red bats may also occasionally use caves for roosts.

One CNDDDB occurrences exists for western red bat within 5 miles of the project area. No western red bats were observed during field surveys, but no surveys were specifically conducted for this species or any other bats. Western red bats are known to forage over vineyards and water features and suitable roosting sites (e.g. eucalyptus trees) are present on the proposed project site.

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 2001c). The Sardis Unit of the Antioch Dunes National Wildlife Refuge, located in part on PG&E-owned property, is located approximately 1.6 miles west of the proposed OGS 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

Aquatic site mapping was conducted by DuPont as part of a wetland delineation study of the entire DuPont property in 2006. The wetland delineation study submitted to the USACE for jurisdictional determination included identification of five waters which were all determined to be non-jurisdictional (OG 2009a, Appendix 5.2F). This included three waters that are located on or adjacent to the proposed OGS project site. There is an isolated wetland (Wetland E) in the western portion of the OGS site, north of PG&E's Antioch Terminal and south of temporary Stockpile Area 1. In the USACE verification, it was determined that Wetland E was non-jurisdictional because it lacks a connection to jurisdictional waters (is an isolated wetland) (OG 2009a, Appendix 5.2F). Wetland E, however, is under perpetual conservation easement granted to CDFG (CH2MHILL 2010k, Attachment C). Stormwater drainage from the OGS site would be designed by the project owner, in consultation with the CDFG, to avoid any changes in flow that could adversely affect Wetland E. This area provides suitable habitat for several bird species, including various waterfowl. Wetland E has been documented to support nesting redwinged blackbirds (Davis pers. comm.). Two additional wetlands (Wetland D and Wetland F) were also determined to be non-jurisdictional. Wetland F is a 0.37-acre wetland located 84 feet south of Stockpile 2. Wetland D is a 0.38-acre wetland located 46 feet north of Stockpile 3 (CH2MHILL 2010c). Project construction would not cause loss or fill of any wetlands. The City of Oakley has recommended conditions of approval for the OGS project which include protecting, preserving, and improving the 0.62-acre wetlands located on the OGS project site by removing garbage and replacing non-native species with native species at an approximate value of \$200,000 (COO 2010a and COO 2010c).

No other wetlands or waters of the United States (U.S) were identified within the project area. However, potential wetlands and other waters of the U.S. occur adjacent to the project area. Two additional wetlands were identified as part of the wetland delineation study. The San Joaquin River, a traditional navigable water, is located north of the OGS site. The shoreline along the San Joaquin River is 3,000 feet north of the project site and supports palustrine emergent wetlands that provide habitat for Sacramento perch, California black rail, California least tern, tricolored blackbird, and other sensitive species. The transmission line right-of-way intersects with East Antioch Creek approximately 120 feet from an existing steel-lattice tower that would be replaced with a tubular steel pole. Access to this area is via an existing paved and earthen walking trail that crosses the aquatic feature via a culvert.

Protected Trees

The City of Oakley Zoning Ordinance defines protected trees as any of the indigenous tree species listed in Article 9.1.1114(c)(2)(a)(i) that is adjacent to or part of a riparian, foothill woodland, or oak savanna area, or part of a stand of four or more trees, measuring 6.5 inches in diameter at breast height (dbh) or greater as measured 4.5 feet from ground level, or multi-stemmed tree with the sum of the circumferences measuring 40 inches or larger, measured 4.5 feet from ground level. Heritage trees are defined by the City of Oakley Zoning Ordinance Article 9.1.1112(c) as a tree 50 inches or more in circumference measured 4.5 feet above the natural grade or a tree determined to have a special significance to the community because of a unique quality, species, size, or historic or ecological value. The City of Oakley does not require a permit for trimming and clearing within public agency or utility easements and rights-of-way for maintenance of easement or right of way. The City of Antioch Zoning Ordinance Title 9, Chapter 5, Article 12 defines protected trees as indigenous established trees, mature trees, street trees, or landmark trees. An indigenous established tree has a circumference of 10 inches diameter at breast height (dbh) or greater and is one of the following species: blue oak (*Quercus douglasii*), valley oak (*Q. lobata*), coast live oak (*Q. agrifolia*), canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizenii*), California buckeye (*Aesculus californica*), or California bay (*Umbellularia californica*). A mature tree has a dbh of at least 26 inches. A street tree is "any tree planted within either the public right-of-way and/or tree planting easement, where applicable." A landmark tree is any tree which is at least 48 inches in diameter and/or in excess of 40 feet in height. Removal of protected trees requires city permits for the cities of Oakley and Antioch. The City of Antioch also requires a bond be posted for protected trees where grading will occur within the drip line of the protected tree in the amounts defined in City of Antioch Municipal Code 9-12 (COA 2011a).

Protected trees in the OGS site and along the transmission line route within the City of Oakley that would be removed as part of the project include the six interior live oaks (*Quercus wislizenii*) located in the vineyard where the proposed Air Cooled Condenser would be located. Protected trees within the City of Antioch that would be removed as part of the project include one interior live oak located near a tower to be replaced along the transmission line route. The second interior live oak that would be removed along the transmission line route within the City of Antioch is less than 10 inches dbh and is in poor condition. This tree is not considered protected as defined by the City of Antioch

zoning ordinance. No heritage trees, landmark trees, or street trees are located within the OGS project site or along any linear features (CH2MHILL 2011c).

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.

General Impact Avoidance, Minimization, and Mitigation Measures

Staff recommends that a Designated Biologist and Biological Monitor(s) be employed to ensure impact avoidance and minimization measures described below and protection of any sensitive biological resources potentially occurring in the project area. Selection criteria and minimum qualifications of the Designated Biologist and Biological Monitor(s) (such as an appropriate degree and/or field experience) are described in staff’s proposed Conditions of Certification **BIO-1** (Designated Biologist Selection) and **BIO-3** (Biological Monitor Qualifications). The Designated Biologist and Biological Monitor, their duties (such as required presence on-site and involvement in preparing plans and reports), and authority (including the authority to halt project activities under certain circumstances) are described in staff’s proposed Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-4** (Designated Biologist and Biological Monitor

Authority), respectively. The Designated Biologist and/or Biological Monitor would be responsible, in part, for developing and implementing the Worker Environmental Awareness Program (WEAP) (see Condition of Certification **BIO-5**), which is a mechanism for training the workers on why it is important to protect the sensitive biological resources described in this analysis.

Staff's proposed Condition of Certification **BIO-6** provides for the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), which consolidates all project resource mitigation, monitoring, and compliance measures, as well as other information necessary to ensure compliance with, and effectiveness of, all project-specific required impact avoidance, minimization, and mitigation measures.

Staff's proposed Condition of Certification **BIO-7** (General Impact Avoidance and Minimization Measures), describes general measures to be in place throughout project construction to avoid and minimize impacts to biological resources from the proposed project during site mobilization, ground disturbance, grading, construction, operation, maintenance, and closure.

The applicant has proposed several mitigation measures that relate to the Designated Biologist duties, and the WEAP, and general impact avoidance, minimization, and mitigation (OG 2009a). This includes measures proposing biological monitors and requirements for their presence on site during sensitive work; protecting wetlands and other waterways from sediment and other pollutants; dust control; development and implementation of site restoration plan; protections for special-status species; and an on-site construction personnel environmental awareness program. Staff agrees with many of these proposals, and, where appropriate, has incorporated these items into staff's proposed conditions of certification.

Construction-Related Impacts and Mitigation

Construction Impacts to General Vegetation

Construction impacts to vegetation could occur through the direct removal of plants during construction or crushing by heavy equipment. 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 16.7 acres. Temporary impacts fees to be paid to the Conservancy are assessed to areas subject to temporary disturbance where recovery would take place within approximately two to four years. The proposed project would result in the temporary disturbance of approximately 38.4 acres. The OGS project site, sanitary sewer force main, and existing transmission towers are located in a variety of land uses, including active industrial and commercial properties (categorized as urban), vacant lots composed of ruderal grassland (categorized as ruderal), active vineyard agricultural (categorized as vineyard), landscaped residential (categorized as ruderal), and inactive non-native ruderal grassland habitat (categorized as ruderal). The row of trees along the northern border of the OGS site is categorized as non-native woodland and the vegetation along East Antioch Creek is categorized as riparian (See **Biological Resources Table 3**). Areas protected by wildlife exclusion fencing or silt fencing or areas categorized as

urban are considered exempt from mitigation fees; this includes 0.52 acre of non-native woodland and 1.6 acres at the Wetland E Conservation Easement that would be protected by wildlife exclusion fencing and 2.8 acres of urban habitat cover (CH2MHILL 2010s).

Construction of the proposed project would not result in substantial loss of native vegetation or a regionally unique habitat type; any temporary or permanent impacts to general vegetation would be mitigated to a less-than significant level through a one-time payment to the Conservancy) (CH2MHILL 2010s) as required in Condition of Certification **BIO-21** (East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan Mitigation Fees). The Conservancy utilizes a mitigation fee that serves to offset losses of land cover types, covered species habitat, and other biological values via purchasing and restoring land/habitat for all species covered under the ECCC HCP/NCCP permit, as part of the core conservation strategy of the ECCC HCP/NCCP. The applicant's one-time payment to the Conservancy as these mitigation fees are the primary fee for the development of areas which are removed from an undeveloped or habitat-providing state (CH2MHILL 2010k). In addition, unpaved areas that are temporarily disturbed within the construction laydown area and the area between the Wetland E conservation easement and Bridgehead Road would be hydro-seeded with native grass mix upon completion of project construction (CH2MHILL 2010ac). This does not include the titanium dioxide disposal site which will remain exposed similar to the existing condition. Areas disturbed during installation of the 230-kV transmission line including tower locations and pull and tensioning sites would be recontoured and hydro-seeded with native grass mix upon completion of project construction. The revegetation plan and Transmission Line Best Management Practices proposed by the applicant are incorporated by reference into staff's proposed Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan).

BIOLOGICAL RESOURCES Table 3
Temporary and Permanent Impacts to General Vegetation

Habitat Cover	Total Acres Impacted	Area Inside Wildlife Exclusion Fencing	Fee Zone¹	Mitigation Acreage Required*
Non-native woodland				
Permanent	0.60	0.52	I	0.8
Temporary (construction laydown area)	0.61	0.57	I	0.04
Ruderal				
Permanent	2.68	0	I	2.68
Temporary	0.30	0	I	0.30
Temporary (construction laydown area)	13.22	0.13	I	13.09
Temporary (soil stockpile area)	5.0	0	I	5.0
Temporary (transmission line corridor)	3.28/9.65	0	I/IV	3.28/9.65
Temporary (transmission line pull sites)	0.09/0.88	0	I/IV	0.09/0.88
Temporary (transmission line access roads)	0.55	0	IV	0.55
Temporary (access roads on DuPont Property)	0.21	0	I	0.21
Urban				
Permanent	2.82	0	I	0
Temporary (construction laydown area)	6.48	0	I	0
Temporary (soil stockpile area)	2.2	0	I	0
Temporary (transmission line corridor)	2.78/1.6	0	I/IV	0
Temporary (transmission line pull site)	0.17	0	I	0
Temporary (sanitary sewer force main)	1.52	0	I	0
Temporary (transmission line access roads)	0.48	0	I	0
Temporary (access roads on DuPont Property)	2.33	0	I	0
Vineyard				
Permanent	13.94	0	I	13.94
Temporary (transmission line corridor)	2.34/2.70	0	I/IV	2.34/2.70
Temporary (transmission line pull site)	0.24	0	I	0.24
Temporary (transmission line access roads)	0.006	0	I	0.006
Riparian				
Permanent	0	0	I	0
Temporary (transmission line corridor)	0/0.18	0/0.18	I/IV	0/0
Total				

Habitat Cover	Total Acres Impacted	Area Inside Wildlife Exclusion Fencing	Fee Zone ¹	Mitigation Acreage Required*
Permanent	16.7	0.52	I	16.7
Temporary	38.4/20.4	0.88	I/IV	38.4

Source: CH2MHILL 2010s

¹ The entire project site would be located within Development Fee Zone I. Approximately 5.62 acres of the transmission line corridor are located in Development Fee Zone I. The remaining 12.4 acres will be located within Development Fee Zone IV.

Construction Impacts to Trees

Construction impacts to trees could occur through the direct removal of trees during construction. Construction of the proposed project would not result in substantial loss of native trees; any impacts to protected trees would be fully mitigated through a payment to the City of Antioch and/or the City of Oakley based upon the result of the arborist report. The applicant submitted the arborist report to the cities of Oakley and Antioch for review in February 2011 (CH2MHILL 2011c). The City of Oakley confirmed it would be processing a tree removal permit for the applicant (Strelo pers comm.). The City of Antioch requires that legally removed protected trees be replaced by boxed specimens at a rate of two 24-inch box trees for each established tree and two 48-inch box trees for each mature tree. The City of Antioch also requires a bond be posted for protected trees where grading will occur within the drip line of the protected tree. Mitigation fees to be paid to the cities of Oakley and Antioch for removal of protected trees and any required bond for grading within the dripline of protected trees within the City of Antioch are incorporated into staff's proposed Condition of Certification **BIO-8** (Protected Tree Mitigation Fees). In addition, to avoid potential impacts to existing trees to remain on the OGS site or along any project linears, the applicant proposes to install silt fencing and/or wildlife exclusion fencing to protect trees during construction (CH2MHILL 2011c). Staff agrees with this applicant-proposed impact avoidance and minimization measure and has incorporated it into staff's proposed Condition of Certification **BIO-7**.

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 OGS site. Small burrowing animals (lizards, snakes, and small mammals) could be harmed through crushing of burrows, loss of refugia from predators, and direct mortality from construction activities. Construction activities and human presence could also alter or disrupt breeding and foraging habitats and activities for common wildlife species.

The OGS site provides suitable nesting habitat for a variety of common bird species. Birds could nest in the eucalyptus trees along the northern border of the OGS site, the wetland habitats north of the proposed site, in trees located north of the OGS site near the soil stockpiles, and in trees along the sanitary sewer force main route. Trees and shrubs along the proposed transmission line route also provide suitable nesting habitat for a variety of common birds. Additionally, some bird species adapted to disturbed environments could nest in equipment or other available substrate within and surrounding the proposed project area. Construction activities during the nesting season (February through September) could adversely affect breeding birds through direct take

or indirectly through disruption or harassment. The applicant proposes to conduct breeding bird surveys prior to each phase of construction and monitor the nest, should one be discovered (OG 2009a, p. 5.2-56). Staff incorporated this applicant-proposed measure into Condition of Certification **BIO-9** (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-9**, significant impacts to nesting birds would not result from proposed project construction activities.

Several isolated wetlands located near the proposed soil stockpiles provide suitable foraging habitat for several bird species, including various waterfowl. Construction activities near the isolated wetlands (Wetland E, Wetland D, and Wetland F), including development of a detention pond and bioswales and creation of soil stockpiles may result in indirect impacts (i.e., contamination) to the habitat and wildlife species potentially occurring in these areas. In addition, dewatering operations proposed for installation of new transmission line towers near East Antioch Creek may result in indirect impacts to the habitat and wildlife species potentially occurring in these areas. The applicant proposed several impact avoidance and minimization measures, which staff has determined are adequate to reduce potential impacts to biological resources at the isolated wetlands and East Antioch Creek to less than significant. These measures include clearly delineating environmentally sensitive areas, using a biological monitor, prohibiting construction discharges into surface waters, installing erosion control measures, complying with best management practices, and controlling introduction of weeds. These measures from Responses to Energy Commission Data Requests Set 2 – Data Response #62-1 (CH2MHILL 2010c) and the ECCC HCP/NCCP Planning Report (CH2MHILL 2010s) are incorporated by reference into staff's proposed Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan).

Terrestrial wildlife could become entrapped in open trenches during construction, especially if trenches remain open during inactive construction periods. Staff recommends Condition of Certification **BIO-7** (General Impact Avoidance and Minimization Measures), which would require exclusion measures for open trenches (e.g., fencing or covering), inspection of trenches prior to resuming construction activities each day, and installation of escape ramps so that animals that fall in the trench could escape. Implementation of this measure would minimize adverse impacts to wildlife from entrapment.

Construction Impacts to Special-Status Plant Species

Project construction would occur entirely within previously disturbed areas or in ruderal uplands that were determined to not support special-status plants. No special-status plants were found during focused surveys at the project site in March 2009 and April 2010. A follow-up survey for special-status plants was conducted in the fall of 2010 and the results were submitted in the Revised Planning Survey Report (PSR) (CH2MHILL 2010ac). . . The additional areas surveyed include the three soil stockpile areas. Two soil stockpiles are subject to regular ongoing disturbance including disking and are not expected to support special-status plants. One soil stockpile area is paved and not

expected to support special-status plants. No special-status plants were found during botanical surveys and as such there is no proposed condition of certification related to special-status plants.

Construction Impacts to Special-status Wildlife

Direct impacts from proposed project construction would include individual mortality from vehicles and equipment and displacement (avoidance of an area and modified behavior due to construction activities). Potentially affected special-status wildlife species include Swainson's hawk and white-tailed kite which were observed or detected in the project area, as well as the other potentially occurring species listed in **Biological Resources Table 2**.

The proposed OGS site and transmission line corridor and its immediate vicinity provides potential habitat for silvery legless lizard, western burrowing owl, golden eagle, Swainson's hawk, northern harrier, white-tailed kite, loggerhead shrike, American badger, and San Joaquin kit fox. The portion of East Antioch Creek that would be crossed by the transmission line route provides limited potential habitat for western pond turtle, giant garter snake, and California red-legged frog (CH2MHILL 2010s). The Wetland E conservation easement area provides habitat for California tiger salamander, song sparrow "Modesto" population, yellow warbler and salt marsh common yellowthroat. The two seasonal wetlands located near Soil Stockpile 2 and 3 also provide marginal habitat for California tiger salamander. Trees in the proposed project area also provide roosting and foraging habitat for special-status bat, including western red bat and pallid bat.

Portions of the project site including the transmission line corridor could support denning and burrowing animals such as western burrowing owls, American badger, and San Joaquin kit foxes. These species use or enlarge burrows, or dens, created by California ground squirrels, and both could potentially be within or directly adjacent to the transmission corridor. Dens within the project site would likely be destroyed or be otherwise indirectly impacted by construction noise and dust. Animals occupying those dens, both within and adjacent to impacted areas could be disturbed or harmed during construction and may be subjected to ongoing impacts related to maintenance after construction is completed. Protection provided by kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species.

Staff's proposed Condition of Certification **BIO-9** (Pre-Construction Nest Surveys and Impact Avoidance and Minimization Measures for Breeding Birds) outlines impact minimization and avoidance measures to avoid construction impacts to nesting special-status birds. Staff's proposed Condition of Certification **BIO-10** (Impact Avoidance and Minimization Measures for Bats) outlines impact minimization and avoidance measures to avoid construction impacts to roosting special-status bats during tree removal. Staff's proposed Condition of Certification **BIO-11** (Swainson's Hawk Nest Tree Mitigation and Monitoring) outlines impact minimization and avoidance measures to avoid construction impacts to nesting Swainson's hawk. Staff's proposed Condition of Certification **BIO-12** (Burrowing Owl Impact Avoidance and Minimization Measures), **BIO-13** (American Badger Impact Avoidance and Minimization Measures), and **BIO-14** (Avoid Harassment or Harm to San Joaquin Kit Fox), outline impact minimization and avoidance measures

to avoid construction impacts to burrowing wildlife. Staff's proposed Condition of Certification **BIO-7** (General Impact Avoidance and Minimization Measures), **BIO-15** (Western Pond Turtle Impact Avoidance and Minimization Measures), **BIO-16** (Giant Garter Snake Impact Avoidance and Minimization Measures), **BIO-17** (California Tiger Salamander Impact Avoidance and Minimization Measures), and **BIO-18** (California Red-legged Frog Impact Avoidance and Minimization Measures) outline impact minimization and avoidance measures to avoid construction impacts to aquatic wildlife potentially occurring in East Antioch Creek and Wetland E, D, and F. The applicant proposed several impact avoidance and minimization measures, which staff has determined are adequate to reduce potential impacts to wildlife to less than significant. These measures include conducting pre-construction surveys and delineating species-specific avoidance buffers. Applicant-proposed impact avoidance and minimization measures along with staff's proposed conditions of certification would avoid impacts to wildlife or mitigate them to less than significant levels. Participation in the ECCC HCP/NCCP would provide take authorization of covered species which include the following species potentially occurring in the project area: California tiger salamander, California red-legged frog, western pond turtle, silvery legless lizard, giant garter snake, western burrowing owl, San Joaquin kit fox, Swainson's hawk, golden eagle. However, direct take of white-tailed kite and golden eagle is not permitted under the ECCC HCP/NCCP. Proof of take authorization would be required under **BIO-22** (East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan Certificate of Inclusion).

Temporary or permanent impacts to foraging habitat for special-status species, including Swainson's hawk and golden eagle, would be mitigated to a less-than significant level through a one-time payment to the East Contra Costa County Habitat Conservancy (Conservancy) (CH2MHILL 2010s) as required in Condition of Certification **BIO-21** (East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan Mitigation Fees). The one-time payment to the Conservancy would also mitigate for loss of silvery legless lizard habitat within the OGS project site as the fees go toward purchasing land/habitat for all species covered under the ECCC HCP/NCCP permit, as part of the core conservation strategy of the ECCC HCP/NCCP. No additional species-level measures are proposed for silvery legless lizard under the ECCC HCP/NCCP beyond mitigation fees for impacts. The one-time payment to the Conservancy is the primary mitigation fee for the development of areas which are removed from an undeveloped or habitat-providing state (CH2MHILL 2010k).

General Construction Impacts

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

Noise

According to the AFC application, construction activities would typically occur between 6:00 a.m. and 7:00 p.m. and would result in a short-term, temporary increase in the ambient noise level. However, noisy construction work would be allowed only during the daytime hours of 7:30 a.m. to 7:00 p.m. on weekdays and 9:00 a.m. to 7:00 p.m. on weekends (Condition of Certification **NOISE-8**). The OGS project site is located in an area that historically was occupied by industrial uses related to the DuPont plant

operations which ceased operations in 1998. Traffic on Bridgehead Road and State Route 160 and activities at the Lauritzen Yacht Harbor and the Burlington Northern Santa Fe Railroad as well as the Contra Costa Power Plant (CCPP) and Gateway Generating Station in the immediate vicinity of the proposed OGS 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 located at Wetland E, which is within the OGS project boundaries and approximately 400 feet west of the main OGS facility site. The San Joaquin River is another sensitive area that supports a diversity of waterfowl and is located approximately 0.6 miles north of a main OGS facility site.

Steam blowing will likely be the loudest construction activity and is anticipated to occur approximately 750 feet from Wetland E and 0.6 mile from the river shoreline. Low-pressure steam blow sound levels could reach approximately 63 A-Weighted Sound Pressure Level (dBA) at the Wetland E and 54 dBA at the shoreline (OG 2009a). High-pressure steam blow sound levels could reach approximately 76 dBA at the Wetland E and 68 dBA at the shoreline (OG 2009a). Other loud construction activity includes pile driving which could reach sound levels of approximately 81 dBA at the Wetland E and 72 dBA at the shoreline (OG 2009a). A maximum construction noise level of 89 dBA Leq is estimated to occur at a distance of 50 feet from the acoustic center of the construction activity (most often the power block) and attenuate to no more than 57 dBA Leq at the Lauritzen Yacht Club Harbor. It was estimated by the applicant that ambient daytime sound levels at the Yacht Club Harbor are approximately 54 dBA, this is a conservative estimate based on the lowest ambient sound level measured for the project area. Studies have shown that noise levels over 60 A-weighted decibels (dBA) can affect the behavior of certain bird species (Dooling and Popper 2007). In addition, 60 dBA has been used by the USFWS and the Energy Commission as a reference point for evaluating noise impacts on wildlife (CEC 2002; CEC 2003). Construction noise levels are predicted to be 55 dBA at the edge of the proposed project site (OG 2009a).

To minimize noise impacts to breeding birds potentially nesting in the row of eucalyptus trees and at the Wetland E conservation easement area as well as bats potentially roosting in trees on the OGS project site, staff recommends conditions of certification **BIO-9** and **BIO-10**, which requires a qualified biologist to monitor any bird nest or bat maternity roost locations exposed to excessive construction noise until the biologist determines that nestlings have fledged and dispersed or bats are volant (capable of flight). Activities that might disturb nesting or roosting activities (e.g., excessive noise above 60 dBA, especially during steam blowing), shall be prohibited within the buffer zone until such a determination is made. With implementation of this condition, impacts to nesting birds and roosting bats from proposed project construction activities would be less than significant. For a complete analysis of construction noise impacts, refer to the **Noise and Vibration** section of this Final Staff Assessment.

Lighting

According to the AFC application, project construction activities are planned to occur between 6:00 a.m. and 7:00 p.m.; however, pursuant to Condition of Certification **NOISE-8**, construction work would be allowed only during the daytime hours of 7:30 a.m. to 7:00 p.m. on weekdays and 9:00 a.m. to 7:00 p.m. on weekends. Any deviation

from those construction hours would be subject to approval of the Compliance Project Manager. 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 adjacent PG&E Antioch Terminal and nearby industrial areas as well as traffic on Bridgehead Road and SR 160 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 (OG 2009a; pp. 5.13-33):

- Lighting on the project site would be limited to areas required for safety and operation, would be hooded and directed onsite to minimize significant light or glare, and would be shielded from public view to the extent practical;
- All lighting that is not required to be on during nighttime hours would be controlled with sensors, switches, or timers operated so that the lighting would only be on when needed; and
- Low-pressure sodium vapor fixtures of a non-glare type would be used. These lights are the efficient electrically-powered light source and typically produce low-intensity yellow/amber light, which would reduce visual contrast with the night sky.

The existing commercial and industrial environment provides several light sources. Implementation of these applicant-proposed measures would ensure that temporary and permanent construction lighting would not create substantial sources of new light. These measures are incorporated by reference into staff's proposed Condition of Certification **BIO-7 and VIS-3** (see the **Visual Resources** section of Final Staff Assessment). In addition, staff recommends that lighting be specifically directed away from biologically sensitive areas (i.e., Wetland E) (refer to Condition of Certification **BIO-7**). 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 species and their habitat 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 OGS project would construct two generation units, each with an associated 155-foot-tall, 20-foot-diameter exhaust stack. The generated power would be transmitted approximately 2.4 miles to PG&E's Contra Costa Substation via an existing transmission corridor. The 230-kV electrical interconnection would extend approximately 2.4 miles and include replacement of 17 existing steel lattice towers with new 95-foot-tall tubular steel pole structures. Three additional 95-foot tall tubular steel poles would be added along the

transmission line route and one steel lattice tower located within Wetland E would remain in place. The existing CCPP and Gateway Generating Station located approximately 0.8 miles northwest, have several tall generation and transmission structures, including two 195-foot-tall Gateway Generating Station exhaust stacks. The tallest existing exhaust stack at the nearby 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). Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing danger. Collisions are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 1994); aside from the wetland, these features are not present near the proposed project area. The Wetland E conservation easement located in the project area is east of the existing transmission line, and north of an existing gas metering yard.

The two proposed exhaust stacks would be approximately 155 feet tall, and would be within an open area adjacent to existing transmission lines. The proposed 230-kV transmission line monopoles would be 95 feet tall (OG 2009a). Structures over 500 feet tall present a greater risk to migratory songbirds than shorter structures (Kerlinger 2000); bird mortality is significantly lower at towers shorter than 350 feet (Longcore et al 2008). Because the project exhaust stacks and transmission lines would be significantly shorter than 350 feet tall, these proposed project features would pose a relatively low height-related collision risk to migrating birds. The applicant proposes to incorporate design measures, such as the installation of approved bird flight diverters which would greatly reduce the chance of collision. Bird flight diverters are usually installed on the ground wire to lessen the collision threat. With installation of approved bird flight diverters, staff concludes that the project structures would not pose a significant collision threat to resident or migratory bird populations. Staff agrees with this applicant-proposed impact avoidance and minimization measure and has incorporated it into staff's proposed Condition of Certification **BIO-7**.

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 OGS transmission lines would be 230-kV;

therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to minimize bird electrocutions.

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 (OG 2009a; p. 5.2-21). Staff agrees with this applicant-proposed impact avoidance and minimization measure and has incorporated it into staff's proposed Condition of Certification **BIO-7**. 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 are located in the vicinity of the proposed OGS site, including the commercial and industrial operations as well as traffic on State Route 160 and Bridgehead Road. A slight increase in light is expected to occur during operation of the OGS. Under certain circumstances, lights can disorient migratory birds or bats flying at night or attract wildlife such as insects and insect-eaters. Implementation of applicant-proposed measures would ensure that operational lighting would not create substantial sources of new light. These measures have been incorporated into staff's proposed Conditions of Certification **VIS-3** and **BIO-7** (see the **Visual Resources** section of this Final Staff Assessment). Implementation of these conditions would ensure significant impacts from operation lighting would be avoided.

Operation Noise

The OGS site is zoned as Heavy Industrial and has a General Plan Land Use Designation of Utility Energy. It is located within 0.5 mile of other energy facilities including the CCPP and the Gateway Generating Station. In addition, the project site is immediately east of Bridgehead Road, approximately 0.1 mile east of State Route 160 and 50 feet 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 would be no significant impacts to biological resources by increased operational noise; no mitigation beyond Staff's Condition of Certification **NOISE-4** (in the **Noise and Vibration** section of this Final Staff Assessment) is proposed.

Stormwater Runoff

Stormwater runoff at the OGS site currently drains to Wetland E and supports the existing hydrology of the wetland area. Stormwater runoff from open areas on the OGS project site would be conveyed to the proposed bioswales and detention basin which would then be discharged to Wetland E in accordance with the Contra Costa County Clean Water Program's Clean Water Program's Stormwater C.3 Guidebook. Runoff from the power block area would be routed through an oil/water separator before being discharged to the sanitary sewer system. Stormwater runoff would be conveyed in accordance with the National Pollutant Discharge Elimination System (NPDES) General

Industrial Permit requirements. Impacts to Wetland E would not occur. For a complete analysis of water quality impacts, refer to the **Soil and Water Resources** section of this Final Staff Assessment.

The project would not affect any creeks, drainages, wetlands, or other aquatic resources. Appropriate soil erosion and sediment controls will be implemented on-site to prevent construction materials and/or eroded soils from entering aquatic resources (Wetland E, Wetland D, and Wetland F). Proposed Conditions of Certification **SOIL&WATER-1**, in which the applicant is required to obtain Compliance Project Manager approval for a site-specific Drainage, Erosion, and Sediment Control Plan, that outlines drainage, soil erosion and sediment control measures would be required, and **SOIL&WATER-2**, in which the applicant is required to develop and implement a construction Storm Water Pollution Prevention Plan. In addition, the applicant has developed measures, in coordination with California Department of Fish and Game staff, to ensure that the OGS project stormwater management system does not negatively effect the quality of stormwater draining into Wetland E and adversely alter the flow of stormwater into the wetland (CH2MHILL 2010j, CH2MHILL 2010k). The proposed stormwater management system is also intended to maintain or improve the current hydrologic function of Wetland E following construction of the OGS. For more details, see the **SOIL&WATER-6** in the **Soil and Water Resources** section of this Final Staff Assessment. The applicant also proposed measures that would potentially enhance the function and values of the wetland and upland habitats of the Wetland E Mitigation Area (Condition of Certification **BIO-19**). In addition, it is expected that for coverage under the ECCC HCP/NCCP, the applicant would install wildlife exclusion fencing and/or silt fencing to protect the riparian habitat along East Antioch Creek in the vicinity of the intersection with the transmission line right-of way (Condition of Certification **BIO-7**).

Wetland E Mitigation Area

The applicant, in coordination with California Department of Fish and Game (CDFG), has proposed enhancement measures that have the potential to improve the existing wetland and upland habitats located within the 1.60-acre conservation easement identified as the Wetland E Mitigation Area. The applicant developed a Wetland E Management Plan (CH2MHILL 2010k) which details plans to enhance the function and values of the Wetland E Mitigation Area. CDFG approved the approach and goals of the plan on June 21, 2010 (CH2MHILL 2010l). The wetland collects stormwater runoff from the 25-acre area located east and south of the easement (CH2MHILL 2010k). The OGS facilities would occupy the majority of these 25-acres after project completion. The applicant proposes to maintain the existing water quality and hydraulic flow to the Wetland E easement area through a stormwater management system. The applicant has developed measures, in coordination with CDFG staff, to ensure that the OGS project stormwater management system does not negatively affect the quality of stormwater draining into Wetland E and adversely alter the flow of stormwater into the wetland (CH2MHILL 2010j, CH2MHILL 2010k). Proposed Condition of Certification **SOIL&WATER-6** requires the applicant to implement a Wetland E Monitoring and Adaptive Management Plan approved by the Compliance Project Manager in accordance with the requirements of CDFG and the Central Valley Regional Water

Quality Control Board (CV RWQCB) (For more details, see the **Soil and Water Resources** section of this Final Staff Assessment).

The applicant, in coordination with CDFG, developed proposed habitat improvements as part of the Wetland E Monitoring and Adaptive Management Plan that would be implemented as part of the conditions of certification for the OGS project (CH2MHILL 2010k). Goals and objectives include measures to re-establish native vegetation within the conservation easement by planting upland dune vegetation within approximately 0.3 acre of the Wetland E Mitigation Area, implementing noxious weed control methods, replacing non-native trees with coast live oak (*Quercus agrifolia*), blocking the overflow drain into the preserve, and including native plants in the landscape screening plan. The landscape screening plan is fully described in **VIS-2** (For more details, see the **Visual Resources** section of this Final Staff Assessment). Goals and objectives also include maintaining wildlife habitat value and wildlife use within the conservation easement. This would be measured by no significant change in duration or extent of wetland ponding compared to pre-project conditions and no significant change in species composition or cover of wetland vegetation compared to pre-project conditions (CH2MHILL 2010k).

Currently, the upland area adjacent to the wetland is dominated by non-native grasses and herbaceous plants including the following California Invasive Plant Council (Cal-IPC) Inventory rated noxious weed species: pampasgrass (*Cortaderia selloana*, rated High), yellow star thistle (*Centaurea solstitialis*, rated High), and Russian thistle (*Salsola tragus*, rated Limited). This area would be revegetated with nursery-grown plugs of native perennial herbs and shrub and hand broadcast native annual seed mixtures including native species similar to those found in the Antioch Dunes National Wildlife Refuge. The herbaceous species would include native upland dune species such as silver bush lupine (*Lupinus albifrons*), naked buckwheat (*Eriogonum nudum* var. *auriculatum*), deerweed (*Lotus scoparius*), California poppy (*Eschscholzia californica*), bush senecio (*Senecio douglasii*), California matchweed (*Gutierrezia californica*), telegraphweed (*Heterotheca grandiflora*), elegant clarkia (*Clarkia unguiculata*), and California croton (*Croton californicus*).

As part of the Wetland E Monitoring and Adaptive Management Plan the project owner would submit detailed baseline maps which show the current species composition or cover of wetland vegetation as well as current extent of noxious weed cover as determined by standard vegetation sampling methods. Sampling methods would be fully described in the Wetland E Monitoring and Adaptive Management Plan (see Condition of Certification **BIO-19**). The maps would be updated and submitted as part of the required annual monitoring reports in order to determine if the habitat enhancement objectives are met during each monitoring year. Removal of non-native trees and noxious weed control methods as well as performance criteria would be detailed in the Wetland E Monitoring and Adaptive Management Plan (Plan). The plan would include monitoring methods, planting design, responsible parties, long-term management and maintenance requirements, contingency plan, and details on the funding source (CH2MHILL 2010k).

Monitoring methods and long-term management and maintenance activities would be fully described in a Wetland E Post-construction Management Plan to be developed

upon project approval by the applicant in coordination with staff and CDFG as part of Condition of Certification **BIO-19** (Wetland E Monitoring and Adaptive Management Plan). Implementation of staff's proposed conditions of certification including **SOIL&WATER-6**, **VIS-2**, **BIO-7**, which includes measures to avoid off-site impacts from construction equipment and lighting, and **BIO-19** would ensure that significant impacts to the conservation easement area would be avoided.

Air Emissions – Nitrogen Deposition

Nitrogen deposition is the input of nitrogen oxide (NO_x) and ammonia (NH₃) derived pollutants, primarily nitric acid (HNO₃), 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 1.6 miles west of the proposed OGS 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 comprises 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 2001c).

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; USFWS 2010a; Euing pers. com.). The Lange's metalmark butterfly is in danger of extinction in the wild. The peak count of Lange's metalmark butterflies at Antioch Dunes NWR was 1,185 individuals in 2000, but dropped to 45 by 2006, rose slightly to 132 in 2008, and subsequently declined to 46 in 2009 and to only 28 butterflies in 2010 (USFWS 2010a; USFWS 2010b). In 2009 surveys, 4,124 Contra Costa wallflower plants and 1,384 Antioch Dunes evening primrose plants were counted at Antioch Dunes NWR (USFWS 2009a; USFWS 2009b). The highest recorded census for Contra Costa wallflower at Antioch Dunes NWR was 11,567 plants in 1999 (USFWS 2009a). The highest recorded census for Antioch Dunes evening primrose at Antioch Dunes NWR was 5,235 plants in 1990 (USFWS 2009b).

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. Noxious weeds (e.g., yellow starthistle, winter vetch, and ripgut brome) are the greatest threat to these endangered species at the Antioch Dunes NWR (USFWS 2001c; USFWS 2009a; USFWS 2009b; USFWS 2010a). 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 (Pavlik 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; this benchmark was also used as the significance threshold in the applicant's nitrogen deposition impact analysis (CH2MHILL 2010g, Data Response #72). Regardless of the numerical threshold/screening level/benchmark, Antioch Dunes NWR and the endangered species therein are evidently experiencing habitat degradation likely caused by nitrogen fertilization.

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 likely resulted in a decrease of NO_x emissions (BAAQMD 2010a). However, given the increase in vehicle transportation emissions and use of synthetic fertilizers, NH₃ could be increasing, although it is difficult to determine because the reactive nature of NH₃ does not allow for a comprehensive inventory or prediction of long-term trends (BAAQMD 2009). 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

¹ In data response #68 (CH2MHILL 2010g), the applicant estimated the baseline nitrogen deposition rate to be 2.42 kg/ha/yr. These data were collected from a monitoring station in Davis, California, approximately 35 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]).

According to the applicant's response to data request #69 (CH2MHILL 2010g), modeled nitrogen deposition rates from OGS at the Antioch Dunes NWR would average 0.083 kg/ha/yr. Considering OGS in combination with background levels, the nitrogen deposition rate at Antioch Dunes NWR would be approximately 6.47 kg/ha/yr. Given that threats to the endangered species at the Antioch Dunes from noxious weeds are exacerbated by nitrogen fertilization, the proposed project's deposition of additional nitrogen 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 be used to directly implement management activities required to address impacts to the Antioch Dunes NWR from the effects of noxious weed proliferation resulting from nitrogen deposition attributable to OGS.

It is understood that emissions from the proposed OGS 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 collectively contribute to 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-20** (Antioch Dunes National Wildlife Refuge Funding).

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

$$(0.083 \text{ kg/ha/yr} / 6.39 \text{ kg/ha/yr}) \times \$385,000 = \$5,000.78/\text{year}$$

Each subsequent annual payment would 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.

It is staff's conclusion that implementation of the management activities funded by annual payment toward the operating budget of Antioch Dunes NWR (as calculated using the above equation and described in **BIO-20**) 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 OGS's contribution to nitrogen deposition. Impacts would be less than significant with the proposed mitigation.

It should be noted that the applicant is proposing to offset the project's NO_x emissions through the purchase of banked emission reduction credits, per the Bay Area Air Quality Management District (BAAQMD) rules and regulations (GB 2009i; refer also to the **Air Quality** section of this Final Staff Assessment for additional information). However, for

the following reasons, these offsets would not sufficiently mitigate the project's 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). Reducing POCs does not pertain to nitrogen deposition.
- The NO_x offsets will not address NH₃, which is a substantial contributor to total nitrogen deposition.
- Proposed offsets are temporally and spatially variable (e.g., from shutdowns that occurred in the past throughout the greater Bay Area region) and therefore would not directly ameliorate the current nitrogen deposition specifically occurring at Antioch Dunes NWR.

City of Oakley Deferred Improvement Agreement for Bridgehead Road Widening

The OGS project would be required to provide a right-of-way dedication and frontage improvements to Bridgehead Road some time in the future via execution of a deferred improvement agreement (COO 2011b), west of and adjacent to the project site, as the city's General Plan Circulation Element calls for Bridgehead Road to be a major arterial route. The frontage area adjacent to the OGS project site along Bridgehead Road is within the 1-mile survey buffer of the proposed OGS project site where reconnaissance surveys were conducted to classify habitat and plant communities as part of the OGS project application. In addition, this area is located within the OGS project site survey area where focused rare plant and reconnaissance level wildlife surveys were conducted in 2009 and 2010. This area is classified as ruderal habitat and is characterized by non-native vegetation. No special-status plants or wildlife were detected in this area during surveys. Bridgehead Road is located directly west of the Wetland E Conservation Area with a conservation easement held by California Department of Fish and Game (CDFG). The City of Oakley states the right of way dedication and frontage improvements may be accomplished without conflict or encroachment on the CDFG easement as there is approximately 30 feet between the edge of the existing pavement and the CDFG easement, which is adequate for the dedication and future roadway improvements along this portion of Bridgehead Road (COO 2011b). Standard measures and best management practices for the roadway improvements which staff anticipates the City of Oakley would implement if necessary to minimize impacts to biological resources include but are not limited to: preconstruction nesting bird surveys, onsite biological monitoring, equipment fueling, maintenance and staging controls, minimal ground disturbance and revegetation, establishment of environmentally sensitive areas, sediment control, Worker Environmental Awareness Training, protected tree avoidance or mitigation, and trash and debris control. Therefore, the potential impacts to sensitive biological resources from the improvements to Bridgehead Road could be reduced to less-than-significant through implementation of appropriate impact avoidance and minimization measures.

CUMULATIVE IMPACTS

Under CEQA Guidelines, a cumulative impact consists of an impact which is created as a result of the combination of the project together with other projects causing related impacts (Title 14 Cal Code Regs §15130(a)(1)). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is cumulatively considerable (Title 14 Cal Code Regs §15130(a)). Such incremental effects are to be viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Title 14 Cal Code Regs §15164(b)(1)).

Staff has proposed conditions of certification that are expected to reduce the proposed project's direct impacts to biological resources to a less than significant level. Staff concludes that with implementation of the applicant's proposed mitigation measures, impact avoidance and minimization measures required as a PSE in the ECCC HCP/NCCP, and compliance with staff's proposed conditions of certification, the cumulative impacts of the OGS project will be less than cumulatively considerable with respect to special status species, sensitive or rare habitats, or other sensitive biological resources.

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), Marsh Landing Generating Station (Energy Commission approved), Contra Costa Power Plant (existing), Gateway Generating Station (existing), Pittsburg Power Plant (existing), Delta Energy Center (existing), and the Los Medanos Energy Center (existing) as well as several other existing and proposed industrial stationary sources (e.g., manufacturing facilities), mobile sources, and other nitrogen-emitting activities such as aerial application of fertilizer.

The Antioch Dunes NWR is the first and only refuge in the United States established to protect endangered plants and insects (USFWS 2001c). 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. Lange's metalmark butterfly is critically imperiled. 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 sources within the region.

The proposed OGS project would contribute to nitrogen deposition at Antioch Dunes NWR. In consideration of the cumulative nitrogen deposition baseline from applicable regional sources, the project's contribution is relatively small (approximately 1 percent). However, it is the culmination of nitrogen emission sources from similarly small past, present, and reasonably foreseeable future projects that evidently contribute to the

current proliferation of noxious weeds at Antioch Dunes NWR. Given the severity of the existing environmental problems at Antioch Dunes NWR, especially related to nitrogen deposition, OGS emissions and the resulting incremental effect to federally endangered Lange's metalmark butterfly, federally and state endangered Antioch Dunes evening primrose, and federally and state endangered Contra Costa wallflower are cumulatively considerable in the absence of mitigation. To this end, staff recommends Condition of Certification **BIO-20** to reduce the project's contribution to cumulative impacts. Per Condition of Certification **BIO-20**, the applicant would provide funding proportional to the proposed project's contribution to nitrogen deposition occurring at Antioch Dunes NWR in order to implement management activities targeting weed removal and propagation/transplantation of listed species. With implementation of this condition, the project's incremental contribution to nitrogen deposition at Antioch Dunes NWR and the resultant indirect impacts would be less than cumulatively considerable.

In addition, implementation of Stationary Source Measures, Mobile Source Measures, and Transportation Control Measures in the BAAQMD's 2010 Clean Air Plan are expected to improve regional NO_x conditions (BAAQMD 2010b). Effective implementation of these measures and programs should reduce nitrogen deposition rates at Antioch Dunes NWR over time.

The USFWS conducts ongoing management of the Antioch Dunes NWR as described in its Comprehensive Conservation Plan in an effort to conserve the last remaining natural populations of Lange's metalmark butterfly, Antioch Dunes evening primrose, and Contra Costa wallflower (USFWS 2001c). By controlling noxious weeds and their resultant cascading effects, these management activities, in effect, also serve to address cumulative effects of regional nitrogen deposition at Antioch Dunes NWR.

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**. Under the Warren-Alquist Act (Public Resources Code § 25500) the Energy Commission's certificate for thermal power plants 50 MW and more is "in lieu of" other state, local, and regional permits (ibid.). Staff will incorporate all required terms and conditions that might otherwise be included in state permits into the Energy Commission's certification process. When conditions of certification are finalized they would satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in state permits. The OGS project is subject to the federal, state, and local LORS included in **Biological Resources Tables 1 and 4**. **Biological Resources Table 4** also includes whether the proposed project would be in compliance with the applicable LORS, and a discussion of the compliance status for direct impacts. A discussion of indirect impacts follows the table provided below.

Biological Resources Table 4
Compliance with Federal, State, and Local LORS for Direct Impacts

<u>Applicable Law</u>	<u>In Compliance</u>	<u>Discussion</u>
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))	Yes	Discharge of dredged or fill material into the waters of the United States requires a permit from the U.S. Army Corps of Engineers (USACE). DuPont completed a wetland delineation report in 2008 which included identification of five waters in the project vicinity which was submitted to the USACE for jurisdictional determination. All were determined by USACE to be non-jurisdictional.
Endangered Species Act (Title 16, United States Code, sections 1531 et seq.; Title 50, Code of Federal Regulations, part 17.1 et seq.)	Yes.	Potential take of California tiger salamander, California red-legged frog, giant garter snake, and San Joaquin kit fox, requires compliance with the federal Endangered Species Act (ESA). The applicant is applying for take coverage through the ECCC HCP/NCCP which covers impacts to all of the species covered under the ECCC HCP/NCCP. Permits from USFWS issued to the Conservancy are extended to the applicant pending approval of the project as a Participating Special Entity. Conditions of certification BIO-14, BIO-16, BIO-17, and BIO-18 provide measures to avoid and minimize impacts to these species.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Yes	Golden eagles may use the site and are protected under the Bald and Golden Eagle Protection Act. The golden eagle is listed in the ECCC HCP/NCCP as “no take species,” and no direct take of individuals is allowed. Participation in the ECCC HCP/NCCP requires implementation of minimization measures and construction monitoring. Permits from USFWS issued to the Conservancy are extended to the applicant pending approval of the project as a Participating Special Entity. Condition of Certification BIO-9 provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification BIO-7 limits off-site disturbance.
Migratory Bird Treaty Act (Title	Yes	Condition of Certification BIO-9

Applicable Law	In Compliance	Discussion
16, United States Code, sections 703–711)		provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification BIO-7 limits off-site disturbance.
Migratory Bird Treaty Reform Act (70 F.R. 12710-12716 (March 15, 2005))	Yes	Condition of Certification BIO-9 provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification BIO-7 limits off-site disturbance.
State		
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Yes	Construction and operation of the proposed project could result in the “take” of California tiger salamander, giant garter snake, Swainson’s hawk, and San Joaquin kit fox, listed under CESA. The applicant is applying take coverage through the ECCC HCP/NCCP which covers impacts to all of the species covered under the ECCC HCP/NCCP. Permits from CDFG issued to the Conservancy are extended to the applicant pending approval of the project as a Participating Special Entity. Condition of Certification BIO-11 specifies compensatory mitigation for loss of habitat for these species. Conditions of certification BIO-14, BIO-16, BIO-17, and BIO-18 provide measures to avoid and minimize impacts to these species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Yes	The applicant is applying take coverage through the ECCC HCP/NCCP which covers impacts to all of the species covered under the ECCC HCP/NCCP. Conditions of certification BIO-14, BIO-16, BIO-17, and BIO-18 provide measures to avoid and minimize impacts to these species.
California Code of Regulations (Title 20, sections 1702(q) and (v))	Yes	The proposed project is not sited in an area of critical concern for biological resources.
Natural Communities Conservation Planning Act (NCCPA) of 2002 (Fish and Game Code, sections 2800 through 2835)	Yes	The applicant is applying take coverage through the ECCC HCP/NCCP which covers impacts to all of the species covered under the ECCC HCP/NCCP. The applicant has submitted a draft PSR to the Conservancy.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Yes	Golden eagles, white-tailed kite, and other bird species that may use the site are California Fully Protected species. Condition of

<u>Applicable Law</u>	<u>In Compliance</u>	<u>Discussion</u>
		Certification BIO-8 provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification BIO-7 limits off-site disturbance.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Yes	No special-status plants were observed on-site. Special-status plants do not occur, or are not known to historically occur, adjacent to the proposed project.
Nest or Eggs (Fish and Game Code, section 3503)	Yes	Condition of Certification BIO-9 provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, Condition of Certification BIO-7 limits off-site disturbance, and BIO-5 includes a Worker Environmental Awareness Program (WEAP) to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.
Birds of Prey (Fish and Game Code, section 3503.5)	Yes	Condition of Certification BIO-9 provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, Condition of Certification BIO-7 limits off-site disturbance, and BIO-5 includes a WEAP to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.5.
Migratory Birds (Fish and Game Code, section 3513)	Yes	Condition of Certification BIO-9 provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification BIO-7 limits off-site disturbance, and BIO-5 includes a WEAP to educate workers about compliance with environmental regulations, including Fish and Game Code section 3513.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Yes	The proposed project is not sited in a significant natural area.
Public Resources Code, sections 25500 and 25527	Yes	The proposed project is not sited in an area of critical concern for biological resources.
Local		
East Contra Costa County Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP)	Yes	The applicant is applying take coverage through the ECCC HCP/NCCP which covers impacts to all of the species covered under the ECCC HCP/NCCP. Permits from CDFG and USFWS issued to

<u>Applicable Law</u>	<u>In Compliance</u>	<u>Discussion</u>
		the Conservancy are extended to the applicant pending approval of the project as a Participating Special Entity. Conditional approval of the Participating Special Entity Agreement is anticipated at the March 2011 Conservancy Governing Board Meeting
City of Oakley General Plan	Yes	Impacts within Oakley are within previously disturbed lands.
City of Oakley Tree Preservation Ordinance	Yes	Condition of Certification BIO-8 provides for payment of fees to the City of Oakley.
City of Antioch General Plan – Resource Management Element	Yes	Impacts within Antioch are within previously disturbed lands.
City of Antioch Tree Preservation Ordinance	Yes	Condition of Certification BIO-8 provides for replacement of trees and posting a bond for each protected tree where work will occur within the dripline.

INDIRECT IMPACTS

LORS compliance issues for indirect effects of the proposed project are discussed below. Federal Endangered Species Act (ESA; 16 USC Section 1531 et seq.)

Federal agencies must ensure that any federal action is (1) not likely to jeopardize the continued existence of any federally listed species, or (2) result in the destruction or adverse modification of the designated critical habitat of a federally listed species (ESA Section 7(a)(2), 16 U.S. C. § 1536(a)(2)). Although there is no federal nexus and therefore Section 7 is not applicable to this project, staff must independently review the proposed project for compliance with the federal ESA given the potential for the project to adversely affect federally listed species (i.e., federally endangered Lange's metalmark butterfly, federally endangered Antioch Dunes evening primrose, and federally endangered Contra Costa wallflower).

Potential take of federally-listed species requires compliance with the federal ESA. "Take" of a federally-listed species is prohibited without a permit. The definition of "take" under ESA section 3(19) includes "harm". Harm is further defined 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.

In its comment letter on the OGS project AFC (USFWS 2010b), see also **Response to Agency Comments** subsection), the USFWS recommended that the applicant ensure that the proposed project does not result in adverse modification of critical habitat. Recent court cases have challenged the definition of "adverse modification"; however, it remains that "adverse modification" occurs only when there is "a direct or indirect

alteration that appreciably diminishes the value of critical habitat.” 50 C.F.R. § 402.02. As the USFWS consultation handbook (USFWS 1998) explains:

Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species.

OGS emissions and the resultant nitrogen deposition constitute approximately one percent of the cumulative nitrogen deposition at the Antioch Dunes NWR. It is clear that nitrogen deposition is resulting in cumulative adverse effects to endangered species critical habitat; however, 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 meet the definition of adverse modification of critical habitat for Antioch Dunes evening primrose and Contra Costa wallflower.

Therefore, it is staff's conclusion that the proposed project would comply with the federal ESA. However, this conclusion is in conflict with the opinion of the USFWS, as described below under **Response to Agency Comments**.

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 conclusion that the proposed project would comply with CESA. CDFG did not submit comments on the Preliminary Staff Assessment or other information for the project record regarding the proposed project's compliance with CESA.

NOTEWORTHY PUBLIC BENEFITS

The applicant, in coordination with California Department of Fish and Game (CDFG), has proposed enhancement measures that have the potential to improve the existing wetland and upland habitats located within the 1.60-acre conservation easement identified as the Wetland E Mitigation Area. The resulting improvements to wildlife habitat value and enhancement goals of the Wetland E Mitigation Area are a noteworthy environmental public benefit.

RESPONSE TO AGENCY COMMENTS

Staff received formal comments from USFWS regarding the AFC for the proposed OGS project (USFWS 2010b) as well as formal comment on the Preliminary Staff

Assessment (PSA) (USFWS 2011a). Staff received comments from USACE regarding the PSA – Notice of Availability (USACE 2011a). Staff also received comments from the City of Antioch regarding the PSA – Parts A and B (COA 2011a). Pertinent comments are summarized below and staff’s response is provided for each.

USFWS AFC Comment Letter
October 13, 2010

Comment: USFWS is concerned that the indirect and cumulative effects of additional nitrogen from the proposed project that will be deposited at Antioch Dunes NWR may reverse or negate the intensive conservation efforts that have been and are being implemented to prevent the decline and perhaps extinction of the endangered Lange's metalmark butterfly.

Response: Staff agrees that the project's indirect effects will be cumulatively considerable and has proposed Condition of Certification **BIO-20** to mitigate cumulative and indirect impacts by directly support the ongoing intensive conservation efforts being implemented at Antioch Dunes NWR. Funding required in **BIO-20** would support a level of effort towards conservation actions at Antioch Dunes NWR that is proportional to the impacts attributable to OGS.

Comment: USFWS recommends that the applicant: (1) ensure the proposed Oakley Generating Station does not jeopardize Lange's metalmark butterfly, Contra Costa wallflower and Antioch Dunes evening primrose, or result in adverse modification or destruction of critical habitat for these two endangered plants; and (2) obtain authorization for incidental take from the Service for the endangered Lange's metalmark butterfly prior to any earthmoving at the proposed project site.

Response: For the reasons described above under **LORS Compliance**, staff has concluded that the proposed project's relatively minor contribution to total nitrogen deposition and the resultant minor incremental effects to habitat at Antioch Dunes NWR would itself not result in take (or jeopardy) of Lange's metalmark butterfly, Contra Costa wallflower, and Antioch Dunes evening primrose or adverse modification of critical habitat. However, this is ultimately the determination of USFWS.

Comment: USFWS identified the following conservation measures to ensure the proposed action does not jeopardize Lange's metalmark butterfly, Contra Costa wallflower and Antioch Dunes evening primrose, or result in adverse modification or destruction of critical habitat for these two endangered plants. USFWS recommends that these measures be implemented for the operational life of the OGS project.

- Annual removal of all exotic weeds from a quarter of the Antioch Dunes NWR. Removal methods should include cattle (*Bos taurus*) or other appropriate grazing animals, hand tools, and appropriate mechanical equipment;
- Annual cultivation of at least 250 individuals of naked-stem buckwheat, 100 individuals of Contra Costa wallflower, and 100 individuals of Antioch Dunes evening primrose, and the planting of these individuals on the Refuge with a success criteria of 50 percent after five years; and

- Captive breeding of Lange's metalmark butterfly and the annual release of at least 200 individuals on the Refuge.

Response: Staff believes that the conservation measures recommended by USFWS are disproportionate to the OGS project's impacts. The OGS project would contribute approximately 1 percent to the cumulative nitrogen deposition at Antioch Dunes and staff recommends mitigation (**BIO-20**) that is proportional to this impact as required by CEQA section 15126.4(a)(4)(B).

It is staff's responsibility to conduct an environmental analysis of the proposed project per CEQA and provide its conclusions of the proposed project's conformance with applicable LORS. Implementation of **BIO-20** would mitigate impacts below the level of significance as required by CEQA. Furthermore, staff believes that the project would not result in "take" or "jeopardy" of endangered species or "adverse modification of critical habitat" as defined in the federal Endangered Species Act (ESA). Therefore, staff cannot recommend the conservation measures presented by USFWS in its comment letter. However, the ultimate determination of compliance with the Federal ESA is made by USFWS.

USFWS PSA Comment Letter
February 14, 2011

Comment: USFWS requested clarification on the level of involvement in the OGS project by the U.S. Environmental Protection Agency (EPA) and the delegation of its authority under the Clean Air Act to the State.

Response: U.S. EPA's involvement in power plants under the licensing authority of the Energy Commission is typically associated with Prevention of Significant Deterioration (PSD) permitting for projects with air emissions above PSD thresholds. A federal PSD permit is not required for OGS because the project's NO₂ and CO emissions would be less than 100 tons per year. Therefore, action by the U.S. EPA is not warranted for this project.

The Bay Area Air Quality Management District (BAAQMD) is responsible for regional implementation of the federal Clean Air Act as delegated by U.S. EPA. The BAAQMD prepared a Preliminary and Final Determination of Compliance with a public comment period. If the Energy Commission grants a license for the OGS, then the BAAQMD will issue an Authority to Construct and Permit to Operate, but these would not be federal actions.

Comment: USFWS provided information on the status of Lange's metalmark butterfly, which is in "imminent danger of extinction", and an analysis of impacts to Antioch Dunes NWR and the federally endangered species therein from OGS nitrogen deposition. The USFWS also concurs with staff's statement in the PSA that the "proposed project's deposition of additional nitrogen at this already stressed ecosystem would be a significant impact".

Response: Staff recognizes the critically imperiled status of the butterfly and the extinction danger and considered these factors in its analysis. Staff's impact

analysis of nitrogen deposition is consistent with USFWS's, although staff and USFWS disagree about whether the project would be in compliance with the federal ESA, as described in the following USFWS comments and staff responses.

Comment: USFWS disagrees with the following conclusions regarding LORS compliance in the PSA: 1) the proposed OGS project would comply with the federal ESA, as amended; 2) the proposed OGS project's contribution to cumulative nitrogen deposition and the resultant habitat degradation at Antioch Dunes NWR would not result in harm to three federally listed species; and 3) the proposed OGS project's contribution to cumulative nitrogen deposition and the resultant habitat degradation at Antioch Dunes NWR would not meet the definition of adverse modification of critical habitat for the two endangered plants.

Response: The rationale of staff's conclusions that the proposed project would comply with the federal ESA, including would not result in harm to federally listed species and would not result in adverse modification of critical habitat is presented under **LORS Compliance**. It is understood that staff and USFWS disagree about this issue; however, this disagreement does not impair the USFWS's implementation or enforcement of the ESA as it pertains to this issue and this project. The Final Staff Assessment comprises staff's official sworn testimony for evidentiary hearings to be held by an assigned Committee of two Commissioners and a Hearing Officer. After evidentiary hearings, the Committee will consider the testimony presented by staff, the applicant, and all parties to the proceeding as well as recommendations and comments provided by government agencies (including USFWS) and the public prior to issuing a Decision. Therefore, staff's conclusion of ESA compliance in this FSA is but one component of the official record that will be considered by the Committee in its determination of the project's conformity with Federal law; USFWS's comments will also be considered.

Comment: USFWS recommended that the Energy Commission obtain written concurrence from USFWS that the proposed OGS project would not jeopardize the Lange's metalmark butterfly, Contra Costa wallflower, Antioch Dunes evening primrose, or result in adverse modification or destruction of critical habitat for these two endangered plants.

Response: It is staff's responsibility to provide its conclusions of the proposed project's conformance with applicable LORS, including the federal ESA. It is staff's standard practice to consult with the agencies responsible for enforcing the LORS in reaching its conclusions, and in the majority of cases, staff and the implementing agency of the LORS are in agreement. However, for the OGS project, staff is unable to present in its sworn testimony the position that harm or adverse modification of critical habitat would occur from the OGS project's contribution to nitrogen deposition. The Committee will consider whether such written authorization is necessary as recommended by USFWS, but it would be contrary to staff's conclusion of LORS compliance to recommend it as a condition of certification for the OGS project in this FSA.

Comment: USFWS requested a copy of the botanical survey report for review and concurrence and recommended that protocol plant surveys be conducted in the project action area if none have been completed in the past two years. USFWS also stated that the action area should include off-site habitats where impacts could occur, including the Antioch Dunes NWR.

Response: Staff provided the USFWS with a link to the botanical survey reports on February 16, 2011. These reports were docketed and have been available on the Energy Commission's OGS project website as of July 2009 and September and December 2010. Rare plant surveys of the project parcel, construction laydown areas, stockpile areas, and the transmission line route were performed on March 4, 2009, April 22, 2010 and October 22, 2010. This is within the blooming period for Contra Costa wallflower (March-July) and Antioch Dunes evening primrose (March-September). Rare plant surveys were conducted using the CDFG-protocol methods during the appropriate blooming season. Although Contra Costa wallflower and Antioch Dunes evening primrose are not covered by the ECCC HCP/NCCP, the applicant is required to conduct rare plant surveys following CDFG-USFWS approved methods during the appropriate season as a requirement of participation in the ECCC HCP/NCCP. The indirect impacts of OGS project is addressed in this FSA which includes a discussion of off-site habitats where project-related impacts could occur, including the Antioch Dunes NWR.

Comment: USFWS recommended that the Applicant and/or the Energy Commission obtain authorization for incidental take of Lange's metalmark butterfly pursuant to sections 7 or 10(a) of the Endangered Species Act prior to adoption of the final environmental document (Decision).

Response: The onus is on the Applicant, not the Energy Commission, to obtain incidental take authorization if required by USFWS. Consultation would be conducted pursuant to ESA section 10(a) because there is not a federal nexus for the OGS project that would trigger section 7 consultation. Although it is staff's conclusion that the project would be in compliance with the ESA and incidental take authorization is not warranted, staff clearly recognizes that the authority to make this conclusion and enforcement is with the USFWS. Federal ESA consultation may occur outside of the Energy Commission's licensing process.

Comment: USFWS recommends that the Energy Commission and/or the Applicant commit to completing specific activities that more directly relate to project impacts (e.g., captive breeding and release of the butterfly or restoration and management of specific acreages at the NWR) rather than providing a specific dollar amount.

Response: It is staff's position that mitigation should be proportional to the project's impact (also required per CEQA section 15126.4(a)(4)(B)). Under consideration in this case, it is the project's proportional contribution to total nitrogen deposition at Antioch Dunes NWR. In other power plant licensing cases (e.g., Metcalf Energy Center, Los Esteros Critical Energy Facility, Donald Von Raesfeld (Pico) Power Plant), the proportion was translated to acquisition and long-term management of occupied off-site habitat for affected species. For

impacts to Antioch Dunes NWR, this is not possible because there is no offsite habitat that supports these species; they only occur at the Antioch Dunes NWR. If the proportion was translated to an acreage on which to implement management activities at the NWR, the applicant would be responsible for less than one acre ($(0.083 \text{ kg/ha/yr}/6.39 \text{ kg/ha/yr}) \times 67 \text{ acres} = 0.87 \text{ acre}$). Staff believes that mitigation would be most effective if funding could be applied to implementing management activities throughout the NWR rather than a improving a very small part of the NWR.

However, staff revised Condition of Certification **BIO-20** to allow funds to be applied to any activity intended to support continued survival of Lange's metalmark butterfly, Contra Costa wallflower, and Antioch Dunes evening primrose instead of only noxious weed management.

***USACE PSA – Notice of Availability Comment Letter
January 11, 2011***

Comment: USACE recommended that to ascertain the extent of waters on the project site, the applicant should prepare a wetland delineation report, in accordance with the "Minimum Standards for Acceptance of Preliminary Wetland Delineations", and submit it to USACE for verification.

Response: Aquatic site mapping was conducted by DuPont as part of a wetland delineation study of the entire DuPont property in 2006. The wetland delineation study submitted to the USACE for jurisdictional determination included identification of five waters which were all determined to be non-jurisdictional (OG 2009a, Appendix 5.2F). Staff received a copy of verification from the USACE dated December 23, 2008 which documented that the waters on and adjacent to the OGS project site were not currently regulated by the Corps of Engineers (OG 2009a). The letter contained approved jurisdictional determination for the DuPont Oakley Site that is valid for five years from the date of the letter.

***City of Antioch –PSA Part A and B Comment Letter
February 10, 2011***

Comment: City of Antioch provided information on the two options for mitigation for impacts related to the removal of protected trees. The City of Antioch also recommended that to be in compliance with City of Antioch Protected Tree Ordinances the arborist report should identify any established trees that shall have construction conducted within the dripline. Each established tree where construction would occur within the drip line shall be bonded for in the amounts outlined in the City's Municipal Code, Section 9-12.

Response: Staff agrees with the City of Antioch's comments and has incorporated these comments into **BIO-8 (Protected Tree Mitigation Fees)**.

CONCLUSIONS

Direct impacts would largely be minimized because the proposed power plant site, construction laydown areas, and proposed linear facilities routes (i.e., transmission, sanitary sewer, and natural gas) are primarily disturbed or developed and surrounded by heavy industrial, vacant industrial, commercial, and agricultural uses including the former DuPont Oakley manufacturing site and marinas along the San Joaquin River to the north, the Burlington Northern Santa Fe railroad to the south, and the PG&E Antioch Terminal to the west. The proposed electrical interconnection between the OGS and the electrical grid would be from the new OGS switchyard (located within the OGS site boundary) to the 230-kilovolt Contra Costa Substation along an existing 2.4 mile long transmission line route. The transmission line would have the existing steel lattice towers replaced with steel-pole structures at appropriate intervals. The existing PG&E right-of way is primarily disturbed or developed and is surrounded by vacant industrial, commercial, agricultural, and residential uses. The potential for the project area to support sensitive biological resources is moderate; the immediate vicinity supports wildlife that are likely habituated to frequent disturbance.

The applicant is applying as a Participating Special Entity with the East Contra Costa County Habitat Conservancy (Conservancy) to receive endangered species permits for species covered under the East Contra Costa County Habitat Conservation Plan / Natural Community Conservation Plan (ECCC HCP/NCCP). The Conservancy is a joint exercise of powers authority formed by the Cities of Brentwood, Clayton, Oakley and Pittsburg and Contra Costa County to implement the ECCC HCP/NCCP. Approval of the Participating Special Entity application by the Conservancy consists of several phases which include the following: a complete Planning Survey Report (PSR) Application is received and approved; the Conservancy finds the proposed activity complies with all terms and requirements of the ECCC HCP/NCCP; the Governing Board approves the Agreement and PSR; the U. S. Fish and Wildlife Service and California Department of Fish and Game provide concurrence; an Agreement is executed with the Participating Special Entity binding them to the relevant terms of the ECCC HCP/NCCP; and all development and staff time fees are paid. The project is expected to be presented to the Conservancy's Governing Board in March 2011. The one-time development fee for this project would be approximately \$227,408, or as adjusted by the Conservancy pending the Annual Adjustment of mitigation fees (CH2MHILL 2010s). As a Participating Special Entity (PSE), the applicant would make a \$200,000 contribution to recovery of endangered and threatened species. The applicant would also make a contribution to complementary conservation planning as a part of the transmission line is within the City of Antioch which is not a Permittee of the ECCC HCP/NCCP. The amount of the contribution to complimentary conservation planning will be finalized during the Governing Board meeting in March 2011. The Final PSR is still in development; however the impact avoidance and minimization measures which are required by the Conservancy and incorporated into **BIO-9, BIO-11, BIO-12, BIO-14, BIO-16, BIO-17, and BIO-18** are not subject to further modification (Krystal Hinojosa pers. comm.). Energy Commission staff have reviewed and incorporated relevant technical information from the Revised PSR into this Final Staff Assessment (FSA) and have incorporated the Conservancy's mitigation measures in staff's proposed conditions of certification.

Direct impacts to the special-status species would be avoided and minimized by conducting comprehensive pre-construction surveys, erecting wildlife exclusion fencing and/or silt fencing before site mobilization, and implementing impact avoidance and minimization measures required as a PSE in the ECCC HCP/NCCP. Impact avoidance and minimization measures described in staff's analysis and included in the proposed conditions of certification would help reduce impacts to sensitive biological resources. These measures along with the mitigation provided by participation in the ECCC HCP/NCCP would offset project related losses to biological resources to less-than-significant levels. With implementation of applicant-proposed impact avoidance and minimization measures, implementation of impact avoidance and minimization measures required as a PSE in the ECCC HCP/NCCP, 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) and associated protected species would result from nitrogen deposition caused by OGS 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) are exacerbated by nitrogen deposition. Emissions from the proposed project would deposit an average of approximately 0.083 kilogram 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 conclusion that implementation of the management activities funded by annual payment toward the operating budget of Antioch Dunes NWR (as described in **BIO-20** (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 OGS's contribution to nitrogen deposition. Indirect and cumulative impacts would be less than significant with mitigation. Staff's conclusion is that the proposed project would comply with the federal ESA for indirect impacts to the Antioch Dunes National Wildlife Refuge (NWR) and associated protected species. However, this conclusion is in conflict with the opinion of the USFWS, as described under **Response to Agency Comments**.

With implementation of applicant-proposed impact avoidance and minimization measures, impact avoidance and minimization measures required as a PSE in the ECCC HCP/NCCP, and staff's proposed conditions of certification, it is staff's conclusion that the project would be in compliance with federal, state, and local laws, ordinances, regulations, and standards (LORS) relating to biological resources.

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 60 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), (see **BIO-3** below), 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. Monthly Compliance Reports will also be submitted to the East Contra Costa County Habitat Conservancy (Conservancy). 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.

Biological Monitor Qualifications

BIO-3 The project owner's CPM-approved Designated Biologist shall submit the resume, at least 3 references and contact information, of the proposed Biological Monitors to the CPM for approval. The resume shall demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks.

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the Conditions of Certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), WEAP, and all state, federal, and local permits.

Verification: The project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site (or related facilities) mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction the specified

information shall be submitted to the CPM for approval 10 days prior to their first day of monitoring activities.

Designated Biologist and Biological Monitor Authority

BIO-4 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist and Biological Monitor(s) the project owner's Construction/Operation Manager shall halt all site mobilization, 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-5 The project owner shall develop and implement a CPM-approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, 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. Discuss penalties for violation of applicable LORS (e.g., federal and state endangered species acts);
6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: 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. At least 10 days prior to site and related facilities mobilization, the project owner shall submit two copies of the CPM-approved materials. 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.

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-6 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, USFWS, and the East Contra Costa County Habitat Conservancy (Conservancy) (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 request responses, and workshop responses;
3. all biological resource conditions of certification identified as necessary to avoid or mitigate impacts;
4. all biological resources mitigation, monitoring, and compliance measures required in the East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan (ECCC HCP/NCCP) terms and conditions, as approved by the East Contra Costa County Habitat Conservancy (Conservancy);
5. all biological resource mitigation, monitoring, and compliance measures required in other state agency terms and conditions, such as those provided in the National Pollution Discharge Elimination System (NPDES) Construction Activities Stormwater General Permit;
6. all biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
7. a list of all sensitive biological resources to be impacted, avoided, or mitigated during project construction, operation, and closure;
8. all required mitigation measures for each sensitive biological resource;
9. a detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
10. 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;
11. 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;
12. duration for each type of monitoring and a description of monitoring methodologies and frequency;
13. performance standards to be used to help decide if/when proposed mitigation is or is not successful;

14. all performance standards and remedial measures to be implemented if performance standards are not met;
15. a preliminary discussion of biological resources-related facility closure measures; and
16. a process for proposing BRMIMP modifications to the CPM and appropriate agencies for review and approval.

Verification: The project owner shall provide the draft BRMIMP to the CPM at least 60 days prior to start of any site (or related facilities) mobilization. The CPM, in consultation with the East Contra Costa County Habitat Conservancy (Conservancy) (and USFWS and CDFG if they choose to comment), 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 the Conservancy, (and USFWS and CDFG if they choose to comment), 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 completion 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. Additional copies shall be provided to the East Contra Costa County Habitat Conservancy, CDFG, and USFWS.

General Impact Avoidance and Minimization Measures

BIO-7 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, East Antioch Creek and other aquatic resources (Wetland E, Wetland D, and Wetland F), the row of *Eucalyptus* trees (excluding the 25 feet of trees to be removed) and the group of trees growing in the ruderal grassland near the laydown area, and any other sensitive biological resources identified during pre-construction surveys. Vehicles and personnel shall be prohibited from entering sensitive habitats. Protection would include wildlife exclusion fencing and/or silt fencing, signs, and sediment control

measures installed prior to pre-construction site mobilization. Best Management Practices will be implemented during all phases of the project. Transmission Line Best Management Practices will be implemented to prevent topsoil from leaving the construction area.

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 (APLIC), Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) to reduce the likelihood of electrocutions of large birds. Bird flight diverters shall also be installed along portions of the transmission line within bird migration routes to reduce the likelihood of avian collisions with the transmission line. Bird flight diverters such as the Swan-Flight Diverter (Tyco Electronics) shall be installed on the transmission line in the vicinity of the Wetland E Conservation Easement Area and East Antioch Creek.
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. Lighting shall be shielded, directional, and at the lowest intensity required for safety.
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. Avoid Use of Exotic Pest Plants. Eliminate from landscaping plans any 'List A' California exotic pest plants of concern as defined by the California Exotic Pest Plant Council.
9. 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.
10. Minimize Impacts to Trees. During construction measures will be implemented to minimize impacts to existing trees to remain on the OGS project site. This includes installation of silt fencing and/or wildlife exclusion fencing to reduce the likelihood of impacts to trees.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Photographic verification of all bird flight diverters installed will be provided upon installation and provided in the Monthly Compliance Report. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed. Additional copies shall be provided to the East Contra Costa County Habitat Conservancy, CDFG, and USFWS.

Protected Trees Mitigation Fees

BIO-8 To comply with various protected tree ordinances, the project owner shall mitigate for loss of protected trees based on the results of the project owner's arborist report. Mitigation shall include either mitigation fees and/or the purchase of replacement trees. A tree permit shall be obtained from the City of Oakley Community Development Department and one of the following mitigation options is required: three new trees of the same species shall be planted for each protected tree removed; or the total appraisal fee for the protected trees scheduled to be removed shall be paid to the Community Development.

Department; or a combination of replacement tree plantings and in lieu fee payments shall be made. Mitigation will be assessed by the CPM in coordination with City of Oakley based on review of the arborist report.

A tree permit shall be obtained from the City of Antioch. Protected trees within the City of Antioch that legally would be removed would be replaced by boxed specimens at a rate of two 24-inch box trees for each established tree and two 48-inch box trees for each mature tree. In lieu of boxed specimens, penalties would be assessed by the City of Antioch based on the size of the tree to be removed. Mitigation will be assessed by the CPM in coordination with City of Antioch based on review of the arborist report.

The project owner will submit an arborist report to the CPM for review and approval in consultation with the City of Antioch which identifies all protected

trees that will remain in place but will have construction within the dripline. A bond will be required for each protected tree at which grading will occur within the drip line within the City of Antioch. If no protected trees would have construction within the dripline the project owner will submit written verification to the CPM and the City of Antioch stating that no construction activities will occur within the dripline of protected trees and no bond is required.

Verification: At least 30 days prior to the start of any tree removal, the project owner shall provide to the CPM for review and approval, and to the City of Oakley and City of Antioch for review and comment, the arborist report which identifies all trees to be removed within the City of Oakley and City of Antioch and all protected trees to remain in place at which grading will occur within the drip line within the City of Antioch. A copy of the receipt of payment and/or verification of tree replacement to the City of Oakley, verifying that the protected tree mitigation fees have been paid, according to the conditions specified above, shall be provided to the CPM prior to tree removal.

A copy of the verification of 2:1 protected tree replacement or the receipt of payment of penalty fees to the City of Antioch, according to the conditions specified above, shall be provided to the CPM prior to tree removal. Prior to tree removal a copy of the receipt of payment of bond will be submitted by the project owner upon posting a bond to the City of Antioch for any protected trees that would have construction or grading within the dripline or written verification that no protected trees are located where construction or grading activities would occur.

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

BIO-9 Pre-construction nest surveys shall be conducted if construction activities including tree removal will occur from February 1 through September 15. 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 as well as the sanitary sewer force main route and transmission line right-of-way. Surveys specifically for nesting Swainson's hawk shall be conducted within 1,000 feet of designated disturbance areas that contain appropriate nesting habitat. Surveys specifically for nesting golden eagle shall be conducted within 1/2 mile of designated disturbance areas that contain appropriate nesting habitat. If a potential Swainson's hawk nests is located within 1,000 feet of the project site, occupancy may be determined by observation from public roads or by observations of Swainson's hawk activity (e.g. foraging) near the project site.
2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. Pre-construction surveys shall be conducted no more than 30 days prior to initiation of construction activity. One survey 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 the CPM (in coordination with CDFG, and USFWS) and monitoring plan shall be developed; Consultation with the CPM in coordination with CDFG shall be required for any construction that occurs within 1,000 feet of a Swainson's hawk nest or 1/2 mile of an active golden eagle nest to ensure that no take of Swainson's hawk or golden eagle occurs during project construction. Nest locations shall be mapped using GPS technology and submitted, along with a weekly report stating the survey results, to the CPM, in the Monthly Compliance Reports.
4. If Swainson's hawk young fledge prior to September 15, construction activities can proceed normally. If the active nest site is shielded from view and noise from the project site by other development, topography, or other features, the project applicant can apply to the Conservancy for a waiver of the no-disturbance buffer zone requirements. The waiver must also be approved by the CDFG and USFWS and the CPM must be notified of any request for a waiver.
5. 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 steam blowing), shall be

Verification: Prior to the start of any pre-construction site mobilization, the project owner shall provide the CPM and the East Contra Costa County Habitat Conservancy (Conservancy) a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed.

If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest, and a monitoring plan shall be submitted to the Conservancy for review and comment and the CPM for approval. Additional copies shall be provided to the CDFG and USFWS. Approval of the plan is required before construction may commence. All impact avoidance and minimization measures related to nesting birds shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist.

Impact Avoidance and Minimization Measures for Bats

BIO-10 The project owner shall conduct a survey for roosting bats within 200 feet of project activities within 15 days prior to any pre-construction site mobilization,

including tree removal.. All trees and snags proposed for removal, topping, or pruning shall be marked in the field. A qualified bat biologist shall conduct a roost assessment of all the marked trees. The biologist shall be approved by the CPM. If no suitable roosting habitat is present, no further action is required.

If suitable roosting habitat is present, the project owner shall also conduct surveys for roosting bats during the maternity season (March 1 to August 31) within 200 feet of project activities. Trees and other appropriate structures shall be surveyed by a qualified bat biologist. Surveys shall include a minimum of one day and one evening survey. The biologist shall be approved by the CPM. If active maternity roosts or hibernacula are found, the trees occupied by the roost shall be avoided (i.e., not removed) by the project, if feasible. If avoidance of the maternity roost is not feasible, the bat biologist shall survey (through the use of radio telemetry or other CPM-approved methods, developed in consultation with CDFG) for nearby alternative maternity colony sites. If the bat biologist determines, in consultation with CDFG and with the approval of the CPM, that there are alternative roost sites used by the maternity colony and young are not present, then no further action is required and tree removal may occur.

However, if there are no alternative roosts sites used by the maternity colony, provision of substitute roosting bat habitat would be required. This measure would not apply to western red bat as they are solitary and primarily use trees as roosts. If western red bats are present during the breeding season, tree removal would not occur during the breeding season and Item 3 below would be implemented. If active maternity roosts are absent, but a hibernaculum (i.e., a non-maternity roost) is present, then exclusion of bats prior to tree removal is required.

1. Provision of substitute roosting bat habitat. If a maternity roost will be impacted by the project, and no alternative maternity roosts are in use near the site, substitute roosting habitat for the maternity colony shall be provided on, or in close proximity to, the project site no less than three months prior to the eviction of the colony. Alternative roost sites will be designed and constructed in accordance with the specific bats' requirements and in coordination with CDFG and the CPM. Alternative roost sites must be of comparable size and proximal in location to the impacted colony. The CDFG shall also be notified of any hibernacula or active nurseries within the construction zone.
2. Exclude bats prior to removal of trees with roosts. If non-breeding bat hibernacula are found in the trees to be removed within the construction footprint, the individuals shall be safely evicted, under the direction of the qualified bat biologist, by partial dismantling of roost sites (e.g. removal of tree limbs) to induce abandonment by bats, or other appropriate measures. Additionally, on the day of tree removal the tree cutters will inspect the trees prior to them felling the trees for bats in areas that the Designated Biologist is not able to observe from the ground.

If an active maternity roost is located in an area to be impacted by the project, and alternative roosting habitat is available, the demolition of the roost site must commence before maternity colonies form (i.e., prior to March 1) or after young are flying (i.e., after August 31) using the exclusion techniques described above.

3. Western red bat specific measures. If an active western bat maternity roost is found in the trees to be removed, tree removal will not occur during the breeding season to avoid disturbing females with non-volant (incapable of flying) young (March 1 through August 31). The leaf litter associated with the tree(s) will be removed during the warm season to prevent western red bats from roosting under the leaf litter during the winter when tree removal will occur. Prior to tree removal, outside of the breeding period, on the day immediately preceding tree removal, any tree to be removed will first be disturbed at the end of the day (after 5:00 pm) by removing the lowest branches that do not have dense clusters of leaves. Trees should be removed the day after the initial disturbance as bats disturbed under these circumstances are not likely to return to the same tree for day roosting the next day. Additionally, on the day of tree removal the tree cutters will inspect the trees prior to them felling the trees for bats in areas that the Designated Biologist is not able to observe from the ground.
4. Bat maternity roosts in trees to remain on site. The Designated Biologist shall monitor the maternity roost until it is determined that young are volant (are capable of flying); activities that might, in the opinion of the Designated Biologist, disturb roosting activities (e.g., excessive noise above 60 dBA, especially during steam blowing), shall be prohibited within the buffer zone until such a determination is made.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. The resume of the proposed bat biologist will be submitted to the CPM for approval at least 30 days prior to the start of any bat surveys. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. If active roost trees are to be removed, a written report summarizing the results of the pre-construction survey shall be sent to the CPM and CDFG no less than 15 days prior to the start of pre-construction site mobilization which will include documentation of any active roost trees to be removed. The report shall describe survey methods, including the time, date, and duration of the survey, identity and qualifications of the surveyor(s), and a list of species observed, a figure showing roost locations observed, and proposed mitigation and exclusion measures. Mitigation and exclusion measures must be developed in coordination with CDFG, and approved by the CPM prior to initiation of the measures or project activities that would disturb the roost site. Within 10 days of removal of trees with roost sites, the project owner shall submit a report describing the results of the exclusion, mitigation measures, and tree removal.

Swainson's Hawk Nest Tree Mitigation and Monitoring

- BIO-11** If pre-construction surveys locate Swainson's hawk nests in trees which are to be removed, the project owner shall implement the following measures to minimize impacts to known Swainson's hawk nests. Tree removal will not occur while the Swainson's hawk nests are active.
1. All active Swainson's hawk nest trees will be preserved on site, if feasible. Nest trees, including non-native trees, lost to project activities will be mitigated by the project owner according to the requirements of the ECCC HCP/NCCP including the following:
 - a. Loss of nest non-riparian nest trees will be mitigated by the project owner by, if feasible on-site, planting of 15 saplings for every tree lost with the objective of having at least 5 mature trees established for every tree lost according to the requirements listed below AND
 - b. Either pay the Conservancy an additional fee to purchase, plant, maintain, and monitor 15 saplings on the HCP/NCCP Preserve System for every tree lost according to the requirements listed below, OR
 - c. The project owner will plant, maintain, and monitor 15 saplings for every tree lost at a site to be approved by the Conservancy (e.g., within an HCP/NCCP Preserve or existing open space linked to HCP/NCCP preserves).
 2. The project owner shall meet all ECCC HCP/NCCP requirements for all planting options which include the following:
 - a. Tree survival shall be monitored at least annually for 5 years, then every other year until year 12. All trees lost during the first 5 years will be replaced. Success will be reached at the end of 12 years if at least 5 trees per tree lost survive without supplemental irrigation or protection from herbivory. Trees must also survive for at least three years without irrigation.
 - b. Native trees suitable for this site should be planted. When site conditions permit, a variety of native trees will be planted for each tree lost to provide trees with different growth rates, maturation, and life span, and to provide a variety of tree canopy structures for Swainson's hawk.
 - c. Whenever feasible and when site conditions permit, trees should be planted in clumps together or with existing trees to provide larger areas of suitable nesting habitat and to create a natural buffer between nest trees and adjacent development (if plantings occur on the development site).
 - d. Trees planted in the HCP/NCCP preserves or other approved offsite location will occur within the known range of Swainson's hawk in the inventory area and as close as possible to high quality foraging habitat.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. If trees with known nests are to be removed while nests are not active, a written report summarizing the results of the pre-construction survey shall be sent to the CPM, the East Contra Costa County Habitat Conservancy (Conservancy), CDFG, and USFWS no less than 15 days prior to the start of ground disturbance which will include documentation of any known nest trees to be removed. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed. Additional copies shall be provided to the Conservancy, CDFG, and USFWS. The report will include written verification that any compensation fees for loss of nest trees have been paid to the Conservancy. Annual Reports will be submitted to the CPM and the Conservancy that document compliance with the ECCC HCP/NCCP requirements for planting and the success of any plantings. Additional copies shall be provided to CDFG and USFWS.

Western Burrowing Owl Impact Avoidance and Minimization Measures

BIO-12 The project owner shall implement the following measures to manage their construction site, and related facilities, in a manner to avoid or minimize impacts to breeding and foraging burrowing owls.

1. The Designated Biologist or Biological Monitors or other agent approved by the CPM, in consultation with the East Contra Costa County Habitat Conservancy (Conservancy), CDFG, and USFWS, shall perform a pre-construction survey of suitable habitat at the project site and a 150-meter (approximately 500-foot) buffer from the perimeter of the proposed footprint (where possible and appropriate based on habitat) within 30 days prior to construction to identify burrowing owls and burrows. Surveys should take place near sunrise or sunset in accordance with CDFG survey guidelines (CBOC 1993). Breeding season surveys (February 1 to August 31) will document whether burrowing owls are nesting in or directly adjacent to disturbance areas. Non-breeding surveys (September 1 to January 31) will document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. All potential burrows or burrowing owls will be mapped. If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey, the site will be resurveyed. Survey results will only be valid for the season (breeding or non-breeding) during which the survey is conducted.

If burrowing owls are found onsite, the following shall be implemented:

1. During the breeding season (February 1 through August 31), all nest sites that could be disturbed by project construction shall be avoided during the remainder of the breeding season or while the nest is occupied by adults or young as determined by the Designated Biologist.
2. During the breeding season (February 1 through August 31), occupied burrows in designated construction areas or within 250 feet of designated construction areas shall not be disturbed unless a qualified biologist

verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

3. During the non-breeding season (September 1 to January 31), occupied burrows in designated construction areas or within 160 feet of designated construction areas shall not be disturbed, if possible.
4. If occupied burrows for burrowing owls are not avoided during the non-breeding season, owls should be excluded from burrows in the immediate impact zone and within a 160-foot buffer zone by installing one-way doors in burrow entrances. These doors should be in place for 48 hours prior to excavation. The project area should be monitored daily for 1 week to confirm that the owl has abandoned the burrow. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation (CDFG 1995). Plastic tubing or a similar structure should be inserted in the tunnels during excavation to maintain an escape route for any owls inside the burrow.

Verification: All avoidance and minimization measures related to burrowing owl shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. The project owner shall submit a report to the CPM, the East Contra Costa County Habitat Conservancy (Conservancy), CDFG, and USFWS at least 10 days prior to pre-construction site mobilization that describes when surveys were completed, observations, and mitigation measures to be implemented. Within 30 days after completion of owl passive relocation and monitoring, and the start of construction-related ground disturbance, the project owner shall provide written verification to the CPM, the Conservancy, USFWS, and CDFG that burrowing owl mitigation measures have been completed.

American Badger Impact Avoidance and Minimization Measures

BIO-13 To avoid direct impacts to American badgers, pre-construction surveys shall be conducted concurrent with the San Joaquin kit fox and burrowing owl pre-construction surveys. Surveys shall be conducted as described below:

The Designated Biologist or Biological Monitors shall perform pre-construction surveys for badger dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If dens are detected each den shall be classified as inactive, potentially active, or definitely active. Den avoidance, monitoring, and destruction methods shall adhere to those impact avoidance and minimization measures prescribed for San Joaquin kit fox (see Condition of Certification **BIO-14**).

Verification: All avoidance and minimization measures related to American badger shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. The project owner shall submit a report to the CPM and CDFG at least 10 days prior to the start of any pre-construction site mobilization that describes when badger surveys were

completed, observations, and mitigation measures to be implemented. Within 30 days after completion of construction the project owner shall provide to the CPM a written construction termination report identifying how impact minimization measures have been completed. Additional copies shall be provided to the Conservancy, CDFG, and USFWS.

San Joaquin Kit Fox Impact Avoidance and Minimization Measures

BIO-14 The following measures, developed in cooperation with East Contra Costa County Habitat Conservancy (Conservancy), shall be implemented to avoid and minimize impacts to San Joaquin kit fox.

1. The Designated Biologist or Biological Monitors or other agent approved by the CPM, in consultation with CDFG and USFWS, shall perform pre-construction surveys in the project area, in all areas identified in the Conservancy's Planning Survey Report as having suitable breeding or denning habitat, including areas within 250- foot-radius of all project facilities, utility corridors, and access roads within 30 days prior to pre-construction site mobilization to identify San Joaquin kit fox dens. Adjacent parcels under different land ownership shall not be surveyed. Surveys will be conducted in accordance with USFWS survey guidelines (USFWS 1999).

If San Joaquin kit fox and/or suitable dens are found onsite, the following shall be implemented:

Exclusion Zones

If dens are identified in the survey area outside of the proposed disturbance footprint exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones around the kit fox dens should have a radius measured outward from the entrance or cluster of entrances. The following radii are minimums, and if they cannot be followed, the CPM, the Conservancy, USFWS, and CDFG must be contacted:

- Potential den: 50 feet
- Known den: 100 feet
- Natal/pupping den (occupied and unoccupied): the CPM, the Conservancy, USFWS, and CDFG must be contacted

Known den: To ensure protection, the exclusion zone should be demarcated by fencing or stakes and flagging that encircles each den at least 100 feet from den entrance and does not prevent access to the den by kit foxes. Exclusion zones shall be demarcated with stakes and flagging and should be maintained until all construction related or operational disturbances have been terminated. At that time, all fencing or stakes and flagging shall be removed to avoid attracting subsequent attention to the dens.

Potential den: Placement of 4-5 flagged stakes at least 50 feet from the den entrance(s).

Construction and other project activities should be prohibited within these exclusion zones.

Destruction of Dens

Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed.

Potential, Known, and/or Occupied kit fox dens shall not be destroyed unless the applicant has taken authorization from the USFWS which would be provided through participation in the ECCC HCP/NCCP.

Potential, Known, and/or Occupied Dens: Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If a natal or pupping den is detected in the survey area, the CPM, USFWS, and CDFG shall be notified immediately. The den shall not be excavated until the pups and adults have vacated and then only after further consultation with CPM, in coordination with the Conservancy, USFWS and CDFG.

If kit fox activity is observed at the den during this initial monitoring period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity.

For dens other than natal or pupping dens, use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the biologist. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. Energy Commission staff, USFWS, and CDFG encourage hand excavation, but realize that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.

Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgment of the biologist the animal has escaped from the partially destroyed den.

If any den was considered unoccupied, but upon commencement of den destruction determined to be occupied, then destruction shall cease and the CPM, USFWS, and CDFG shall be notified immediately.

Verification: All avoidance and minimization measures related to San Joaquin kit fox shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. The pre-construction survey shall be conducted no more than 30 days prior to the initiation of pre-construction site mobilization on the OGS project site or sanitary sewer line and transmission line corridors. A written report summarizing the results of the pre-construction survey shall be sent to the CPM, the East Contra Costa County Habitat Conservancy (Conservancy), CDFG, and USFWS within 5 working days of survey completion and prior to the start of ground disturbance. Within 30 days after completion of construction the project owner shall provide to the CPM a written construction termination report identifying how impact minimization measures have been completed. Additional copies shall be provided to the Conservancy, CDFG, and USFWS.

Western Pond Turtle Impact Avoidance and Minimization Measures

BIO-15 The following measures shall be implemented to avoid and minimize impacts to western pond turtle.

1. Pre-construction surveys shall be conducted concurrent with the giant garter snake pre-construction surveys. Surveys shall be conducted as described below in condition of certification **BIO-16**
2. ESA fencing will be installed to protect the riparian habitat along East Antioch Creek in the vicinity of the intersection of the transmission line right-of-way as described under giant garter snake avoidance and minimization measures (see **BIO-16**).

Verification: All avoidance and minimization measures related to western pond turtle shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. The project owner shall submit a report to the CPM and CDFG at least 10 days prior to the start of any pre-construction site mobilization that describes when western pond turtle surveys were completed, observations, and mitigation measures to be implemented. Within 30 days after completion of construction the project owner shall provide to the CPM a written construction termination report identifying how impact minimization measures have been completed. Additional copies shall be provided to the East Contra Costa County Habitat Conservancy and CDFG.

Giant Garter Snake Impact Avoidance and Minimization Measures

BIO-16 The following measures, developed in cooperation with East Contra Costa County Habitat Conservancy (Conservancy) shall be implemented to avoid and minimize impacts to giant garter snake (GGS).

1. The Designated Biologist or a representative approved by USFWS and the CPM shall perform pre-construction surveys in areas identified in the Conservancy's Planning Survey Report as having suitable GGS habitat and 200 feet of adjacent upland as measured from the outer edge of each

bank. Surveys will document the extent of suitable habitat in the project area, including all project facilities, utility corridors, and access roads, and document any sighting of GGS.

2. Construction within 200 feet of aquatic features (East Antioch Creek) or within suitable GGS habitat must follow USFWS construction guidelines. The project applicant shall minimize all construction within 200 feet of aquatic features with suitable GGS habitat to the greatest extent possible. All construction that must occur within 200 feet of aquatic features with potential GGS habitat shall occur within the GGS active period (May 1-October 1).
3. Wildlife exclusion fencing will be installed to protect the riparian habitat along East Antioch Creek in the vicinity of the intersection of the transmission line right-of-way.
4. USFWS shall approve in writing any construction work within GGS habitat that must be conducted outside of this time window (October 1 and April 30).

Verification: All giant garter snake (GGS) impact avoidance and minimization measures shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. The Designated Biologist or a representative approved by the CPM, in consultation with the East Contra Costa County Habitat Conservancy (Conservancy), CDFG, and USFWS, must survey the construction area within potential GGS habitat no more than 24 hours prior to the initiation of construction in the vicinity the GGS habitat along East Antioch Creek. Another pre-construction survey must be conducted if construction activity ceases for a period of more than 2 weeks. The project owner shall submit a report to the Conservancy, USFWS, CDFG, and the CPM documenting results of pre-construction surveys within 24 hours of commencement of construction activities. The project owner shall submit a report to the Conservancy, USFWS, CDFG, and the CPM if any GGS are found within work areas no more than 24 hours after the sighting is made. Within 30 days after completion of construction the project owner shall provide to the CPM a written construction termination report identifying how impact minimization measures have been completed. Additional copies shall be provided to the Conservancy, CDFG, and USFWS.

California Tiger Salamander Impact Avoidance and Minimization Measures

BIO-17 The following measures, developed in cooperation with East Contra Costa County Habitat Conservancy (Conservancy) shall be implemented to avoid and minimize impacts to California tiger salamander.

1. Wildlife exclusion fencing and silt fencing shall be installed to protect Wetland D, Wetland, and Wetland F. "Sensitive Resource Area" signage shall also be installed at each wetland prior to pre-construction site mobilization.

Verification: All avoidance and minimization measures related to California tiger salamander shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of construction the project owner shall provide to the CPM a written construction termination report identifying how impact minimization measures have been completed. Additional copies shall be provided to the Conservancy, CDFG, and USFWS.

California Red-legged Frog Impact Avoidance and Minimization Measures

BIO-18 The following measures, developed in cooperation with East Contra Costa County Habitat Conservancy (Conservancy) shall be implemented to avoid and minimize impacts to California red-legged frog.

1. Wildlife exclusion fencing will be installed to protect the riparian habitat along East Antioch Creek in the vicinity of the intersection of the transmission line right-of-way as described under giant garter snake avoidance and minimization measures prior to pre-construction site mobilization.

Verification: All avoidance and minimization measures related to California red-legged frog shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of construction the project owner shall provide to the CPM a written construction termination report identifying how impact minimization measures have been completed. Additional copies shall be provided to the Conservancy, CDFG, and USFWS.

Wetland E Monitoring and Adaptive Management Plan

BIO-19 The project owner shall develop and implement a Wetland E Monitoring and Adaptive Management Plan (Plan). The plan must include monitoring methods, planting design, responsible parties, long-term management and maintenance requirements, contingency plan, and details on the funding source. The plan must be developed by the project owner in coordination with the CPM and CDFG, consistent with the stated purposes of the 1997 conservation easement on the property. The Plan will include all proposed habitat improvements and enhancement goals, objectives and performance standards developed by the applicant in coordination with CDFG (CH2MHILL 2010k). Detailed baseline maps which show the current species composition or cover of wetland vegetation as well as current extent of noxious weed cover as determined by standard vegetation sampling methods will be included in the Plan. Sampling methods would also be fully described in the Plan.

For the CPM to deem the enhancements successful:

1. The site will have 75 percent survivorship of planted coast live oak by year 5.

2. Surviving trees shall show leader growth for 2 out of the last 3 years of monitoring.
3. The site will have 75 percent survivorship of planted upland dune shrubs by year 5.
4. The native upland herbaceous species shall be established without reseeding for 2 out of the last 3 years of monitoring.
5. The site will not require watering or maintenance other than weed control after year 3.
6. The site shall not contain more than 5 percent invasive exotics (Cal-IPC rating High) after 5 years.

The project owner shall maintain wildlife habitat value and wildlife use of Wetland E.

For the CPM to deem this successful:

1. There shall be no significant change in the duration or extent of wetland ponding compared to pre-project conditions.(see **SOIL&WATER-6** for details)
2. There shall be no significant change in species composition or cover of wetland vegetation compared to pre-project conditions based upon standard vegetation sampling techniques.
3. Annual monitoring reports will be submitted for years 1, 2, 3, 4, and 5, with the first year beginning one year after the habitat improvements are implemented. If habitat improvements are not deemed successful after 5 years, the project owner would propose adaptive management measures developed in coordination with CPM and CDFG to meet required goals, objectives and performance standards.

Verification: At least 60 days prior to the start of any construction-related ground disturbance the project owner shall submit a Draft Wetland E Monitoring and Adaptive Management Plan to the CPM, California Department of Fish and Game (CDFG), and the Central Valley RWQCB (CV RWQCB). The CPM in consultation with CDFG and the CV RWQCB, will determine the plan's acceptability. At least 15 days prior to the start of any construction-related ground disturbance, the project owner shall provide the CPM with the final version of the Wetland E Monitoring and Adaptive Management Plan that has been reviewed and approved by the CPM, in consultation with CDFG and the CV RWQCB. All modifications to the Wetland E Monitoring and Adaptive Management Plan shall be made only after approval from the CPM, in consultation with CDFG and the CV RWQCB.

Habitat improvements shall be initiated no later than 12 months from the start of construction. Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Wetland E Monitoring and Adaptive Management Plan have been completed.

The project owner shall submit annual reports to the CPM, CDFG, and the CV RWQCB describing planting, monitoring, and maintenance activities implemented as well as documentation of compliance with all goals, objectives and performance standards in the Wetland E Monitoring and Adaptive Management Plan. The reports shall fully describe the status of the habitat improvement at the Wetland E conservation area, and shall describe any adaptive management methods implemented. Annual monitoring reports will be submitted to the CPM for review and approval and to CDFG and CV RWQCB for review and comment for years 1, 2, 3, 4, and 5, with the first year beginning one year after the habitat improvements are implemented. The annual report for years 1, 2, 3, 4, and 5 shall be submitted within 30 days after the anniversary date of the commencement of habitat improvements. If after 5 years, habitat improvements are not deemed successful, the project owner would develop adaptive management measures in coordination with CPM and CDFG to meet required goals, objectives, and performance standards. Annual monitoring reports shall be submitted to the CPM for review and approval and to the CDFG and CV RWQCB for review and comment annually within 30 days of the anniversary date of the commencement of habitat improvements for the life of the project.

Antioch Dunes National Wildlife Refuge Funding

BIO-20 The project owner shall provide an annual payment to California Wildlife Foundation or other third-party approved by USFWS to assist in noxious weed management and its effects at the Antioch Dunes National Wildlife Refuge. Management activities funded may include but are not limited to: captive breeding and release of Lange's metalmark butterfly; propagation and transplantation of naked-stem buckwheat, Contra Costa wallflower, and Antioch Dunes evening primrose; noxious weed eradication using grazing animals, hand tools, and/or appropriate mechanical equipment. The first annual payment shall be no less than \$5,000.78.

Each subsequent annual payment 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 following the start of project operation, the project owner shall provide written verification to the CPM, USFWS, and CDFG that the first-annual payment was made to California Wildlife Foundation or other third-party approved by USFWS in accordance with this condition of certification. The project owner shall provide evidence that it has specified that its annual payment to California Wildlife Foundation or other third-party approved by USFWS can be used only to assist in noxious weed management and remediation of its effects (e.g., activities to support continued survival of Lange's metalmark butterfly, Contra Costa wallflower, and Antioch Dunes evening primrose) at the Antioch Dunes National Wildlife Refuge.

Thereafter, within 30 days after each anniversary date of the commencement of project operation, the project owner shall provide written verification to the CPM, USFWS, and CDFG that payment has been made to the California Wildlife Foundation or other third-party approved by USFWS in accordance with this condition of certification. This verification shall be provided annually for the operating life of the project. The project

owner also shall request an annual report from the California Wildlife Foundation or other third-party approved by USFWS documenting how each annual payment required hereunder was used and applied to assist in noxious weed management at the Antioch Dunes National Wildlife Refuge. The project owner shall provide copies of such reports to the CPM within thirty (30) days after receipt.

East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan Mitigation Fees

BIO-21 The project owner shall pay mitigation fees for temporary and permanent impacts based on the acres of impact (staff assumes a 1:1 mitigation ratio for temporary and permanent impacts) as a one-time development fee of \$227,408 or updated fee as adjusted by the East Contra Costa County Habitat Conservancy (Conservancy), pending the approval date and the Annual Adjustment of mitigation fees. As a Participating Special Entity, the project owner would make a \$200,000 contribution to recovery of endangered and threatened species. The project owner would also make a contribution to complementary conservation planning as determined by Conservancy's Governing Board.

Verification: A copy of the receipt of payment issued to Conservancy, verifying the funds have been paid, shall be provided to the CPM within 30 days prior to site or related facilities mobilization.

East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan Certificate of Inclusion

BIO-22 The project owner shall provide a copy of the final East Contra Costa County Habitat Conservation Plan /Natural Communities Conservation Plan (ECCC HCP/NCCP) Certificate of Inclusion (permit). The terms and conditions contained in the incidental take permit shall be incorporated into the project's BRMIMP and implemented.

Verification: Within 5 business days of its receipt, the project owner shall submit to the CPM a copy of the East Contra Costa County Habitat Conservancy's Certificate of Inclusion (permit) and verify that the permit terms and conditions are incorporated into the BRMIMP and will be implemented.

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CULTURAL RESOURCES

Testimony of Kathleen Forrest

SUMMARY OF CONCLUSIONS

Energy Commission staff has analyzed the information provided in the Application for Certification (AFC) and acquired from other sources to determine consistency of the Oakley Generating Station (OGS) project, proposed by Radback Energy, with applicable state, and local laws, ordinances, regulations, and standards (LORS). Staff has also assessed the potential for the OGS project to have significant adverse cultural resources-related impacts. In addition, for applicant-proposed mitigation of project impacts, and for staff-developed conditions of certification, staff has assessed their ability to reduce project impacts to cultural resources to a less than significant level. Staff has also assessed the feasibility and enforceability of applicant-proposed mitigation and staff-recommended conditions of certification.

Energy Commission staff concludes that the proposed OGS project would have:

- No impact on known California Register of Historical Resources (CRHR)-eligible archaeological resources, ethnographic resources, individual built-environment resources, or historic districts.
- A less-than-significant impact on unknown archaeological resources discovered during construction-related excavation activities, with the implementation of Conditions of Certification **CUL-1** through **CUL-7**. Staff thus recommends that the Commission adopt these conditions of certification, which would provide for the hiring of a Cultural Resources Specialist and archaeological monitors, for the cultural resources awareness training for construction workers, for the archaeological and Native American monitoring of ground-disturbing activities, for the recovery of data from discovered CRHR-eligible archaeological deposits, for the preparation 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, these conditions of certification would facilitate the identification and assessment of previously unknown CRHR-eligible cultural resources encountered during construction and reduce any impacts to these resources to a less than significant level.
- Additionally, with the adoption and implementation of the proposed conditions of certification, the OGS project would be consistent with all applicable LORS.

INTRODUCTION

This assessment identifies the potential impacts of the OGS project on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the human occupation and use

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

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

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

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

If cultural resources are identified, staff determines which are historically significant (defined as eligible for the CRHR) and whether the OGS would have a significant impact on those that are CRHR eligible. Staff's primary concern is to ensure that all potentially CRHR-eligible cultural resources are identified, that all potential OGS impacts to those resources are identified and assessed, and that conditions are proposed that ensure that all significant impacts that cannot be avoided 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, in which there is no federal involvement,¹ the applicable laws are primarily state laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

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.*

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

<u>Applicable Law</u>	<u>Description</u>
State	
Public Resources Code 5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely 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.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
City of Oakley General Plan (<i>City of Oakley, 2002. Amended 2010</i>)	Open Space and Conservation Element Goal 6.4 Encourage preservation of cultural resources within the Plan Area. Policy 6.4.1 Preserve areas that have identifiable and important archaeological or paleontological significance.

<u>Applicable Law</u>	<u>Description</u>
City of Antioch General Plan (<i>City of Antioch, 2003</i>)	<p>Cultural Resource Objective: Preserve archaeological, paleontological, and historic resources within the Antioch Planning Area for the benefit and education of future residents.</p> <p>Cultural Resource Policies:</p> <p>a. Require new development to analyze, and therefore avoid or mitigate impacts to archaeological, paleontological, and historic resources. Require surveys for projects having the potential to impact archaeological, paleontological, or historic resources. If significant resources are found to be present, provide mitigation in accordance with applicable CEQA guidelines and provisions of the California Public Resources Code.</p> <p>b. If avoidance and/or preservation in the location of any potentially significant cultural resources is not possible, the following measures shall be initiated for each impacted site:</p> <ul style="list-style-type: none"> • Native American monitoring • Development of a test-level research design • Complete the excavation program as specified in the research design. • Development a Treatment Plan to mitigate project effects on cultural resources, if they cannot be avoided. • Implementation of Treatment Plan. <p>d. As a standard condition of approval for new development projects, require that if unanticipated cultural or paleontological resources are encountered during grading, alteration of earth materials in the vicinity of the find be halted until a qualified expert has evaluated the find and recorded identified cultural resources.</p> <p>e. Preserve historic structures and ensure that alterations to historic buildings and their immediate settings are compatible with the character of the structure and surrounding neighborhood.</p>

SETTING

Information provided regarding the setting of the proposed project places it in its geographical and geological context and specifies the technical description of the project. Additionally, the prehistoric, ethnographic, and historical background provides the context for the evaluation of the CRHR eligibility of any identified cultural resources within staff's area of analysis for this project.

REGIONAL SETTING

The proposed Oakley Generating Station is located in Oakley, California, in northeastern Contra Costa County. It is adjacent to the Sacramento-San Joaquin River Delta in the western Central Valley. The proposed project site is located within the city limits of Oakley, California, and the linear facilities extend west into Antioch, California.

The proposed project site is located on a 21.95-acre site in the southwest corner of the existing E. I. du Pont de Nemours and Company (DuPont) property, adjacent to the junction of State Routes (SR) 4 and 160 and the Antioch Bridge, which crosses the San Joaquin River to the north. The proposed project site is bounded by the DuPont property to the north and east, the Burlington Northern Santa Fe Railway (BNSF) and vineyards to the south, and industrial uses and the SR 160 corridor to the west (OGS 2009a, p. 5.3-2).

The proposed site is currently zoned Heavy Industrial (H-1) and is designated in Oakley's General Plan as Utility Energy (UE). Land uses around the project consist mainly of industrial and agricultural uses, with single family residential within 1 mile of the site (OGS 2009a, p. 5.6-1). The proposed project site has been historically and is currently used as a vineyard and is separated from the DuPont site by a row of mature eucalyptus trees. A small wetland is adjacent to the west side of the parcel. The transmission line associated with the project runs through several different land uses, including commercial (Oakley) and different types of residential uses (Antioch) (OGS 2009a, p. 5.6-9–5.6-15).

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed OGS would be a 624-megawatt (MW), natural gas-fired, combined-cycle, air-cooled electrical generating facility. The proposed 230-kilovolt (kV) onsite switchyard would deliver the power generated directly to the grid through a 2.4-mile-long, single circuit, 230-kV transmission line, connecting the project site with PG&E's Contra Costa Substation (OGS 2009a, p. 2-1).

The proposed site is currently under cultivation as vineyards and has been since the early 1960s, as seen in aerial photos. In addition to the vineyards, there is also a dirt road and a defunct telephone line on the site (OGS 2009a, p. 5.3-10). The general area is a mix of early and mid-twentieth century residential and late twentieth century planned development, utility uses, industrial uses, commercial construction and two transportation corridors (OGS 2009a, pp. 5.3-16–5.3-17).

The proposed project is directly north of PG&E's Antioch Terminal, which would supply the natural gas for the project. The project would connect with the adjacent PG&E Line 303 at the southwest corner of the site via a 300-foot-long, 6- to 10- inch pipe for its gas supply. It is also possible for the owner to connect a 410-foot pipe to PG&E's Line 400 at the west edge of the proposed project site, as a secondary natural gas supply (OGS 2009a, p. 2-20). The lines would be constructed using an open trench method, with an "optimal" trench being 30 inches wide and 54 inches deep. Boring or directional drilling would be used where the pipeline passes beneath other buried utilities (OGS 2009a, p. 4-1). Connections to an existing onsite potable water line would be utilized, and a new

0.44-mile sanitary sewer force main would be constructed to run south from an interconnection point in Bridgehead Road to Main Street, and then turn east for 0.11 miles to the interconnection point with Ironhouse Sanitary District's gravity main (OGS 2009a, p. 2-1 and CH2MHILL 2010t, p.1-1).

The proposed 20-acre laydown area is east of and adjacent to the proposed project site, on the DuPont property. This area was used by DuPont for dumping the titanium dioxide byproducts of paint manufacturing and has been previously graded. It is bordered by a dirt road on the southern edge and by a railroad spur along its eastern edge. The northern half of the laydown area is paved with concrete. Several building footings and piles of building debris remain in the area (OG 2009a, Appendix 5.3B, pp. 12–13). Large or heavy equipment would be delivered to the site by rail to the existing rail siding on the project site (OGS 2009a, p. 2-33).

Three areas proposed for dirt stockpile are north of the proposed plant site, on the DuPont site. DuPont has requested use of any excess dirt, for use during build-out of the draft DuPont Oakley Specific Plan (OGS 2009a, p. 2-33). The southernmost area is an existing, paved parking lot; the second area is located further north in an open grassy field; and the third area is the furthest north in an old agricultural field (OG 2009a, Appendix 5.3B, p. 13).

The OGS would connect to the regional electrical grid via a 2.4-mile long transmission line between the new switchyard and the 230kV Contra Costa Substation in Antioch. The transmission line would be placed within PG&E's existing 80-foot wide, 60-kV transmission line right-of-way. Eighteen existing towers would be replaced with tangent-type, 95-foot steel-pole structures and one new pole would be added (OGS 2009a, p. 5.2-33 and OGS 2009a, pp. 3-1–3-2).

The existing transmission line corridor runs south for approximately 1 mile from the proposed project site, adjacent to SR 160, which was constructed in the 1970s. It then turns west and continues for approximately 1.4 miles until it reaches the Contra Costa Substation. The corridor crosses paved roads, freeway entrances and exits, vineyards, residential yards, and parking lots. A majority of the east-west segment runs adjacent to a paved recreational path. The easternmost section of the east-west portion runs through a vacant parcel along a dirt road (OG 2009a, Appendix 5.3B, p. 13).

As stated in the AFC, the depth of ground disturbance would vary by proposed project activity. Ground disturbance on the proposed plant site could be as deep as 50 feet in areas where pile-supported foundations are used, but would generally be between 12 and 15 feet. The unpaved portions of the proposed laydown areas could be disturbed up to seven feet in depth, and the stockpile areas up to one foot. The transmission line towers would result in 30 feet of disturbance at each location, using drilled pier foundations; there would be no additional ground disturbance in other areas of the transmission corridor (CH2MHILL 2010c, p. 3). The new towers would also include 16-square-foot concrete foundations. Construction of the new transmission line would include the staging conductor pulling and tensioning equipment at each end of the line,

which would be staged in areas already disturbed (OGS 2009a, p. 5.2-43) Disturbance up to 1 foot would be anticipated in the transmission corridor laydown areas (CH2MHILL 2010c, p. 3).

Prehistoric Background

The prehistoric resources in the Sacramento-San Joaquin River Delta exhibit traits of the Central Valley and San Francisco Bay Area cultures. The proposed chronologies of the Central Valley and Bay Area are variations based on the general California chronology, which consists of an Early, Middle and Late Horizon. Wide regional differences in central California and significant temporal overlap between site types prevented clear distinctions between the three horizons and eventually a model was proposed that emphasized the patterns of cultural identity and deemphasized dates of occupations (OG 2009a, p. 5.3-2).

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 entirely 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 Background

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 missionaries (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 of oak were eaten, as were nuts, wild fruits and berries, various seeds, roots, and bulbs (Levy 1978, p. 398).

The Bay Miwok were organized in political units called tribelets, similar to other Californian Native Americans. Each tribelet was an independent and sovereign nation that embraced a defined and bounded territory. A tribelet 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 tribelet's territory (Levy 1978, p. 411).

Historic Background

Spanish Period (1769 to 1821)

Juan Rodriguez Cabrillo explored the California coast by ship in 1542. The interior of California, including the Delta region and Central Valley, remained unexplored by Europeans until the 1770s. The Spanish period began with the establishment of the Mission San Diego de Alcalá in 1769. Pedro Fages led the first expedition into the interior of California in 1772, including the Delta region. Mission San Francisco was founded shortly after in 1776, and Mission San Jose in 1797. Approximately 3,000 native people were housed at Mission San Jose (OG 2009a, Appendix 5.3B, pp. 5–6).

Mexican Period (1821 to 1848)

The Mexican period began in 1821 when Mexico won its independence from Spain. The Mexican period is commonly referred to as the Mexican Rancho Period, due to the granting of large tracts of land called *ranchos* by the Mexican Governors of Alta California. The land initially belonged to the missions, which were secularized in 1833, and was intended for those natives who had inhabited regions adjacent to the missions. In most cases however, the land was granted to politically prominent individuals. The nearest rancho to the project area was John Marsh's Rancho de Los Medanos, located along the San Joaquin River and Suisun Bay in present-day Antioch (OG 2009a, Appendix 5.3B, p. 6).

American Period (1848 to the present)

The United States formally obtained California from Mexico through the Treaty of Guadalupe Hidalgo on February 2, 1848, and the territory attained statehood in 1850 (OG 2009a, Appendix 5.3B, pp. 6–7). The area around Oakley and Antioch in Contra Costa County remained largely unsettled until the late nineteenth and early twentieth

centuries, when European and Chinese immigrants reclaimed portions of the Delta and associated waterways, planting orchards and vineyards. The area became one of the most productive farming sections of Contra Costa County (CH2MHILL 2010c, data response 45, p. 24).

The City of Antioch was settled by brothers Joseph H. and William W. Smith in 1849 on part of the original *Rancho de Los Medanos*, referred to locally as Smith's Landing. A shipload of settlers settled in Smith's Landing in 1850, encouraged by Reverend W. W. Smith's offer of a free lot for each family. The name of the town was changed to Antioch at approximately this time as well. Antioch's economy was jumpstarted by the discovery of coal in the hills south of town in 1859 and by the discovery of copper nearby in 1863. Lumber companies and paper mills also contributed, taking advantage of the prime shipping location on the river (OG 2009a, Appendix 5.3B, p. 7).

Railroads began traversing the region in the late 1800s, and the Atchison, Topeka, and Santa Fe (AT&SF) Railroad was completed by 1878. The San Francisco and New Orleans line of the Southern Pacific Railroad (SPRR) was completed through the area in 1899, and several short rail lines ran from Antioch south to the coal mines. The access to both rail and river transport enabled the community to easily move goods in and out of the area (OG 2009a, Appendix 5.3B, p. 7).

The City of Oakley was founded in 1897 by James O'Hara and incorporated in 1999 (OG 2009a, Appendix 5.3B, p. 7–8). R.C. Marsh contributed 12 acres of his property to develop Oakley Township and laid out and named the first streets. A post office was established on September 9, 1898, with Marsh serving as the first postmaster. The township deeded a right-of-way grant to the AT&SF Railroad to construct a spur to the new town, erect a temporary shelter, and eventually build a permanent depot and freight buildings (CH2MHILL 2010c, p. 24). After business increased in the new town, a station was constructed and proved invaluable to the local fruit and almond industries. The first passenger train ran from Oakley to Stockton in July of 1900 (OG 2009a, Appendix 5.3B, p. 7–8). Marsh donated additional land to Oakley in 1909, when the first addition was platted. Live Oak School, located at 5471 Live Oak Avenue, approximately 0.5 miles from the project site, was constructed at this time (CH2MHILL 2010c, p. 24).

Agriculture was the main economic force in the region in the early twentieth century. Fruit and vegetable wholesalers built packing sheds along the AT&SF spur to hold goods for shipment to the east coast. The main crops in the 1910s included celery, asparagus, tomatoes, apricots, wine grapes and almonds. Walnuts, berries, olives, cereals, hay, and grain were also cultivated by the 1940s. The California Almond Growers Association established a processing plant and warehouse in the area, and nearly all the almond growers in Oakley joined the cooperative (CH2MHILL 2010c, p. 25).

The town continued to grow throughout the 1920s, 30s and 40s with the installation of street signs, dial telephones, natural gas and a sewer line. Refrigerated trucking became the predominate method of transporting produce after World War II, and the

AT&SF abandoned its spur track. The area continued to grow after World War II, although it stayed fairly rural until the latter part of the twentieth century (CH2MHILL 2010c, p. 25).

The E. I. du Pont de Nemours and Company (DuPont) purchased 552 acres in 1955 to establish a Freon manufacturing plant. The plant was a major employer in the area, employing nearly 600 people during its peak. The area continued to be agricultural, producing almonds, walnuts, apricots and olives, and many dairies and cattle ranches operated in the surrounding area. The DuPont plant was closed in 1998. Oakley continued to grow, with more than 33,000 residents in 2006, and grapes are the major agricultural product today (CH2MHILL 2010c, p. 25).

CULTURAL RESOURCES INVENTORY

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

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on 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 recommendations or determinations of historical significance (see "Determining the Historical Significance of Cultural Resources," below) for any cultural resources that are identified.

This subsection describes the research methods used by 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), archival research, 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 historically 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.

Project 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 an important cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to important cultural resources, called the "project area of analysis," is a composite geographic area that accommodates the analysis of each type of cultural resources that is present. The project area of analysis can vary, depending on the type of cultural resources under analysis, and is

usually defined as a specific area within and surrounding the project site and associated linear facility corridors. For this project, staff has defined a project area of analysis for the following cultural resources types:

- For archaeological resources, the area of analysis is 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 historical significance of the properties. The Native American Heritage Commission (NAHC) assists project cultural resources consultants and staff in identifying these resources, and consultation with Native Americans and other ethnic or community groups may contribute to defining the area of analysis. For the OGS, staff identified no ethnographic resources and so defined no area of analysis for them.
- For built-environment resources, the area of analysis is defined as one parcel deep from the project site footprint in urban areas and from any above-ground linear facilities, to encompass resources whose setting could be adversely affected by industrial development.

As used by staff, the term “project areas” means the footprints of the several project components, including the plant site, the laydown areas, and the several linear facility corridors, plus any new access roads and any borrow and disposal sites.

Background Inventory Research

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

CHRIS Records Search

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

CHRIS Results

The applicant's cultural resources consultant, CH2MHill, commissioned a literature search from the Central California Information Center (CCIC) CHRIS, located at California State University, Stanislaus. The parameters of the literature search were a one- mile buffer zone around the OGS plant site, the associated laydown area, and the stock pile areas, and a one-half mile buffer around the transmission line corridors. The literature search and records review included a review of all archaeological sites, known cultural resources surveys and excavation reports, the National Register of Historic Places and the California Register of Historical Resources, California Historical Landmarks and Points of Historical Interest, and historic and topographic maps from the years 1867, 1872, 1910, and 1918. Local listings were also reviewed for the presence of historic and cultural resources (OG 2009a, Appendix 5.3B, pp. 8–9).

Eight previous cultural resources studies have been prepared within the plant site, laydown area, and linear facilities. An additional 30 studies have been prepared within one mile of the plant site and laydown area, and one-half mile of the linear facilities (OG 2009a, Appendix 5.3B, pp. 8–9). The eight surveys in the project area include an archaeological reconnaissance for a Highway 4 widening project; an archaeological resource inventory for water conveyance features; a historic resource survey of the Burlington Northern Santa Fe (BNSF) Railway; a cultural resources inventory of the Trembath and Oakley Floodwater Control Basins; and an archaeological survey of a cogeneration project in Antioch (OG 2009a, Appendix 5.3B, p. 11).

One resource (P-07-2614, an archaeological site) has been previously recorded within the project buffer area, south of the BNSF tracks. This site has both prehistoric and historic elements and, according to the 2003 survey form, has been heavily disturbed by agricultural activity. This resource is outside the project site (OG 2009a, Appendix 5.3B, p. 10).

The BNSF Railway, formerly the AT&SF Railway, runs adjacent to site and is included in the project buffer area. The AT&SF Railway was chartered in 1859 and broke ground in Topeka, Kansas in 1868. It ran through the OGS area by 1899 and merged with the Burlington Northern Railway in 1996. Another segment of the AT&SF Railway in Contra Costa County has been previously recorded (as resource CA-CCO-732) (OG 2009a, Appendix 5.3B, Appendix A, survey form).

No additional archaeological, ethnographic, or architectural resources were identified through the literature search.

Archival and Library Research

Detailed resource-specific information needed by staff may entail primary and secondary research in various archives and libraries holding such sources as historic aerial photography, historic maps, city directories, and assessors' records. The applicant may include archival information as part of the information provided to staff in the AFC or may undertake such research to respond to staff's Data Requests. Staff may also undertake such research to supplement information provided by the applicant.

Archival and Library Research Results

CH2MHill reviewed aerial photographs provided by Environmental Data Resources (EDR) from the years 1939, 1952, 1958, 1965, 1971, 1984, 1993, 1998 and 2005 and historic maps from 1908, 1910, 1912, 1914, 1916, 1918, 1947, 1952, 1953, 1954 and 1968. These maps and aerial photos were used to track the changes to the area and to determine whether any footings in the DuPont facility are more than 45 years old (OG 2009a, Appendix 5.3B, pp. 8–9).

Local Agency and Organization Consultation

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

Results of Inquiries to Local Agencies and Organizations

CH2M Hill contacted the East Contra Costa Historic Society and Museum and the Contra Costa Historical Society. The East Contra Costa Historic Society requested further information on the project. CH2MHill mailed a letter and project map to Kathy Leighton, with the East Contra Costa Historic Society, on April 24, 2009. CH2MHill also emailed a map and project description to the Contra Costa Historic Society on April 24, 2009. Neither organization provided a response to the requests for information (OG 2009a, Appendix 5.3B, p. 11).

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to by staff as Native American ethnographic resources. The NAHC's Sacred Lands database has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. Their Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas. Both applicants and staff request information on the presence of sacred lands in the vicinity of a proposed project and also request a list of Native Americans to whom inquiries will be made to identify both additional cultural resources and any concerns the Native Americans may have about a proposed project.

Results of Inquiries Made to Native Americans

CH2MHill contacted the NAHC on April 7, 2009, requesting information about traditional cultural properties in the OGS area. The NAHC responded on April 16, 2009, with a list of Native Americans interested in consulting on development projects in that area. The Sacred Lands file search performed by the NAHC returned no indication of the presence of Native American cultural resources or traditional cultural properties. CH2MHill contacted each individual/group by letter on April 24, 2009, and followed up by phone on May 5, 2009. Andy Galvan, representing the Ohlone Indian Tribe,

requested and was provided the results of the literature search and requested to view the results of the report prior to completion. A summary of the report results was provided to Mr. Galvan via email. Mr. Galvan also requested the presence of a Native American monitor whenever an archaeological monitor is present on site. Ramona Garibay, representing the Trina Marine Ruano Family, also requested notification in the event of a prehistoric discovery (OG 2009a, Appendix 5.3B, p. 11).

Energy Commission staff also contacted the NAHC on June 23, 2010, requesting a current list of Native American representatives with traditional ties to Contra Costa County, who have expressed interest in receiving information regarding development projects in the area. Staff contacted the three identified representatives on July 21, 2010, and has not received a response to date.

Field Inventory Investigations

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

Results of Pedestrian Archaeological Survey

As part of the cultural resources survey for the OGS project, on April 20, 2009, CH2MHill performed an archaeological field survey that included the footprint of the proposed project facilities, a 200-foot buffer around the proposed facilities site, the proposed gas line corridor, and a 50-foot buffer around linear facility corridors, the project site, construction laydown areas, parking area and 200-foot buffer, and the transmission line corridor and a 50-foot buffer. CH2MHill also conducted a pedestrian archaeological survey of the proposed route of the OGS sanitary sewer force main on August 5, 2010. The survey examined an area 50 feet on either side of the centerline of Bridgehead Road and Main Street. Pedestrian transects were spaced no more than 10 meters apart (OG 2009a, Appendix 5.3B, p. 12).

As a result of the pedestrian archaeological survey, CH2MHill identified two resources: part of the BNSF (formerly AT&SF) Railroad and an AT&SF trestle constructed in 1926 (CH2MHILL 2010t, p. 2-7). A one-half mile segment of the AT&SF Railroad runs in an east-west direction, south of the proposed site/laydown area, along the project's southern boundary. It was completed in 1899 and a spur into the DuPont facility was added in the 1950s. This railroad runs along the original AT&SF railroad grade (OG2009a, Appendix 5.3B, Appendix A, AT&SF survey form).

The railroad trestle bridge associated with the BNSF railroad crosses over Bridgehead Road. The bridge consists of two monumental cast-in-place concrete abutments and steel I-beam construction. It is approximately 50 feet long and 25 feet wide, and is suspended approximately 15 feet above the roadway. According to the information

provided, the bridge was likely constructed in 1926 and may be associated with the construction of Bridgehead Road and the Antioch Bridge (CH2MHILL 2010t, p. 2-7-2-8).

CH2MHill also resurveyed P-07-002614, a prehistoric/historic scatter located south of the BNSF tracks. Prehistoric material recorded in the original survey included two cores and a flake tool; one additional core was observed during the resurvey. The historic component of the site is a small scatter of trash, including glass fragments and ceramic dish fragments. As the resource is within the buffer area for the project site and not within the site boundaries, it is not anticipated that the project would impact the P-07-002614 (OG 2009a, Appendix 5.3B, pp. 13–14).

CH2MHill concluded that the overall archaeological sensitivity of the area is moderate due the local topography, the proximity to the San Joaquin River, and the scale and scope of previous ground disturbance. CH2MHill also concluded that the sensitivity of the underlying soils is also moderate, as some possibility exists for intact cultural deposits beneath the areas disturbed by agricultural activities, including existing vineyard cultivation. Additionally, there is an overall low density of previous finds in the area (OG 2009a, Appendix 5.3B, p. 14).

Survey for Built-Environment Resources

CH2MHill also undertook a survey of the built environment resources in the project area of analysis on behalf of the applicant. CH2MHill consulted historic aerial photographs, United States Geological Survey (USGS) topographical maps, and the Contra Costa County Assessor records to determine dates of construction for buildings and to document the evolution of development in the project area. The survey examined built resources that are within one parcel's distance of the project site and aboveground linear facilities (i.e., within those parcels immediately adjoining the project parcel boundaries and the routes of the aboveground linear facilities). The survey area is a mix of early and mid-twentieth century properties and late twentieth-century planned housing development, a utility substation and transmission line corridors, industrial and commercial buildings, and two transportation corridors (OG 2009a, Appendix 5.3B, p. 14).

Development in the area was sparse and primarily agricultural until the 1960s. Between 1953 and 1968, roads began to be paved and more buildings, presumably residential, were constructed. The DuPont plant was opened in 1956. The mobile home park at 5751 Bridgehead Road was constructed at this time, but appears to have been partially demolished by the construction of State Route (SR) 160 in the early 1970s. The transmission line from the DuPont plant to the Hillcrest Substation and Yard/Contra Costa Substation does not appear on historic quadrangle maps, and likely would have been moved during construction of SR 160 in the 1970s. The Almondridge subdivision, which straddles the transmission line between Phillips Lane and Viera Avenue, appears to have been developed in the 1980s (OG 2009a, Appendix 5.3B, p. 15).

A total of 14 built environment resources in the project area of analysis date to 1965 or earlier and were recorded by CH2M Hill. They include 10 residential structures and four

commercial/industrial buildings. The residential structures include a modest Craftsman-style residence, a Ranch-style residence, and Minimal Traditional residences. Structures at 2122 Willow Avenue (1956), 3001 Oakley Road (1915), 5301 Elm Street (c. 1950), 5346 Elm Street (1947), 5387 Elm Street (1951), 5394 Elm Street (1946), 5406 Elm Lane (1947), and 5487 Elm Lane (1953) are all examples of post-World War II residential development. All are single-story, wood frame houses, clad predominantly with stucco in either the Ranch or Minimal Traditional style. They have hipped or gabled composition shingle roofs and metal or vinyl replacement windows, with the exception of 5301 Elm Street, which retains some wood sash. The primary residence at 3001 Oakley Road was originally constructed in 1915, earlier than the others; however, it was heavily modified at some point to resemble a Minimal Traditional-style residence (OG 2009a, Appendix 5.3B, DPR 523 forms).

The structure at 3401 Oakley Road is a modest example of a Craftsman- or Bungalow-style residence. It is a one-story, single-family building with a front gable roof, exposed rafters and clapboard siding. The house has a front gable roof, and a wing projects slightly from the north side of the building. The windows appear to have been replaced (OG 2009a, Appendix 5.3B, DPR 523 form). All of the residential structures have been modified since their construction, and none were identified by CH2MHill as noteworthy examples of their respective architectural types.

The 5751 Bridgehead Road location is a mobile home park that, based on historic aerial photographs, was constructed circa 1958. The lots were initially laid out in rows with a tree between each mobile home, but this configuration has deteriorated over time. The construction of SR 160 appears to have altered the size of the park, which is now smaller than its original footprint. The current buildings appear to be modern, one-story prefabricated homes (OG 2009a, Appendix 5.3B, DPR 523 form).

The Antioch Gas Terminal, located at 5900 Bridgehead Road, was constructed circa 1952 and serves as the center for natural gas transmission. It is a one-story concrete block, rectangular building with a flat roof that cantilevers out beyond the face of the building. There are cut-outs along the cantilever, which is supported by a concrete wall at the center of the building. There are several fixed metal windows on the building, which is accessed via entrances on the west and north elevations. Several other one-story concrete buildings are located on the site (OG 2009a, Appendix 5.3B, DPR 523 form).

The DuPont Oakley Plant, located at 6000 Bridgehead Road, was constructed between 1955 and 1956 as a Freon manufacturing plant. The location provided easy access to SR 160 and the AT&SF Railroad. The Antioch Works began producing Freon and tetraethyl lead (TEL) in 1956 (OG 2010c, pp. 1–2). In 1958, the plant consisted of over 20 buildings and holding tanks. Buildings included the administration building, gate house, water storage tank and associated fire pump house, and the purchased power station. When the company started production of titanium oxide in 1963, buildings associated with this production were constructed on the eastern and southern end of the property. No further significant construction appears to have taken place after 1963 (OG 2010c, pp. 1–3). Both Freon and TEL have since been banned or phased out of production, leading to the shutdown and dismantling of the plant. Of the more than 40

buildings and structures that existed during the plant's operation, the administration building, gate house, water storage tank, fire pump house and purchased power substation (all circa 1958) are still extant, along with a pipe plant building, RCRA building, flammable drum storage, the security, personnel orientation, emergency response/Terp building, Freon warehouse, DAP warehouse, and two additional unnamed buildings, all constructed after 1965. Only the administration building and gate house remain in use (OG 2010c, p. 5).

The building at 6113 Bridgehead Road is a small one-story, vacant commercial structure, constructed in 1961. The very low side-gable roof has a wide overhanging eave that covers the entrance and forms a small porch, which is supported by thick posts and a decorative railing. The building is clad with smooth-finished stucco and has sliding metal sash windows with prominent window frames and false keystones. The building, once surrounded by agricultural fields, is now surrounded by pavement. SR 160 runs behind the building, slightly obscured by a raised embankment and mature eucalyptus trees (OG 2009a, Appendix 5.3B, DPR 523 form).

The Contra Costa Substation was constructed in the late 1940s or early 1950s, likely coinciding with the construction of the Contra Costa Power Station at Marsh Landing (OG 2009a, Appendix 5.3B, DPR 523 form). While the construction history of the property is not known, it appears to include approximately twenty structures, a large parking lot, and outdoor equipment storage on the western half of the site, and large electrical transmission equipment on the eastern half of the site (based on staff's site visit and satellite images on Google Earth).

Summary of Identified Cultural Resources

Staff has identified one prehistoric/historic archaeological site and 16 built-environment resources within the one-mile records search radius and archaeological and built-environment survey area, as shown in Table 1. The prehistoric/historic site is a sparse prehistoric scatter and historic trash scatter (P-07-002614), located south of the project site. Ten of the built-environment resources are residential, four are commercial or utility-related, one is a bridge, and one is a linear resource, the BNSF (BNSF) Railroad.

CULTURAL RESOURCES Table 1
Known Cultural Resources Located in the Vicinity of the Proposed Project

Resource Type and Designation	Resource Designation	Resource Description	Previously Known/New
<u>Prehistoric Archaeological Resources</u>	P-07-002614	Prehistoric/Historic artifact scatter	Previously Known
<u>Built-Environment Resources</u>	AT&SF Railroad/CA-CCO-732	½ mile segment of railroad (1899, with modern upgrades)	Newly Recorded
	AT&SF Trestle Bridge	Railroad trestle bridge	Newly Recorded
	2212 Willow Ranch Ave., Antioch	Ranch-style residence (1956)	Newly Recorded
	3001 Oakley Rd., Antioch	Minimal Traditional residence (date unknown)	Newly Recorded
	3401 Oakley Rd., Antioch	Craftsman residence (1921)	Newly Recorded
	5301 Elm Lane., Antioch	Minimal Traditional (c. 1950)	Newly Recorded
	5346 Elm Lane., Antioch	Minimal Traditional (1947)	Newly Recorded
	5387 Elm Lane., Antioch	Minimal Traditional (1951)	Newly Recorded
	5394 Elm Lane., Antioch	Minimal Traditional (1946)	Newly Recorded
	5406 Elm Lane, Antioch	Minimal Traditional (1947)	Newly Recorded
	5487 Elm Lane, Antioch	Minimal Traditional (1953)	Newly Recorded
	5751 Bridgehead Rd., Antioch (Sandy Point 3)	Prefabricated (35 residences, 1953-1968)	Newly Recorded
	Antioch Gas Terminal (5900 Bridgehead Rd.)	Utilitarian (c. 1952)	Newly Recorded
	DuPont Oakley Plant (6000 Bridgehead Rd.)	International, Utilitarian/Industrial (c. 1955-1956)	Newly Recorded
	6113 Bridgehead Rd.	Commercial (1961)	Newly Recorded
	Contra Costa Substation (north of	Unknown (c. 1950)	Newly Recorded

	Wilbur Ave., west of Hwy. 160), Antioch		
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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. As noted in the CEQA Guidelines § 15064.5(a), a significant “historical resource” is defined as:

- A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR;
- A resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of § 5024.1 (g) of the Public Resources Code (PRC); 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.

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.

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

Additionally, cultural resources listed in or formally determined eligible for the National

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

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

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

CRHR Evaluations

Under CEQA, only CRHR-eligible cultural resources that the proposed project could potentially impact need be considered in staff's recommendations for mitigation measures for project impacts. Consequently staff seeks CRHR eligibility recommendations for those cultural resources subject to possible project impacts. The existing documentation for previously known cultural resources may include CRHR eligibility recommendations, and the applicant's cultural resources specialists often make CRHR eligibility recommendations for newly identified cultural resources they discover and record in their project-related surveys. Staff considers these prior CRHR eligibility evaluations and may accept them or conclude that additional information is needed before making its own recommendations.

When the available information on known or newly identified resources that could be impacted by the proposed project is not sufficient for staff to make a recommendation on CRHR eligibility, staff may ask an applicant to conduct additional research to gather the information needed to make such a recommendation, or staff may gather the additional information. For an archaeological resource, the additional research usually entails some degree of field excavation, called a "Phase II" investigation. For an ethnographic resource, the additional research may be an ethnographic study. For built-environment resources, the additional research would probably be archival. The object of this additional research is to obtain sufficient information to enable staff to validate or make a recommendation of CRHR eligibility for each cultural resource that the proposed project could impact.

AT&SF Railroad/CA-CCO-732 (BNSF Railroad)

The Atchison, Topeka and Santa Fe Railway (AT&SF) was chartered in Kansas in February of 1859. While it never reached Santa Fe, New Mexico due to difficulties in the terrain, it served the Midwest and Western states including Arizona, California, Colorado, Illinois, Iowa, Kansas, Louisiana, Missouri, Nebraska, New Mexico, Oklahoma and Texas. The AT&SF broke ground in Topeka on October 30, 1868 and the first section of track, only six miles long, opened on April 26, 1869. The tracks reached Pueblo, Colorado in March of 1876, opening new freight opportunities for the railroad. The AT&SF merged with the Burlington Northern Railroad on December 31, 1996, forming the Burlington Northern and Santa Fe Railway (BNSF) (Railway, pp.16–20).

An approximately one-half mile segment of the AT&SF Railroad runs just south of the proposed OGS project site and laydown area, within the buffer area, and was recorded by CH2MHill. As stated in the DPR 523 form, the segment extends east-west along the southern boundary of the DuPont site, beginning at the Cline Winery property at the east and extending to the western end of the proposed project site. The segment was completed in 1899, and a spur was constructed into the DuPont facility in the 1950s. As stated in the consultant's evaluation, this section of railroad runs along the footprint of the original railroad grade. However, the line has been entirely upgraded including modern crossings, new ballast, and upgraded rail lines and ties. The grade has also been modified to accommodate heavier loads on the tracks (OG 2009a, Appendix 5.3B, CA-CCO-732 DPR 523 form).

The applicant's consultant recommended that this section of the AT&SF Railroad, including the spur into the DuPont facility, be considered ineligible for listing on the NRHP due to loss of integrity of materials and workmanship (OG 2009a, Appendix 5.3B, CA-CCO-732 DPR 523 form). It does not appear, from the information provided by the applicant, that the section of AT&SF within the project area of analysis is not associated with events that have made a significant contribution to the broad patterns of our history or associated with the lives of persons significant in our past (CRHR Criteria 1 and 2); does not embody the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values (Criterion 3), due to the modern alterations; and it has not yielded, or does not appear likely to yield, information important to history or prehistory (Criterion 4). Staff concurs with the consultant's evaluation, that alterations to the railway have compromised its integrity of materials and workmanship. Therefore, staff recommends that the section of AT&SF Railroad within the project area of analysis does not meet any of the eligibility criteria for the CRHR, and has not been identified as a historical resource for the purposes of CEQA.

Railroad Trestle

The railroad trestle bridge associated with the BNSF railroad crosses over Bridgehead Road. The bridge consists of two monumental cast-in-place concrete abutments and steel I-beam construction. It is approximately 50 feet long and 25 feet wide, and is suspended approximately 15 feet above the roadway. The bridge was likely constructed in 1926 and may be associated with the construction of Bridgehead Road and the Antioch Bridge. According to the information provided, the bridge does not appear to meet CRHR Criteria 1, 2 or 3 and is not the type of resource that would be eligible under Criterion 4. Staff recommends that the bridge does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA. (CH2MHILL 2010t, p. 2-7-2-8).

Residential Buildings

As described above, the residential buildings in the project area of analysis are predominantly post-World War II construction. All of the residential structures identified by the applicant's consultant as 45 years old or older are located along the existing transmission line corridor. The transmission corridor includes existing steel lattice towers which have already impacted the integrity and feeling of the structures within the project area of analysis. The applicant's consultant recommended that none of the

buildings meet any of the CRHR criteria and are not historic resources for the purposes of CEQA, and staff concurs with this recommendation.

6113 Bridgehead Road

The building at 6113 Bridgehead Road is a small one-story, vacant commercial structure constructed in 1961. The very low side-gable roof has a wide overhanging eave that covers the entrance and forms a small porch, which is supported by thick posts and a decorative railing. The building is clad with smooth-finished stucco and has sliding metal sash windows with prominent window frames and false keystones. The building, once surrounded by agricultural fields, is surrounded by pavement. SR 160 runs behind the building, slightly obscured by a raised embankment and mature eucalyptus trees (OG 2009a, Appendix 5.3B, DPR 523 form). The building does not appear to meet CRHR Criteria 1, 2 or 3 and is not the type of resource that would be eligible under Criterion 4. As stated in the consultant's evaluation, the setting of this building has been substantially altered over time, including the construction of the highway and surrounding development. Staff recommends that the structure at 6113 Bridgehead Road is not eligible for listing on the CRHR and is not a historical resource pursuant to CEQA.

Antioch Gas Terminal

The Antioch Gas Terminal, located at 5900 Bridgehead Road, was constructed circa 1952 and serves as the center for natural gas transmission. It is a one-story concrete block, rectangular building with a flat roof that cantilevers out beyond the face of the building. There are cut outs along the cantilever, which is supported by a concrete wall at the center of the building. There are several fixed metal windows on the building, which is accessed via entrances on the west and north elevations. Several other one-story concrete buildings are located on the site (OG 2009a, Appendix 5.3B, DPR 523 form). The building does not appear to meet CRHR Criteria 1, 2 or 3 and is not the type of resource that would be eligible under Criterion 4. Staff recommends that the Antioch Gas Terminal is not eligible for the CRHR and is not a historical resource pursuant to CEQA.

Contra Costa Substation

The Contra Costa Substation was constructed in the late 1940s or early 1950s, likely coinciding with the construction of the Contra Costa Power Station at Marsh Landing (OG 2009a, Appendix 5.3B, DPR 523 form). While the construction history of the property is not known, based on staff's site visit and satellite images on Google Earth it appears to include approximately twenty structures, a large parking lot, and outdoor equipment storage on the western half of the site, and large electrical transmission equipment on the eastern half. The complex does not appear to meet CRHR Criteria 1, 2 or 3 and is not the type of resource that would be eligible under Criterion 4. Staff recommends that the Contra Costa Substation is not eligible for listing on the CRHR and is not a historical resource pursuant to CEQA.

DuPont Antioch Works

Staff requested in Data Request 46 (CEC2010a, Data Request Set 1A (#44-67), dated February 17, 2010) that the DuPont Antioch Works be evaluated for its potential eligibility as a historic district for the California Register of Historical Resources. As

described previously, the DuPont Antioch Works was purchased by the DuPont Company in 1955 to construct a Freon manufacturing plant. In 1958 the plant consisted of over 20 buildings and holding tanks, including the administration building, gate house, water storage tank and associated fire pump house, and the purchased power station. No further significant construction appears to have taken place after 1963 (CH2MHILL 2010c, p. 1–3). Of the more than 40 buildings and structures that existed during the plant's operation, the administration building, gate house, water storage tank, fire pump house and purchased power substation (all circa 1958) are still extant, along with a pipe plant building, RCRA building, flammable drum storage, the security, personnel orientation, emergency response/Trp building, Freon warehouse, DAP warehouse and two additional unnamed buildings, all constructed after 1965. Only the administration building and gate house remain in use (CH2MHILL 2010c, p. 5).

The evaluation by CH2M Hill recommended that the DuPont Antioch Works site is not eligible for the CRHR within the context of the development of the local and regional economy of Antioch and/or Oakley (Criterion 1). They also recommend that it is not associated with a person or persons important to local, California or national history (Criterion 2), and, while the administration building and gate house display elements of the International style, they do not display distinctive characteristics of a type, period, region or method of construction (Criterion 3). Additionally, the site does not retain sufficient integrity from the identified period of significance (1955-1981) to convey its significance. While it retains integrity of location and some integrity of setting, the majority of buildings and structures have been removed from the site, altering the setting, and leading to the loss of integrity of design, materials, workmanship, feeling and association. The removal of the majority of the buildings compromises the site's ability to convey its historic identity, and "it lacks a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (CH2MHILL 2010c, p. 7–8). Staff concurs with the consultant's evaluation and recommends that the DuPont Antioch Factory Works site is not eligible as a historic district for CRHR and not a historical resource for the purposes of CEQA.

All CRHR-Eligible Resources Subject To Potential Project Impacts

No CRHR-eligible cultural resources were identified within the OGS project area of analysis.

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" (PRC § 21084.1). As noted in the CEQA Guidelines, § 15064.5, "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.

The significance of an historical resource is materially impaired when a project:

- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR;
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant;
- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR, as determined by a lead agency for purposes of CEQA.

Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, 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 AND INDIRECT IMPACTS

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 built-environment resources 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 causes obsolescence and demolition or creates improved accessibility, making vandalism or greater weather exposure possible.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at a proposed laydown area 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 identifies all CRHR-eligible cultural resources (above). In the next step in its analysis, staff must evaluate the potential project impacts to the identified cultural resources to determine if these impacts are substantial and adverse. Staff then must recommend mitigation for any substantial and adverse impacts on resources. Staff also must assess whether the proposed project has the potential to impact as-yet-unknown buried archaeological resources and recommend mitigation for unanticipated impacts, if impacts to such resources cannot be avoided.

Identification and Assessment of Direct Impacts and Recommended Mitigation

The proposed OGS ground disturbing activities include site grading; hauling and storage of equipment, materials, and supplies; installation of fencing; construction of an access road; trenching for pipelines; and excavation of pads and foundations for project equipment. As stated in the AFC, the depth of ground disturbance would vary by proposed project activity. Ground disturbance on the proposed plant site could be as deep as 50 feet in areas where pile-supported foundations are used, but would generally be between 12 and 15 feet. The unpaved portions of the proposed construction laydown areas could be disturbed up to seven feet in depth, and the stockpile areas up to one foot. The transmission line towers would result in 30 feet of disturbance at each location, using drilled pier foundations; there would be no additional ground disturbance in other areas of the transmission corridor (CH2MHILL 2010c, p. 3). The new towers would also include 16-square-foot concrete foundations. Construction of the new transmission line would also include the staging conductor pulling and tensioning equipment at each end of the line, which would be staged in areas already disturbed (OGS 2009a, p. 5.2-43) Disturbance up to one foot would be anticipated in the four transmission corridor laydown areas (CH2MHILL 2010c, p. 3).

With respect to built-environment resources, there are no known CRHR-eligible resources in the project area of analysis, including the project site, transmission line corridor, and construction laydown areas. Therefore the proposed project would not have a significant adverse impact on known built-environment resources.

There are also no known significant archaeological resources that would be adversely impacted by the proposed project. However, because of the possibility that subsurface prehistoric and historic-period archaeological deposits could be encountered during construction, CEQA directs the lead agency to make provisions for archaeological resources unexpectedly encountered during construction (PRC § 21083.2; CEQA Guidelines, §§ 15064.5(f) and 15126.4(b)).

The applicant has proposed a number of measures intended to mitigate potential impacts to buried archaeological resources that could be discovered during project construction (OG 2009a, pp. 5.3-22–5.3-24):

Designated Cultural Resource Specialist. The applicant will retain a designated Cultural Resource Specialist (CRS) who will be available during the earth-disturbing portion of the project to evaluate any unanticipated discoveries during the construction phase. The CRS will meet the Secretary of the Interior's professional guidelines for a Principle Investigator and will be responsible for identifying and evaluating the significance of any potential finds, as well as recommend mitigation for a significant find.

Worker Education Training. The applicant will design and implement a worker education program for all personnel who have the potential to encounter and alter archaeological sites, historical resources, or properties that may be eligible for the CRHR. The program will detail the procedures to be followed if cultural resources are discovered during construction, and provide examples of the types of historic and prehistoric artifacts and explain the legal basis for the protection of significant cultural resources.

Monitoring and Emergency Discovery. The applicant will retain a qualified archaeologist to monitor ground-disturbing activities during the project's construction phase, including pre-construction geotechnical testing. The monitor will have the authority to halt construction should archaeological material be discovered, at which time the CRS and site superintendent will be notified immediately. The area of the find will be delineated and construction in this area will halt. Construction will not resume until CRS, in consultation with Energy Commission staff and the Compliance Project Manager, have inspected and evaluated the find.

Site Recording and Evaluation. Any find will be recorded by the CRS following accepted professional standards, and a standard DPR 523 form and location information will be submitted to the CHRIS Northwest Information Center. If the find is determined by the CRS and CPM to not be significant, construction may proceed without further delay. If the CRS determines that further information is required to determine whether the find is significant, the CRS will, in consultation with staff and the CPM, prepare a plan and timetable for evaluation.

Mitigation Planning. If a find is determined to be significant by the CRS and CPM, the CRS will prepare and conduct a mitigation plan in accordance with state guidelines. This plan will emphasize avoidance of significant archaeological resources, if possible. If avoidance is not possible, recovery of a sample of the deposit from which archaeologists can define scientific data to address archaeological research questions will be considered an effective mitigation measure for damage to or destruction of the deposit. The mitigation program will be carried out as soon as possible to avoid construction delays. Construction will resume at the site as soon as the field data collection phase of any data recovery efforts is completed. The CRS will verify the completion of field data collection by letter to the project owner and the CPM so they can authorize construction to resume.

Curation. The CRS will arrange for curation of archaeological materials collected during an archaeological data recovery mitigation program. Curation will be performed at a qualified curation facility meeting the standards of the California Office of Historic Preservation. The CRS will submit field notes, stratigraphic drawings, and other materials developed as part of the data recovery/mitigation program to the curation facility along with the archaeological collection, in accordance with the mitigation plan.

Report of Findings. If a data recovery program is planned and implemented during construction as a mitigation measure, the CRS will prepare a detailed scientific report summarizing results of the excavations to recover data from an archaeological site. This report will describe the site soils and stratigraphy, describe and analyze artifacts and other materials recovered, and draw scientific conclusions regarding the results of the excavations. This report will be submitted to the curation facility with the collection.

Inadvertent Discovery of Human Burials. The applicant will ensure that impacts to cultural resources related to the unanticipated discovery of human remains are treated in accordance with state law as detailed in PRC Sections 5097.91 and 5097.98, as amended.

Staff has incorporated many of the applicant's recommendations into the proposed conditions of certification to ensure that all impacts to cultural resources, including unanticipated finds, are mitigated to a less than significant level.

Conditions of Certification **CUL-1** through **CUL-7**, below, provide for the contingency of discovering archaeological resources during OGS construction and related activities. Staff's proposed **CUL-1** requires a Cultural Resources Specialist (CRS) to be retained and available during all ground disturbing activities to evaluate any discovered buried resources and, if necessary, to conduct data recovery to mitigate for any unavoidable impacts. **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 a Cultural

Resources Monitoring and Mitigation Plan (CRMMP) to the Energy Commission Compliance Project Manager (CPM) prior to the start of construction. **CUL-4** requires the CRS to write and submit to the CPM a final report on all cultural resources monitoring and mitigation activities that occurs on the OGS project site, including linears. **CUL-5** requires the project owner to train workers to recognize cultural resources and instruct them on procedures to halt construction if cultural resources are discovered. **CUL-6** prescribes the monitoring requirements, by an archaeologist and, possibly, by a Native American for the identification of buried 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.

In summary, because the project would have no significant impacts on known CRHR-eligible cultural resources, no mitigation would be required for such resources. Proposed Conditions of Certification **CUL-1** through **CUL-7** would provide for identification and appropriate treatment of buried resources accidentally discovered during construction.

Identification and Assessment of Indirect Impacts and Recommended Mitigation

No historical resources were identified within the OGS project area of analysis. Therefore, the project would not result in any indirect impacts to known cultural resources and does not require mitigation for indirect impacts.

Operation Impacts and Mitigation

Normal operation of the power plant facilities would not result in a potential impact to cultural resources in the area. However, 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 in previously undisturbed soils and sediments. Staff assumes this disturbance would be of previously disturbed soils and sediments, so such repairs would not impact previously unknown subsurface archaeological resources. If, during operation of the OGS, the owner should plan any changes or additions entailing significant amounts of ground disturbance, the owner would have to petition the Energy Commission to review the environmental impacts of those activities and approve the plan. Cultural resources staff would then determine if previously undisturbed sediments would be affected by the planned activities and, if so, recommend the application of existing conditions or devise new ones to mitigate any impacts to known or newly identified CRHR-eligible cultural resources. Consequently, at this time staff has recommended no conditions of certification addressing operation impacts.

Indirect Impacts and Mitigation

Staff received comments from the City of Oakley that the OGS project would be required to provide a right of way dedication and frontage improvements to Bridgehead Road, west of and adjacent to the project site, sometime in the future via execution of a deferred improvement agreement (COA 2011a), as the city's General Plan Circulation Element calls for Bridgehead Road to be a major arterial route. Bridgehead Road is within the cultural resources 200-foot survey buffer area and was surveyed for cultural resources as part of the OGS project application. No cultural resources were identified

in this area. Archaeological sensitivity in the area is considered moderate, due to the site's proximity to the San Joaquin River, the local topography and previous ground disturbance (OG 2009a, Appendix 5.3B, pp. 12–14). Feasible mitigation for the roadway improvements which staff anticipates the City of Oakley would implement if necessary includes archaeological survey, construction monitoring, avoidance of discovered archaeological sites, and data recovery if avoidance is not possible. These mitigation measures should be effective in reducing to less than significant any impacts to significant cultural resources because they are proven methods, easily employed, and widely accepted measures in cultural resources management practice. Additionally, the City of Oakley indicated that the proposed widening of Bridgehead Road from a two-lane rural road to a four-lane arterial was contemplated in the General Plan Circulation Element and the accompanying General Plan EIR (COO 2011c). Therefore, the potential impacts to cultural resources from the improvements to Bridgehead Road could be reduced to less than significant through implementation of appropriate impact avoidance and minimization measures.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time together with impacts from other nearby, past, present, and reasonably foreseeable future projects (PRC § 21083; 14 CCR §§15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in the OGS project vicinity could occur if any other existing or proposed projects, in conjunction with the proposed OGS, 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 OGS and other proposed projects in the vicinity could have a cumulatively considerable effect on subsurface archaeological deposits, both prehistoric and historic.

The applicant identified the pending residential and commercial projects in both Oakley and Antioch through April 2009. Of the 4,058 approved residential lots in Oakley, 1,369 building permits had been approved and 1,064 had received a final inspection. Many of these residential projects are subdivisions, including the 140-acre Emerson Property project which consists of 578 residential units and 23.74 acres of commercial uses. Oakley also had two additional commercial projects under construction, six projects had received planning entitlements and nine projects were undergoing review as of April 2009. The City of Antioch had 32 residential and 68 commercial projects pending as of February, 2009. The residential projects included single family homes and a senior housing project. Commercial projects included medical facilities, banks, shopping centers, gas stations and cell phone towers (OG 2009a, p. 5.6-21). Additionally the City of Oakley has developed a draft *DuPont Specific Plan* for the entire DuPont property, including the project site. This plan includes 15 acres of retail/commercial property, 34 acres of research and development/business park, and 77 acres of light industrial development, and 200 acres of open space (OG 2009a, p. 5.6-16). The applicant stated that standard mitigation is available to reduce impacts to cultural resources from the approved projects and those currently undergoing review to less-than-significant levels, and that it is anticipated that any impacts resulting from these projects would be mitigated to less-than-significant levels (OG 2009a, p. 5.3-21).

As noted above, the OGS project would not directly or indirectly impact any known historical resources. Conditions of Certification **CUL-1** through **CUL-7** would also reduce any potential OGS impacts to previously unknown subsurface cultural resource finds to less than significant. Regardless of impacts from other projects, the OGS project is unlikely to result in impacts that would, either individually or cumulatively, contribute to a significant impact to cultural resources in the project vicinity.

Staff has proposed conditions of certification for the OGS 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 future projects in the area could mitigate impacts to known, CRHR-eligible resources through avoidance or data recovery and could mitigate impacts to as-yet-undiscovered subsurface archaeological sites to less-than-significant levels by requiring archaeological monitoring protocols for ground disturbance through avoidance or data recovery. These are standard measures used to ensure compliance with Section 15064.5 of the State CEQA Guidelines and related provisions of the Public Resources Code. It is assumed that similar measures would be applied to other projects in the area as appropriate. Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code section 5097.98.

Since any impacts from the proposed OGS project would be mitigated to a less-than-significant level by the project's compliance with proposed Conditions of Certification **CUL-1** through **CUL-7**, 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 OGS project to be cumulatively considerable when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If Conditions of Certification **CUL-1** through **CUL-7** are properly implemented, the proposed OGS project would result in a less-than-significant impact on known and newly found cultural resources. The project would therefore be in compliance with the applicable state laws, ordinances, regulations, and standards listed in Table 1.

City of Oakley General Plan

The City of Oakley has two cultural-resource specific goals and related policies in its general plan. Goal 6.4 encourages preservation of cultural resources within the General Plan Area and is implemented by Policy 6.4.1, which requires developers to preserve areas that have identifiable and important archaeological or paleontological significance. There were no historical resources, archaeological or built environment, identified within the OGS project area of analysis. Conditions of certification **CUL-1** through **CUL-7** ensure that any unanticipated finds would be protected, consistent with all federal, state, and local LORS. Therefore, the project is consistent with General Plan Goal 6.4 and Policy 6.4.1 is not applicable to the OGS project.

City of Antioch General Plan

The City of Antioch General Plan contains one cultural resource-specific objective,

which requires developers to preserve archaeological, paleontological, and historic resources within the Antioch Planning Area for the benefit and education of future residents. Policies implementing this objective identify specific requirements to analyze and mitigate any project-related significant adverse impacts to cultural resources, including unanticipated finds. Staff's proposed Conditions of Certification require specific actions equal to or greater than those required by this General Plan goal and its related policies, consistent with the requirements of CEQA. A policy requiring preservation of historic structures and requiring developers to ensure that alterations to historic buildings and their immediate settings are compatible with the character of the structure and surrounding neighborhood does not apply to this project, as no significant historic buildings or settings would be adversely impacted by this project. Implementation of conditions of certification **CUL-1** through **CUL-7** would ensure the project is consistent with this City of Antioch General Plan objective and applicable policies.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments regarding cultural resources were received.

CONCLUSIONS AND RECOMMENDATIONS

Staff's analysis has determined that the proposed OGS project would have no impact on known CRHR-eligible archaeological resources, ethnographic resources, individual built-environment resources, or historic districts.

With the adoption and implementation of Conditions of Certification **CUL-1** through **CUL-7**, the project would have a less-than-significant impact on archaeological resources discovered during construction-related ground-disturbing activities. Staff thus recommends that the Commission adopt these conditions. These measures are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction and to mitigate any significant impacts from the project on any newly found resources assessed as eligible for the CRHR. To accomplish this, 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 discovered CRHR-eligible 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 previously unknown CRHR-eligible cultural resources encountered during construction or operation. Additionally, with the adoption and implementation of these conditions, the OGS project would be in conformity with all applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of construction-related ground disturbance (includes “preconstruction site mobilization,” “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 (at the project owner’s option). The project owner shall submit the resumes and qualifications for the CRS, CRS alternates, and all technical specialists to the CPM for review and approval.

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 construction-related ground disturbance shall occur prior to Compliance Project Manager (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 reasons including but not limited to non-compliance on this or other Energy Commission projects. After all ground disturbance is completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, if the CPM approves. With the discharge of the CRS, these cultural resources conditions no longer apply to the activities of this power plant.

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 construction-related ground disturbance, the project owner shall submit the resume for the CRS, and alternate CRS(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, if different from the alternate CRS, to the CPM for review and approval. At the same time, the project owner shall also provide the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project to the proposed new CRS. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved CRM may temporarily serve in place of a CRS for a maximum of 3 days. If cultural resources are discovered during the time, then construction-related ground disturbance shall halt and remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to construction-related ground disturbance, the CRS shall provide a letter to the CPM naming CRMs for the project and attesting that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.
4. At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to their qualifications.
5. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.
6. At least 10 days prior to the start of construction-related 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 construction-related 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, confidential cultural resources reports, all supplements, the Energy Commission's Final Staff Assessment (FSA), and the Final Decision, including all Conditions of Certification, 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 construction-related ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

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

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

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

Verification:

1. At least 40 days prior to the start of construction-related ground disturbance, the project owner shall provide the AFC, data responses, confidential cultural resources documents, and the Energy Commission FSA to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.
2. At least 15 days prior to the start of construction-related ground disturbance, if there are changes to any construction-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.
3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.
4. Weekly, during construction-related ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.
5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Prior to the start of construction-related 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 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 construction-related 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 construction-related tasks during the construction-related ground disturbance and post-construction-related 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 construction-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 construction-related ground disturbance and how long they would be needed to protect the resources from construction-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 demonstrating when and how the project owner will comply with Health and Human Safety Code 7050.5(b) and Public Resources Code 5097.98(b) and (e).
10. 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 construction-related ground disturbance and cannot be treated prescriptively.
11. 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 construction-related 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 construction-related ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials generated or collected as a result of the archaeological investigations (survey, 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, results, samplings, and analyses. All survey reports, DPR forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of construction-related 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 construction-related ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

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

CUL-5 Prior to and for the duration of construction-related ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The training shall be prepared by the CRS, may be conducted by any member of the cultural resources team, and may be presented in the form of a video. During the training and during construction, the CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when construction-related ground disturbance is completed or suspended, but must be resumed when construction-related 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 construction-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 construction-related 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 construction-related ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.
2. At least 15 days prior to the beginning of construction-related ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.
3. Monthly, until construction-related ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all construction-related 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 the earth-removing activities in the areas specified in the previous paragraph, for as long as the activities are ongoing. Where excavation equipment is actively removing dirt and hauling the excavated material farther than fifty feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no further than fifty

feet from the location of active excavation, one monitor shall both observe the location of active excavation and inspect the dumped material.

A Native American monitor shall be obtained to monitor construction-related ground disturbance in areas where Native American artifacts are discovered, and written notification of discoveries of archaeological material of interest to Native Americans shall be sent to those Native Americans who requested to be notified of such discoveries. 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 construction-related ground disturbance to proceed without a Native American monitor.

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

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 the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

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 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.

Verification:

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

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

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts to such

a resource can be anticipated, construction-related 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. If the discovery includes human remains, the project owner shall comply with the requirements of Health and Human Safety Code 7050.5(b) and (c). Monitoring and daily reporting as provided in these conditions shall continue during the project's construction-related ground-disturbing activities elsewhere. The halting or redirection of construction-related ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

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

Verification:

1. At least 30 days prior to the start of construction-related 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 construction-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 a resource of interest to Native Americans, 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 construction-related 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.

CULTURAL RESOURCES ACRONYM GLOSSARY

OAKLEY GENERATING STATION

AD	After the Birth of Christ
AFC	Application for Certification
ARMR	Archaeological Resource Management Report
BC	Before the Birth of Christ
CCIC	Central California Information Center (CHRIS), California State University, Stanislaus
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Conditions of Certification
CPM	Energy Commission Compliance Manager
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
LORS	Laws, Ordinances, Regulations, and Standards
MCR	Monthly Compliance Report

MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
OGS	Oakley Generating Station
OHP	Office of Historic Preservation
Project Area of Analysis	The project site (see below) plus what additional areas staff defines for each project that are necessary for the analysis of the cultural resources that the project may impact.
Project Site	The bounded area(s) identified by the applicant as the area(s) within which they propose to build the project.
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 files.

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CH2MHILL 2010c—CH2MHILL/D. Davy (tn 55826). Applicant’s Response to CEC Staff Data Requests #44-67, dated March, 9, 2010. Submitted to CEC/Docket Unit on March, 9, 2010. Confidential filing.

CH2MHILL 2010t—CH2MHILL/D. Davy (tn 58574). Supplemental Information Item #3: Sanitary Sewer Force Main, dated September 21, 2010. Submitted to CEC/Docket Unit on September 21, 2010. Confidential filing.

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[http://www.ci.oakley.ca.us/UserFiles/06%20GP%20Open%20Space%20and%20Conservation%20Element%20CC\(5\).pdf](http://www.ci.oakley.ca.us/UserFiles/06%20GP%20Open%20Space%20and%20Conservation%20Element%20CC(5).pdf)

City of Antioch General Plan, 2003.

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COA 2011a – City of Antioch/M. Gentry (tn 59733). City of Antioch Comments on PSA, dated February 10, 2011. Submitted to CEC/Docket Unit on February 18, 2011.

COO 2011c – City of Oakley/R. Willis (tn 59804). City of Oakley Comments Regarding Environmental Review of Bridgehead Road Widening, dated February 23, 2011. Submitted to CEC/Docket Unit on February 25, 2011.

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HAZARDOUS MATERIALS MANAGEMENT

Testimony of Geoff Lesh, P.E., and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Oakley Generating Station (OGS), 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., Contra Costa Generating Station, 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 OGS project site. Other proposed conditions of certification address the issues of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed OGS 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 (29 percent ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at the OGS project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (OG 2009a, Table 5.5-2). 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 18,000 gallon tank. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with the use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form, which is stored as a liquefied gas at high pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind

concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, water treatment chemicals, and welding gasses will be present at the proposed OGS 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. Pacific Gas and Electric Company (PG&E) proposes to serve the OGS from the Antioch Natural Gas Terminal adjacent to the OGS site. Natural gas will be delivered to the site via a new 300-foot-long, 6- to 10-inch-diameter pipeline (OG2009a Section 4.0, Figure 4.0-1). The pipeline will terminate in a PG&E gas metering yard located inside the OGS site. The project owner also may choose to include a secondary natural gas supply via a new 410-foot long, 6- to 10-inch-diameter pipeline connecting to PG&E's Antioch Terminal. Because the Antioch Terminal is adjacent to the OGS, neither of these pipelines would extend offsite into public right-of-way (OG2009a Section 2.5.3). The OGS project would also require the transportation of aqueous ammonia to the facility.

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	Contains standards for gas piping construction and service.

General Order 112-E and 58-A	
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, construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of the 2007 California Building Code for Seismic Category D (OG2009a, Appendix 2C, Section 2C4.4.7).

SETTING

The project site is on land that is zoned Heavy Industrial. It is on a 21.95-acre site that was previously part of a larger 210-acre site owned by E.I. DuPont de Nemours and Company (DuPont). The site elevation is approximately 32 feet above mean sea level. The site is bounded to the west by the Pacific Gas and Electric Company's (PG&E) Antioch Terminal, a large natural gas transmission hub; to the north by DuPont property that is industrial and vacant industrial; to the east by DuPont's titanium dioxide landfill area; and to the south by the Burlington Northern Santa Fe railroad. Immediately south of the railroad is a large parcel currently in agriculture. A 74.6-acre commercial development, the Rivers Oaks Crossing, has been proposed for this parcel (OG2009a, Section 5.9.1). Surrounding land uses include the former DuPont Oakley manufacturing site and marinas along the San Joaquin River to the north, power plants owned by Pacific Gas and Electric Company (PG&E) and Mirant to the west; vineyards and mixed commercial, industrial, and residential uses to the south, and vineyards and residential uses to the east (OG2009a, Section 1.0).

Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

- local meteorology;
- terrain characteristics; and
- location of population centers and sensitive receptors relative to the project.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as their

associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and directions are described in the **Air Quality** section (5.1) of the Application for Certification (AFC) (OG 2009a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 108.0°F are appropriate for conducting the worst-case off-site consequence analysis (CH2MHILL 2010q, Table 1).

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 of about 30 feet above mean sea level. Terrain in the region is also generally flat with low hills rising to an elevation of about 200 feet above sea level approximately 0.7 miles south of the project site.

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 are listed in AFC Appendix 5.1D, and shown on AFC Figure 5.1-D2. The nearest residences are a trailer park located on Bridgehead Road, approximately 0.2 mile southwest of the project site. This trailer park is a non-conforming residential use in a commercial zoning district. The nearest school to the project site is Orchard Park Elementary, located at 5150 Live Oak Avenue, Oakley, CA, 94561, approximately 0.8 mile south-southeast from the project site. The nearest hospital/long-term health care facility is Sutter Delta Medical Center, which is located at 3901 Lone Tree Way, Antioch, California 94509, and is approximately 5 miles southwest (OG 2009a, Section 5.5.1.1).

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 (OG 2009a, Section 5.5). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in AFC Table 5.5-2 (OG 2009a) and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different-sized transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps one and two that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site

impacts since they will be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, the only hazardous materials proposed for use are paint, paint thinner, flushing and cleaning fluids, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, antifreeze, and pesticides. Any impact of spills or other releases of these materials will be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, mineral insulating oil, water treatment chemicals and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at OGS) 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 Staff Assessment 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 and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases such as propane or liquefied petroleum gas, but can explode under certain conditions (as demonstrated by the July 2004 natural gas detonation in Belgium).

While natural gas will be used in significant quantities, it will not be stored on site. The OGS will require construction of one or two offsite pipelines to supply natural gas to the project site. PG&E operates the Antioch Terminal, a major high-pressure natural gas transmission pipeline hub that borders the OGS site. PG&E proposes to serve the OGS from Line 303, which passes through the southwest corner of the OGS site as it enters the Antioch Terminal from the south. The tap to Line 303 will be located either in the southwest corner of the OGS site or in the Antioch Terminal. From this tap, natural gas will be delivered to the site via a new 300-foot-long, 6- to 10-inch-diameter pipeline, as shown in AFC Figure 4.0-1. The pipeline will terminate in a PG&E gas metering yard

located inside the OGS, west of the plant switchyard. The project owner also may choose to include a secondary natural gas supply via a new 410-foot long, 6- to 10-inch-diameter pipeline connecting to PG&E's Line 400, which passes through the OGS site and enters the northeast corner of the Antioch Terminal. Construction will be by open trench within a construction corridor width of 100 feet or less. No other alternative routes were evaluated because this route is the shortest possible and lies entirely within the OGS site or Antioch Terminal, thus requiring no additional offsite rights-of-way or utility easements. PG&E will construct, own, and operate this new pipeline (OG 2009a, Section 4.0).

The natural gas pipeline(s) 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). Additionally, the gas pipelines that would be constructed for this project would be located and lie entirely within the OGS site or Antioch Terminal which greatly reduces the risks of impacts to the public from a rupture or failure. A review of potential pipeline safety concerns for power plants sited by the California Energy Commission concludes that newly installed gas pipelines which are built and maintained to current standards are safe and present little risk to the public during their lifetime (CEC 2010). Staff concludes that existing LORS are sufficient to ensure minimal risks of pipeline failure.

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. Purging and cleaning of onsite fuel gas piping will be done in accordance with the current version of NFPA 850, which governs construction and fire protection of natural gas fired power plants. Its most recent revision, NFPA850-TIA10-2, effective November 9, 2010, specifies strict safety procedures to be followed for either purging or cleaning of the gas piping. This revision was made in response to the urgent recommendations made by the United States Chemical Safety Board after its investigation of the explosion which occurred during commissioning of the KLEEN Energy Power Plant at Middletown, Connecticut on February 7, 2010. On June 28, 2010 the United States Chemical Safety and Hazard Board (CSB) issued Urgent Recommendations to the United States Occupational Safety and Health Administration (OSHA), the National Fire Protection Association (NFPA), the American Society of Mechanical Engineers (ASME), and major gas turbine manufacturers to make changes to their respective regulations, codes, and guidance to require the use of inherently safer alternatives to natural gas blows for the purposes of pipe cleaning. Recommendations were also made to the fifty states to enact legislation applicable to power plants that prohibits flammable gas blows for the purposes of pipe cleaning. In accordance with those recommendations, staff proposes **Condition of Certification HAZ-9** which prohibits the use of flammable gas blows for pipe cleaning at the facility either during construction or after the start of operations.

All fuel gas pipe purging activities shall vent any gases to a safe location outdoors, away from workers and sources of ignition. Fuel gas pipe cleaning and purging shall adhere to the provisions of most current versions of the National Fuel Gas Code (NFPA 54) including all Temporary Interim Amendments.

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.

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 OGS. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. OGS would use 29 percent aqueous ammonia solution stored in one stationary above-ground storage tank, with a maximum capacity of 18,000 gallons (OG 2009a, Section 5.5.2.3.2 and Table 5.5-2).

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 benchmark exposure levels of ammonia gas occurring offsite. These include:

1. the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm);
2. the immediately dangerous to life and health level of 300 ppm;
3. the emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by the United States Environmental Protection Agency (US EPA) and California; and
4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm.

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assume that the potential release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

Applicant's off-site consequence analysis (OCA) describes the modeling parameters used for the worst-case accidental release of aqueous ammonia and gives the results (CH2MHILL 2010q). Pursuant to the California Accidental Release Program (CalARP) regulations (federal risk management plan regulations do apply to sources that store or use aqueous ammonia solutions above 20%), the OCA was performed for a worst-case release scenario involving the failure and complete discharge of the storage tank. For the scenario, the contents of the storage tank (18,000 gallons) would be collected by the secondary containment structure (CH2MHILL 2010q).

Ammonia emissions from the potential release scenario were calculated following methods provided in the RMP off-site consequence analysis guidance, US EPA, April 1999. The highest daily temperature recorded in the area during the last three years (108°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. Potential off-site ammonia concentrations were estimated using the SLAB numerical dispersion model (CH2MHILL 2010q).

The results of the applicant's modeling show that concentrations exceeding CEC's level of significance of 75 ppm would not extend beyond the facility fenceline for the worst-case scenario. Staff has reviewed the applicant's modeling and accepts the results. 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 OGS 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 sump surrounding the aqueous ammonia storage tank 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 the ammonia truck unloading area that would drain into the storage tank's concrete containment sump; 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 (OG 2009a, section 5.5.4.2.1). 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 voltage step-up transformers would be in excess of the minimum quantity that requires such a plan. However, there are known Waters of the United States nearby 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 CCCHSD-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 (ECCFPD 2010). Staff finds that the County's Hazmat team is capable of responding to a hazardous materials emergency call from the OGS 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.

The City of Oakley has two major truck routes (State Route [SR] 4 and East Cypress Road). The city's 2020 General Plan designates SR 4 Bypass as a truck route that will serve as the primary route for regional goods movements in the area. Main Street/SR 4 will continue to serve as the primary route for goods movements within Oakley, and will be connected to the SR 4 Bypass by Lone Tree Way in Brentwood and by Laurel Road in Oakley.

Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. The proposed route for OGS is for trucks to either use SR 160, exit at Wilbur Avenue, and turn onto Bridgehead Road, or use SR 4/Main Street and turn onto Bridgehead Road.

The CVC Sections 35550-35559 regulate the use of trucks on state facilities, including Main Street/SR 4 and SR 160. When trucks leave State Route 160 they enter onto the surface streets of the City of Antioch briefly before entering into the City of Oakley. The two proposed routes are considered truck routes by the City of Antioch and the proposed routes fulfill General Plan policy 11.7.2I, which is to promote the safest possible transport of hazardous materials through Antioch (COA 2011a). The City of Oakley regulates the use of trucks on truck routes within that city (OG 2009a, Section 5.5.2.2).

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 at either SR-160 or SR-4/Main (depending of which route is used). 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 5.12 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 6,700 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 OGS would require a maximum of 37 deliveries per year (OG 2009a, Section 5.5.2.3.2). Each delivery will travel less than approximately 0.4 miles along Bridgehead Road regardless of whether it arrives from SR-160 or from SR-4/Main to the OGS.

This would result in a maximum of 15 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 main highway to the facility via Bridgehead Road. Results show a risk of 0.04 in 1,000,000 for one trip and a total annual risk of 1.5 in 1,000,000 for 37 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 routes 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 2007 California Building Code for Seismic Design Category D (OG2009a, Appendix 2C, Section 2C4.4.7). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks), staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Staff has also begun a review of the impacts of the recent earthquakes in Haiti (January 12, 2010; magnitude 7.0) and Chile (February 27, 2010; magnitude 8.8). The building standards in Haiti are less stringent than those in California, while those in Chile are as stringent and modern as California seismic building codes. Yet, the preliminary reports show a lack of impact on hazardous materials storage and pipelines infrastructure in both countries. For Haiti, this most likely reflects a lack of industrial storage tanks and gas pipelines; for Chile, this most likely reflects the use of strong safety codes.

Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled *Chemical Facility Vulnerability Assessment Methodology* (US DOJ 2002), the North American Electric Reliability Council published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy (DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S. Department of Homeland Security published in the Federal Register (6 CFR Part 27) an interim final rule requiring that facilities that use or store certain hazardous materials conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. The rule applies to aqueous ammonia solutions of 20 percent or greater and this proposed facility plans to utilize a 29 percent aqueous ammonia solution. Staff 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 OGS 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 does not propose that the project owner conduct its own vulnerability assessment.

These 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 three projects in the vicinity of the proposed OGS that could potentially contribute to cumulative impacts. The Gateway Generating Station (GGS), Contra Costa Power Plant (CCPP), and the proposed Marsh Landing Generating Station (MLGS) are located approximately 0.6 mile or more and northwest of the OGS site, but not directly adjacent. These are the facilities that would have hazardous materials onsite. The CCPP and GGS currently have aqueous ammonia storage facilities onsite in addition to similar chemicals that are projected for the proposed OGS. (OG 2009a, Section 5.5.3). Since the applicant's modeling of an accidental release shows that ammonia concentrations exceeding 75 ppm would be found only at distances less than 42 feet from the ammonia storage tank and thus not extend off-site to reach either of these facilities, cumulative impacts from ammonia releases from these four facilities are not expected to occur.

Worst-case accidental - or intentional - release scenarios are highly unlikely because the applicant will develop and implement a hazardous material storage and handling program for OGS 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 OGS site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the OGS 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comment: The City of Antioch Community Development Department Planning Division commented that, although when trucks leave State Route 160 they enter onto the surface streets of Antioch briefly prior to entering into Oakley, the City of Antioch does not have issue with the proposed routes for hazardous materials transportation. The two proposed routes are considered truck routes by the City of Antioch and the proposed routes fulfill General Plan policy 11.7.2I, which is to promote the safest possible transport of hazardous materials through Antioch (COA 2011a).

Staff Response: Staff acknowledges the comments from the City of Antioch and has incorporated them into the text of this technical analysis section.

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**. The potential for fire or explosion due to a planned flammable gas release is addressed by Condition of Certification **HAZ-9** prohibits the use of flammable gas blows for pipe cleaning at the facility either during construction or after the start of operations.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix B, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a Hazardous Materials Business Plan (HMBP), 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. The project owner shall consider all recommendations that are made by the CCCHSD and CPM within thirty (30) days of submittal. Copies of any comments received (or if none were received, a letter so stating), the final updated HMBP, updated SPCC Plan, and updated RMP shall then be provided to the CCCHSD-HMP

and the East Contra Costa Fire Protection District (ECCFPD) 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 any comments received (or if none were received, a letter so stating), a final updated Business Plan and updated SPCC Plan to the CCCHSD-HMP for information and to the CPM for approval. At least thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide any comments received (or if none were received, a letter so stating), and the final updated RMP to the CCCHSD-HMP and the ECCFPD 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 percent of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

Verification: At least 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 routes approved by the CPM (SR-4 to SR-160 to Wilbur Avenue to Bridgehead Road to the project site, or SR 4/Main Street

and turn onto Bridgehead Road 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 construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;
2. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
3. Evacuation procedures.

Verification: At least 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 the entire boundary of the OGS site.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components—transformers, gas lines, and compressors—depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with both appropriate law enforcement agencies and the applicant.

Verification: At least 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 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.

HAZ-9 The project owner shall not allow any fuel gas pipe cleaning activities on site, either before placing the pipe into service or at any time during the lifetime of the facility, that involve “flammable gas blows” where natural (or flammable) gas is used to blow out debris from piping and then vented to atmosphere. Instead, an inherently safer method involving a non-flammable gas (e.g. air, nitrogen, steam) or mechanical pigging shall be used. Exceptions to any of these provisions will be made only if no other satisfactory method is available, and then only with the approval of the CPM.

Verification: At least 30 days before any fuel gas pipe cleaning activities involving fuel gas pipe of four-inch or greater external diameter, the project owner shall submit a

copy of the Fuel Gas Pipe Cleaning Work Plan which shall indicate the method of cleaning to be used, what gas will be used, the source of pressurization, and whether a mechanical PIG will be used, to the CBO for information and to the CPM for review and approval.

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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- NRC. 1972. Guideline for Short-Term Exposure of the Public to Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.
- NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.
- WHO. 1986. World Health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists

AIHA, American Industrial Hygienists Association

EEGL, Emergency Exposure Guidance Level

EPA, Environmental Protection Agency

ERPG, Emergency Response Planning Guidelines

IDLH, Immediately Dangerous to Life and Health Level

NIOSH, National Institute of Occupational Safety and Health

NRC, National Research Council

STEL, Short Term Exposure Limit

STPEL, Short Term Public Emergency Limit

TLV, Threshold Limit Value

WHO, World Health Organization

HAZARDOUS MATERIALS
Appendix B
Hazardous Materials Proposed for Use at the OGS
(Source: OG 2009a Table 5.5-2)

Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities								
Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ _a	RQ of Material as Used Onsite _b	EHS TPQ _c	Regulated Substance TQ _d	Prop 65
Aqueous ammonia (29.4% NH ₃ by weight)	Aqueous ammonia	7664-41-7	18,000 gal _g	100 lbs	526 lbs	500 lbs	500 lbs	No
Aqueous ammonia (19%-28% NH ₃ by weight)	Aqueous ammonia	7664-41-7	400 gal	100 lbs	357 lbs	500 lbs	500 lbs	No
Anti-scalant	Antiscalant	Various	400 gal	e	e	e	e	No
Citric acid	Citric Acid	77-92-9	625 lbs	e	e	e	e	No
Cleaning chemicals/detergents	Various	None	3,000 gal	e	e	e	e	No
Diesel No. 2	Diesel No. 2	68476-34-6	400 gal	e	e	e	e	No
Hydraulic oil (e.g., Fryquel)	Phosphate ester	None	300 gal	42 gal _f	42 gal _f	e	e	No
Laboratory reagents	Various	Various	10 gal	e	e	e	e	No
Lubrication oil	Oil	None	20,000 gal	42 gal _f	42 gal _f			No
Mineral insulating oil	Oil	8012-95-1	82,000 gal	42 gal _f	42 gal _f			No
Oxygen scavenger (e.g., NALCO ELIMIN-OX)	Oxygen scavenger	None	500 gal	e	e	e	e	No
Amine solution	Amine	2008-39-1	400 gal	e	e	e	e	No
Bromine containing solution	Bromine	7726-95-6	600 gal	e	e	500 lbs	500 lbs	No
Sodium dichloroisocyanurate	Sodium bromide	2893-78-9/7647-15-6	25 gal	e	e	e	e	No
Sodium bisulfite (NaHSO ₃)	Sodium bisulfite	7631-90-5	500 gal	5,000 lbs	5,000 lbs	e	e	No
Sulfuric acid (93%)	Sulfuric acid	7664-93-9	600 gal	1,000 lbs	1,075 lbs	1,000 lbs	1,000 lbs	Yes
Sodium hydroxide (NaOH) (20% to 50%)	Sodium hydroxide	1310-73-2	400 gal	1,000 lbs	800 lbs	e	e	No
Sodium hypochlorite (12.5%)	Sodium hypochlorite	7681-52-9	600 gal	100 lbs	800 lbs	e	e	No
Hydrochloric acid	Hydrochloric acid	7647-01-0	25 gal	5,000 lbs	5,000 lbs	e	15,000 lbs	No
Sodium nitrite	Sodium nitrite	7632-00-0	500 lbs	100 lbs	100 lbs	e	e	No
Trisodium phosphate (Na ₃ PO ₄) (e.g., NALCO 7208)	Trisodium phosphate	7601-54-9	400 gal	e	e	e	e	No

Sulfur hexafluoride	Sulfur hexafluoride	2551-62-4	200 lbs	e	e	e	e	No
Acetylene	Acetylene	47-86-2	540 cu ft	e	e	e	e	No
Hydrogen	Hydrogen	1333-74-0	50,000 cu ft	e	e	e	e	No
Oxygen	Oxygen	7782-44-7	540 cu ft	e	e	e	e	No
Propane	Propane	74-98-6	200 cu ft	e	e	e	e	No
EPA Protocol gases	Various	Various	2,500 cu ft	e	e	e	e	No
Cleaning chemicals	Various	Various	Varies (less than 25 gal liquids or 100 lbs solids for each chemical)	e	e	e	e	No
Paint	Various	Various	Varies (less than 25 gal liquids or 100 lbs solids for each type)	e	e	e	e	No

- ^a RQ for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund Amendments and Reauthorization Act (SARA) (Ref. 40 Code of Federal Regulations [CFR] 302, Table 302.4). Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.
- ^b RQ for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a material only contains 10% of a reportable chemical and the RQ is 100 lb., the RQ for that material would be $(100 \text{ lb})/(10\%) = 1,000 \text{ lb}$.
- ^c Extremely Hazardous Substance (EHS) TPQ (Ref. 40 CFR Part 355, Appendix A). If quantities of extremely hazardous materials equal to or greater than the TPQ are handled or stored, they must be registered with the local Administering Agency.
- ^d TQ is from 19 California Code of Regulations (CCR) 2770.5 (state) or 40 CFR 68.130 (federal)
- ^e No reporting requirement. Chemical has no listed threshold under this requirement.
- ^f State RQ for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)]
- ^g The ammonia tank capacity is 18,000 gallons; however, the tank is only filled to 85% of its capacity, or 15,300 gallons.

LAND USE

Testimony of Negar Vahidi and Susanne Huerta

SUMMARY OF CONCLUSIONS

Energy Commission staff concludes that the proposed Oakley Generating Station (OGS) would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to local land use planning. In addition, the OGS would be compatible 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 in the project area. The cumulative implementation of the planned developments would result in the conversion of lands that are currently in agricultural production to urban land uses. However, project-related cumulative land use impacts would be less than significant.

INTRODUCTION

The land use analysis of the OGS 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 2**. The proposed project site, the construction laydown site, the three dirt stockpile areas, the sanitary sewer force main, and approximately one mile of the transmission line are located within the city of Oakley. The remaining 1.4 miles of the proposed transmission line is located within the city of Antioch. In addition, the project site retains Contra Costa County's zoning designation. Therefore, applicable land use LORS for Contra Costa County, the city of Oakley, 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	None
Local	
<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. In 1999, the city of Oakley became incorporated and retained the county's general plan and zoning designations. A general plan was then adopted in 2002, followed by a municipal code in 2006. However, some properties, including the proposed project site, retained the county's zoning designations. Therefore, this analysis includes proposed project's consistency with the county's applicable zoning ordinances.
<u>City of Oakley 2020 General Plan (COO 2010a)</u>	The City of Oakley's General Plan was originally adopted in 2002. The Contra Costa County General Plan assumed a planning horizon of 1995 – 2010 and addressed growth, development, housing, and recreational use within the Oakley community, as well as the lands that were unincorporated County lands at the time the County general plan was adopted. The primary function of the General Plan is to prescribe growth within the region in an orderly fashion and to allocate specific areas for development that will cause the least impact to the environment. On January 26, 2010, the city adopted an amended version of the plan.
<u>City of Antioch General Plan (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.
<u>City of Antioch Zoning Ordinance (COA 2009)</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.

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.

Power Plant Site

The proposed project site is located in the city of Oakley, in eastern Contra Costa County, at 6000 Bridgehead Road, northeast of the junction of State Route 4 and State Route 160. The project would be located on a 21.95-acre site that was part of a larger 210-acre property owned by E.I. du Pont de Nemours and Company (DuPont), but has since been created as a separate lot as a result of recordation of a lot line adjustment. The existing land use for the majority of the 21.95-acre project site is a vineyard, while a portion of the northwest end of the site is a wetland and a portion of the northeast end of the site was formerly used for industrial purposes, as it was formerly a part of the developed portion of the DuPont property.

The project is bounded to west by the PG&E Antioch Terminal, which is a large natural gas transmission hub, to the north by the industrial and/or vacant industrial portions of the DuPont property, to the east by DuPont's titanium dioxide landfill area, and to the south by the Burlington Northern Santa Fe (BNSF). South of the railroad is a 76.4-acre active vineyard, which is also in the process of redevelopment under the River Oaks Specific Plan (refer to the "Cumulative Impacts and Mitigation" subsection for details) (COO 2007).

The proposed project would include a new entrance lane from Bridgehead Road, just south of the intersection of Bridgehead Road and Wilbur Avenue. This would be the primary access point to the OGS.

Construction laydown and parking areas would be located on a 20-acre parcel east of the proposed project site boundary, but within the DuPont property. Primary access to the project site during construction would also be from Bridgehead Road.

Other Project-Related Features and Facilities

The OGS-related linear facilities would include connections to a transmission line, potable water line, a sanitary sewer pipeline, and a natural gas supply. These linear facilities and other features/facilities that would be developed as part of the proposed project are listed below.

- A 230-kilovolt (kV) onsite switchyard;
- A 2.4-mile single-circuit, 230-kV transmission line that would connect the OGS with the PG&E Contra Costa Substation;
- A pull-and-tensioning site for the proposed transmission line located just west of Highway 160 in a vineyard (CH2M Hill 2010a);
- Direct connection to the PG&E natural gas terminal adjacent to the project site;
- Connection to an existing onsite potable water line;
- A 0.44 mile sanitary sewer force main that would connect to an existing sewer line located in Main Street (CH2M Hill 2010b);
- Three offsite dirt stockpile areas north of the project site; and
- A 20-acre construction laydown and parking area east of the project site.

Agricultural Land

The Farm Land Mapping and Monitoring Program (FMMP) of the California Department of Conservation (DOC) provides statistics on the conversion of farmland to non-agricultural uses for Contra Costa County. According to the FMMP “Important Farmlands” maps dated 2008, the majority of the proposed project site is located on land designated as “Farmland of Statewide Importance,”¹ with areas of “Urban and Built-Up Land.”² (DOC 2008). Portions of the proposed 230-kV transmission line would traverse land designated as “Urban and Built-Up Land,” “Other Land,”³ and “Farmland of Statewide Importance.” However, this transmission line would be constructed within an existing 80-foot-wide 60-kV transmission line right-of-way (ROW) owned by PG&E (CCGS 2009). In addition, a pull-and-tensioning site would be located just west of Highway 160 in a vineyard within the city of Antioch.

The proposed project and related facilities are not subject to an Agricultural Land Conservation (Williamson Act) contract or within agricultural zoning designations.

SURROUNDING AREA

The OGS site is surrounded by industrial and commercial uses to the north, west and east and agricultural uses to the south. Contra Costa Substation (CCS) is located approximately two miles west of the OGS project site. Land in the general vicinity of the project site contains a mix of industrial and commercial uses, undeveloped land, open space, agriculture, recreation facilities and residential development. The nearest residences are approximately 900 feet southeast of the site boundary.

The BNSF railroad runs in an east-west direction and is adjacent to the southern boundary of the OGS site. State Route (SR) 160 is adjacent to the west boundary of the project site.

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

- Almondridge City Park;
- Meadow Brook City Park;
- Unity In Antioch;
- Live Oaks Community Christian;
- Cornerstone Pentecostal Church;

¹ Farmland of Statewide Importance is similar to prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

² Urban and Built-Up Land is occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, and

³ Other Land is not included in any other mapping category. Common examples include low density rural developments, riparian areas not suitable for livestock grazing, and vacant and nonagricultural land surrounded on all sides by urban development.

- Bouton-Shaw Academy (Private 1-12);
- Heather Park;
- Orchard Park Elementary School;
- Bridgeway Preschool; and
- Calvary Chapel Antioch

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

The general plan land use and zoning designations for the proposed power plant site and project-related features are illustrated in AFC Figures 5.6-3 (General Plan Designations) and 5.6-4 (Zoning Designations), respectively. In addition, these figures illustrate the land use and zoning designations of lands within a one-mile buffer of the proposed power plant site and lands within a ¼ mile buffer of the proposed transmission line. 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 OGS project site is currently in the city of Oakley and designated by the Oakley General Plan as Utility Energy (UE), which allows for power plant uses involved in the clean production of electricity utilizing the best available combustion turbine technology (COO 2010a, COO 2010b). In addition, the project site is within the Northwest Oakley Planning Area, which is intended for industrial and commercial development by the General Plan.

The city of Oakley designates the entire DuPont property a redevelopment zone, but has not formally rezoned the DuPont property, including the project site itself, from the previous Contra Costa County Heavy Industrial (HI) zoning designation. The city of Oakley initially adopted the zoning districts of Contra Costa County at the time of incorporation in 1999. In December 2002, the city adopted its own general plan and followed with the Oakley Municipal Code. Oakley did update the zoning districts; however, certain properties were not rezoned at that time. The DuPont property, which includes the project site, was one of the sites that was not rezoned and retains the zoning district from Contra Costa County (referred to as a "carry-over" zone district). The applicable zoning district for the project site (along with the three offsite dirt stockpile areas and construction laydown site) would be Specific Plan-3 (SP-3) (COO 2009) if the city had adopted the SP-3 zoning prior to certification for this project. At this time, the city's zoning code does not include a description of the zoning requirements or development standards for the SP-3 zone (COO 2010c). Because the SP-3 zone is still pending, the Contra Costa County Heavy Industrial (HI) zoning designation would guide development of the OGS site, but for the California Energy Commission's exclusive authority to license power plant projects over 50 megawatts.

Other Project-Related Features and Facilities

The proposed 230-kV transmission line is 2.4-miles long and would connect to the CCS located in the city of Antioch. Upon exiting the west side of the project site, one mile of the transmission line would alternate between land adjacent to State Route 160

(considered county land and within the Public/Semi-Public general plan designation) and land within the city of Oakley's Commercial general plan designation. Based on AFC Figure 5.6-4 (Zoning Designations), SR 160 is not within a county zoning designation, and the city's zoning designations for the remaining portions of the transmission line are Light Industrial (L-I) and Retail Business (R-B).

Within the city of Antioch, 1.4 miles of the transmission line would traverse the following general plan designations: Medium Density Residential, Medium Low Density Residential, Business Park, Public/Institutional, Open Space, and the Residential Transit-Oriented Development under the Hillcrest Station Specific Plan. Zoning designations include the Planned Development District (P-D), the Planned Business Center (PBC), and the Light Industrial District (M-1).

The west side of the construction laydown site is within the city of Oakley's Utility Energy general plan designation and the east side is within the Light Industrial designation. The dirt stockpile areas are predominantly within the city of Oakley's Business Park general plan designation with small areas on the west side of the sites within the county's Public/Semi-Public general plan designation.

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 “Farmland of Statewide Importance,” “Urban and Built-Up Land,” and “Other Land.”

As described in detail in the “**Agricultural Land**” subsection above, under the standard FMMP mapping criteria, the project site is designated as Farmland of Statewide Importance (DOC 2008).

Under certain circumstances, the conversion of 21.95 acres of Farmland of Statewide Importance would result in a significant impact. However, Cline Cellars, Inc. (Cline), has managed approximately 13 acres of vineyards on the proposed project site for twenty-five years (Cline 2010); and in a letter to the Energy Commission, Cline states that, “...[t]hese grapes have a very low yield and... due to its size, the low yields and proximity to industrial development, we do not consider this property to have great agricultural potential and it should not be treated as prime farmland” (Cline 2010).

In addition, although the project site is designated as Farmland of Statewide Importance, the site is small and predominantly surrounded by non-agricultural land uses, including the DuPont site with existing industrial development and vacant land to the north and east, the PG&E Antioch Terminal (a natural gas transmission hub) to the west, and the BNSF railroad along the southern boundary of the project site. Therefore, the conversion of the project site would not result in a significant loss of agricultural land.

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.

Construction of the proposed transmission line would require a pull-and-tensioning site, which would be located in a vineyard just west of Highway 160 (CH2M Hill 2010a). Based on the description of the location and AFC Figure 5.6-2 (Important Farmland Within Project Area), it appears the pull-and-tensioning site would be located within land

designated as Farmland of Statewide Importance. Since this would be a construction site, impacts to agricultural land would be temporary and would not result in any permanent conversion of existing Farmland. Therefore, this impact would be less than significant.

Physical Disruption or Division of an Existing Community

The proposed project would be located entirely on private property and completely surrounded by industrial development. Land in the general vicinity of the project site contains a mix of industrial and commercial uses, undeveloped land, open space, agriculture, recreation facilities and residential development. The nearest residences are approximately 900 feet southeast of the site boundary. Access to the proposed project (including the construction laydown/worker parking area) would be through existing road ROW, including Bridgehead Road and Wilbur Avenue.

The offsite portions of the proposed transmission line would be constructed within an existing transmission line ROW; and the sanitary sewer force main would extend 0.33 south from the project site within the public ROW of Bridgehead Road to Main Street, it would then turn eastward for 0.11 mile and connect to an existing sewer line. After construction of the sewer line, the pavement in Bridgehead Road and Main Street would be restored (CH2M Hill 2010b). Therefore, no existing roadways or pathways would be completely blocked or removed from service due to the proposed OGS. 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 community⁴, nor would it conflict with the established industrial and power generation-related uses located immediately adjacent to the project site. 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

⁴ An established community usually refers to a residential community.

approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code section 25525).

When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects, staff has requested that the affected local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with that agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

As part of staff's analysis of local LORS compliance, and specifically to determine the views of the city of Oakley on the project's consistency with their General Plan and zoning codes, staff sent a letter to the city of Oakley in November 2009. The city of Oakley's April 5, 2010 letter provides the city's response to the California Energy Commission's Request for Agency Participation in the Review of the Contra Costa Generating Station Project (09-AFC-04). Attachment 1 of this letter provides the city of Oakley Comments and Recommendations on the Oakley Generating Station Project.

Attachment 1 requests that the applicant pay a General Plan Fee as adopted by Resolution No. 53-03, which is intended to ensure that "...developers and property owners should pay for all costs incurred by the city related to development or exercise of entitlements..." (COO 2003).

After review of these documents, staff has determined that the General Plan Fee (adopted by city of Oakley Resolution No. 53-03) is not a LORS that is applicable to the proposed project because of the Energy Commission's exclusive authority to license power plants over 50 megawatts. Specifically, Warren-Alquist Act § 25500 states:

In accordance with the provisions of this division, the [energy] commission shall have the exclusive power to certify all sites and related facilities in the state, whether a new site and related facility or a change or addition to an existing facility. The issuance of a certificate by the commission shall be in lieu of any permit, certificate, or similar document required by any state, local or regional agency, or federal agency to the extent permitted by federal law, for such use of the site and related facilities, and shall supersede any applicable statute, ordinance, or regulation of any state, local, or regional agency, or federal agency to the extent permitted by federal law.

In addition, according to the city of Oakley April 5, 2010 letter, the city's General Plan designates the project site for a land use of Utility Energy, which

[a]llows for power plant uses involved in the clean production of electricity utilizing the best available combustion turbine technology"(COO 2010c). The project parcel is currently zoned SP-3 (future Specific Plan). However, the city has not yet approved a specific plan for the parcel, therefore, the underlying applicable zoning designation would be Heavy Industry (H-I). This zoning is compatible with power plant development. A rezone and a revision to the DuPont Specific Plan would not be required with Energy Commission certification (COO 2010c).

The development of the OGS project is consistent with the overall goals and policies of the city of Oakley General Plan. The OGS is a natural gas-fired power plant that would produce electricity using current best available combustion turbine technology, and is consistent with the city's General Plan UE land use designation. In addition, the project would site new industrial growth within an existing industrial area that is planned for future industrial growth as discussed in the Northwest Oakley Planning Area. The city's General Plan goals and policies are also consistent with the city of Antioch's goals and policies which support and encourage industrial development in this area, including the Eastern Waterfront Employment Focus Area.

The county's H-I (Heavy Industrial) District permits heavy industrial manufacturing uses of all kinds (Contra Costa Co. 2008). The OGS is a natural gas-fired power plant proposed to be sited on a site that is currently in use for agriculture, but is a part of an existing industrial development. Therefore, the processing of gas would be consistent with the heavy industrial land use types allowed in the county H-I District, such as the existing Contra Costa Power Plant which is also within the county's H-I District.

The proposed transmission line would traverse approximately 1.4 miles of land in the city of Antioch within an existing transmission line ROW. The surrounding area consists of open space, commercial, and residential development. The transmission line would be consistent with the city of Antioch's General Plan since it would be sited within an existing transmission line ROW and any associated impacts would be temporary. Therefore, upon completion of construction, the transmission line would not result in any LORS inconsistencies.

LAND USE Table 2 provides the consistency of the proposed OGS with the specific applicable land use LORS adopted by 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 2
Project Compliance with Applicable Federal, State, and Local Land Use LORS

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Federal	None		
State	None		
Local			
<u>Contra Costa Code, Title 8 (Zoning) - Chapter 84-62: H-I, Heavy Industrial District</u> (Contra Costa Co. 2008)	<p><u>Article 84-62.4. Uses:</u></p> <p><i>84-62.402 Uses--Permitted.</i> 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. (Ord. 1459: prior code § 8164(b): Ord. 1046: Ord. 382).</p> <p><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.⁵ (Ord. 67-39 § 5, 1967: Ord. 1459: prior code § 8164(a): Ords. 1046, 382).</p> <p><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).</p>	YES	<p>AFC Figure 5.6-4 shows the existing zoning as Redevelopment Agency Planned Development (P-1 RA) within the city of Oakley (CCGS 2009). However, based on a letter from the city and the updated 2009 Zoning Map, the current zoning is SP-3 (future Specific Plan) (COO 2010b, COO 2009). Nonetheless, the city's zoning designation for the project site is pending; therefore, the county's Heavy Industrial zoning is still applicable, which is a "carry-over" zone from the Contra Costa County Zoning Ordinance.</p> <p>The OGS is a natural gas-fired power plant proposed to be developed on a site that is currently used for agriculture, but is a part of an existing industrial development. Therefore, the processing of gas would be consistent with the heavy industrial land use types allowed in the county H-I (Heavy Industrial) District⁶. The propose project is consistent with the development requirements of the Contra Costa County Code.</p>

⁵ *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).

⁶ For example, the Contra Costa Power Plant is located in unincorporated Contra Costa County and is within the HI zoning district.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
<u>City of Oakley 2020 General Plan:</u> <u>Chapter 2 - Land Use Element</u> <u>(Oakley 2010a)</u>	<u>General Land Use</u> Policy 2.1.4 Promote the placement of the most intensive non-residential development (Commercial, Business Park and Light Industrial) in the Northwest Oakley Planning Area as defined in Figure 2-3.	YES	The proposed industrial project would be located in the Northwest Oakley Planning Area and is consistent with this policy.
	Policy 2.1.8 Discourage development that results in land use incompatibility. Specifically, require buffers between uses where appropriate and discourage locating sensitive uses (residential) adjacent to existing potentially objectionable uses or locating potentially objectionable uses adjacent to sensitive uses.	YES	The proposed project site is surrounded by industrial development. Other nearby land uses include commercial and agricultural development. There are no residential developments adjacent to the project site, and the closest residence is 900 feet southeast of project site boundary. Therefore, the proposed project is consistent with this policy.
	INDUSTRIAL Goal 2.4 Promote economic growth within the City of Oakley to ensure employment opportunities and goods and services are available within the community.	YES	The OGS would expand the existing industrial development in the Northwest Oakley Planning Area, therefore providing additional employment. The proposed project is consistent with this goal.
	Policy 2.4.1 The City of Oakley does not support or accommodate general Heavy Industrial uses. The City does allow and encourage Light Industrial and Utility Energy uses in appropriate locations.	YES	The proposed project is a utility energy development, and the project site is within the Northwest Oakley Planning which is intended for industrial development by the city's General Plan. There are no residential developments adjacent to the project site, and the closest residence is 900 feet southeast of project site boundary. In addition, the southern boundary of the site would be adjacent to a railroad ROW, which would create a buffer between the proposed project and the agricultural activities south of the site. Therefore, the proposed project would be compatible with existing land uses and is consistent with these policies.
	Policy 2.4.2 Avoid development which results in land use incompatibility. Specifically, avoid locating objectionable land uses within residential neighborhoods and protect areas designated for existing and future industrial uses from encroachment by sensitive (residential) uses.		
	Policy 2.4.3 Ensure there is adequate land available to accommodate		

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	industrial development.		
	Policy 2.4.4 Incorporate design buffers between potentially incompatible land uses and avoid, to the extent feasible, new land uses that compromise existing businesses and operations.		
	<p>(UE) Utility Energy</p> <p>The Utility Energy designation allows for power plant uses involved in the clean production of electricity utilizing the best available combustion turbine technology. The structures associated with this land use designation shall be aesthetically designed, including landscape buffers, and produce no significant adverse affects, including excess noise, dust, and glare on surrounding land uses.</p>	YES	The OGS is a natural gas-fired power plant that would produce electricity using current best available combustion turbine technology, and is consistent with this land use designation.
	<p>Northwest Oakley Planning Area (summarized)</p> <p>The Northwest Oakley Special Planning Area encompasses approximately 972 acres of land located generally north of existing Oakley Road and generally bounded by Big Break Road to the east, Highway 160 to the west and the Delta along the north. This Area has historically been dominated by the former DuPont facility to the north and other uses of industrial character along Highway 4/Main Street. The BNSF Railroad bisects this Area...</p> <p><i>Development Vision</i></p> <p>The City envisions this Area as the primary employment center within Oakley. The existing uses along Highway 4/Main Street are designated</p>	YES	The proposed project site is within the Northwest Oakley Planning which is intended for industrial and commercial development by the city's General Plan. As a utility energy development, the proposed project would be consistent with the purpose and intent of this planning area.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	<p>for commercial uses. Land north of the BNSF Railroad is designated as Business Park, Utility Energy and Light Industrial. Development within the Business Park designation is anticipated to be of a campus character, providing attractive architecture within a landscaped setting...</p> <p>Light Industrial uses will be required to maintain development standards that will contribute to the success of the areas designated as Business Park.</p>		
<u>City of Oakley Zoning Ordinance</u>	<p>Specific Plan-3 (SP-3)</p> <p>The SP-3 (future Specific Plan) zone is pending, and does not include a description of the zoning requirements or development standards; therefore, the county's Heavy Industrial (H-I) zoning is still applicable, which is a "carry-over" zone from the Contra Costa County zoning ordinance (COO 2010c).</p>	YES	<p>According to the AFC, the city's zoning is (P-1 RA) Redevelopment Agency Planned Development, which is based on the city's 2008 zoning map (AFC page 5.6-15). However, according to the city's updated 2009 zoning map, the current applicable zoning district for the project site, the dirt stockpile areas and the construction laydown site is Specific Plan-3 (COO 2009). According to the city of Oakley, although</p> <p>..."[t]he project parcel is currently zoned SP-3 (future Specific Plan), ...the City has not yet approved a specific plan for the parcel, therefore, the underlying applicable zoning designation would be Heavy Industry (H-I). This zoning is compatible with power plant development. A rezone would not be required with CEC certification. A revision to the DuPont Specific Plan would not be required with CEC certification" (COO 2010c).</p> <p>As discussed above the proposed project is consistent with the Contra Costa County HI zone.</p>
<u>City of Antioch General Plan (COA 2003):</u>	<p><u>4.4.1 Land Use Designations</u></p> <p>Medium Low Density. These areas are generally characterized by single-family homes in typical subdivision development, as well as other detached housing such as zero lot line units and</p>	YES	<p>The proposed transmission line would traverse approximately 1.4 miles of land in the city of Antioch within an existing transmission line ROW. The surrounding area consists of open space, commercial, and residential development. Staff concludes that the transmission line would be consistent with the city of Antioch's General Plan</p>

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	<p>patio homes. Duplex development would generally fall into this development density. Areas designated Medium Low Density are typically located on level terrain with no or relatively few geological or environmental constraints. Older subdivisions within the northern portion of Antioch reflect this residential density.</p> <p>Medium Density Residential. A wide range of living accommodations, including conventional single-family dwellings, small lot single-family detached dwellings, mobile homes, townhouses, and garden apartments, characterizes the Medium Density land use designation. Development in these areas can be expected to be a maximum of two (2) stories, and include generous amounts of public or open space for active and passive recreational uses. Lands adjacent to parks, commercial uses, transit routes and rail stations, and arterial roadways would be appropriate for the upper end of the allowable development intensity for this category. Other lands would serve as a buffer or transition between lower density residential areas and higher density residential and commercial areas, as well as areas exhibiting greater traffic and noise levels.</p> <p>Business Park. The primary purpose of lands designated Business Park on the General Plan land use map is to provide for light industrial, research and</p>		<p>since it would be sited within an existing transmission line ROW and any associated construction-related impacts would be temporary. Therefore, upon completion of construction, the transmission line would not result in any LORS inconsistencies.</p>

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	<p>development, and office-based firms seeking an attractive and pleasant working environment and a prestigious location. Business Park areas are typically labor-intensive, meaning that the density of employment is higher than areas involving mostly manufacturing or warehouse uses. Business Park development may occur as a single use, a subdivision wherein individual entities own and operate their businesses, or as multi-tenant complexes.</p> <p>Public/Institutional. This category is used to designate public land and institutional uses, including public and private schools and colleges, public corporation yards, libraries, fire stations, police stations, water treatment facilities, animal shelters, public and private museums, churches, and governmental offices.</p> <p>Open Space. These land uses are of a basically open space nature, and include parks, as well as other open space areas. Certain open space areas, such as those that exist to protect sensitive environmental resources, might not be open to public use, while other lands may be owned and managed by private entities, and therefore not open to the general public. The most prevalent public open space uses are City and regional parks, as well as private open space areas within residential developments. It is intended that this designation be applied only to lands owned by public agencies or</p>		

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	which are already programmed for acquisition.		
	<p><u>4.3.2 Community Structure Policies.</u></p> <p><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.</p> <p><i>Policy d:</i> Concentrate large-scale industrial uses along the waterfront east of Rodgers Point and within areas designated for industrial use along existing rail lines. Limit employment-generating uses adjacent to residential areas and within mixed-use planned communities to business parks and office uses.</p>	YES	Consistent with Policy b, the OGS project (associated features) 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 OGS project would expand the existing industrial development along Wilbur Road, providing additional employment. Therefore, the proposed project is consistent with the city's applicable Community Structure Policies.
	<p><u>4.4.4.2 Employment-Generating Land Use Policies.</u></p> <p><i>Policy d:</i> Ensure appropriate separation and buffering of manufacturing and industrial uses from residential land uses.</p>	YES	The proposed transmission line would traverse approximately 1.4 miles of land in the city of Antioch within an existing transmission line ROW. The surrounding area consists of open space, commercial, and residential development. Staff concludes that the transmission line would be consistent with the city of Antioch's General Plan since it would be sited within an existing transmission line ROW and any associated construction-related impacts would be temporary. Therefore, upon completion of construction, the transmission line would not result in any LORS inconsistencies.
<u>City of Antioch – Hillcrest Station Specific Plan: General Plan Amendment</u>	4.4.6.4 Hillcrest Station Area Focus Area, The SR-4/SR-160 Industrial Frontage Focus Area has been repealed and replaced with the Hillcrest Station Area Specific Plan. Please refer to this adopted Plan for all policies	YES	The city of Antioch provided PSA comments correcting some of the land use designations in the PSA for the transmission line. Based on communications with the city of Antioch planning staff, the Hillcrest Station Specific Plan has been included. The city did not indicate that there would be any potential conflicts with this Specific Plan, and since the transmission line would be sited within an existing

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	<p>related to the area shown on Figure 4.5.</p> <p>Residential TOD. This mixed-use classification is intended to create a primarily residential neighborhood within walking distance to eBART station, with complimentary retail, service, and office uses. Residential densities are permitted between a minimum of 20 and a maximum of 40 units per gross acre. A range of housing types may be included in a development project, some of which may be as low as 10 units per acre, provided the total project meets the minimum.</p>		transmission line ROW, any associated construction-related impacts would be temporary. Therefore, Energy Commission staff concludes that the transmission line would be consistent with this plan, and upon completion of construction, the transmission line would not result in any LORS inconsistencies.
<u>City of Antioch Municipal Code, Title 9: Planning and Zoning (COA 2009)</u> <u>Chapter 5 – Zoning:</u> <u>Article 38, Land Use Regulations</u>	<u>Article 3 § 9-5.30</u>	YES	The proposed transmission line would traverse approximately 1.4 miles of land in the city of Antioch within an existing transmission line ROW. The surrounding area consists of open space, commercial, and residential development. Staff concludes that the transmission line would be consistent with these zoning districts since it would be sited within an existing transmission line ROW and any associated construction-related impacts would be temporary. Therefore, upon completion of construction, the transmission line would not result in any LORS inconsistencies.
	<p>(J) M-1 Light Industrial District. This district allows light industrial uses and excludes those heavy industrial uses with potentially hazardous or negative effects. This district is consistent with the Business Park, Light Industrial, and Rail-Served Industrial General Plan Designations, as well as with the Eastern Waterfront, SR-4/SR-160 Business Park, and East Lone Tree Focused Planning Areas. Uses include the fabrication, assembly, processing, treatment, or packaging of finished parts or products from previously prepared materials typically within an enclosed building.</p>		
	<p>(L) PBC Planned Business Center. This district provides sites in landscaped settings for office centers,</p>		

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	<p>research and development facilities, limited industrial activities (including production and assembly, but no raw materials processing or bulk handling), limited warehouse type retail and commercial activities, and small-scale warehousing distribution. Individual business centers would have a common architectural and landscape treatment, while architectural variation is encouraged between centers. The district is consistent with the Business Park and Light Industrial General Plan Designations, as well as with the Somersville Road Corridor, Eastern Waterfront, SR-4/SR-160 Business Park, and East Lone Tree Focused Planning Areas.</p>		
	<p><u>Article 23: Planned Development District</u></p> <p>Planned Development Districts are intended to accommodate a wide range of residential, commercial and industrial land uses which are mutually supportive and compatible with existing and proposed development on surrounding properties.</p> <p>§ 9-5.2304 USES PERMITTED.</p> <p>Any and all uses otherwise permitted in the city may be included in a P-D District, provided such uses are shown on the approved final development plan for that district and are in accordance with the General Plan and any applicable Specific Plan.</p>		

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. 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 2**, development of the proposed project and its associated features/facilities are compatible with existing surrounding land uses, because the proposed project site, the dirt stockpile areas, and the construction laydown area are located entirely within the DuPont site, which was a major chemical manufacturing facility and was remediated in compliance with Department of Toxic Substances Control requirements. The site is currently occupied by industrial development and vacant land. In addition, the proposed 21.95-acre OGS site is adjacent to major transportation corridors (i.e., SR 4, SR 160, and the BNSF railroad). The proposed OGS is consistent with applicable LORS, such as existing and expected (i.e., city of Oakley) General Plan Land Use and Zoning designations for the proposed project site and the immediately surrounding existing land uses. 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 primarily associated with industrial uses and public utilities. There are sensitive receptors (such as recreational facilities, schools, churches, etc) within a one-mile buffer of the proposed OGS. However, none of these sensitive receptors are in close proximity of the proposed project site. The nearest residence is 900 feet southeast of the project site and the nearest residential neighborhood is approximately 4,000 feet east of the site boundary.

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 Final Staff Assessment have analyzed the project for potential adverse impacts to sensitive receptors and have concluded there are no significant adverse impacts to sensitive receptors in their respective areas.

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]).

The area in the immediate vicinity of the proposed OGS site consists of similar industrial and utility development, as well as areas of commercial and agricultural development. Areas south of the OGS site have new and growing residential developments and, the following projects are pending: the River Oaks Crossing Specific Plan, the DuPont Specific Plan, the Eastern Waterfront Employment Focus Area, the SR4 Industrial Frontage. According to the AFC (pg. 5.6-27), these projects would contribute to the loss of land currently used as vineyards (CCGS 2009). Implementation of the Rivers Oaks Crossing Specific Plan would result in the conversion of 76.4 acres of land currently used for vineyards, and implementation of the redevelopment plans within the Eastern Waterfront Focus Area would result in the conversion of approximately 136 acres of land currently in use for agriculture (COO 2007). Although these proposed plans would result in the conversion of land currently in use for agriculture, the impact would not be cumulatively considerable since the acreage of the conversions are small, the areas have low agricultural yields (refer to the "Conversion of Farmland" subsection), and the prevalence of industrial and commercial development.

In addition, the Marsh Landing Generating Station and the Willow Pass Generating Station are proposed power plants that would be located west of the proposed project site at the existing Contra Costa (in unincorporated Contra Costa County) and Pittsburg Power Plants (in city of Pittsburg), respectively. Both of these projects are consistent with the general industrial character of the existing on-site permitted uses and the pattern of development of the surrounding area.

Therefore, project-related cumulative land use impacts would be less than significant.

RESPONSE TO COMMENTS

Staff received comments related to land use from the city of Antioch (COA 2011). The comment is below, followed by staff's response.

Comment: The city of Antioch indicated that based on the aerals provided in Part A of the PSA, the applicable general plan and zoning designations listed in the Land Use section for portions of the transmission line needed to be corrected. The city provided the general plan and zoning designations that they consider to be applicable based on the aerial map.

Response: Staff contacted the city of Antioch to discuss the city's PSA comments on the land use section. In comparing the applicable LORS provided in the land use section of the PSA and the LORS provided by the city in their PSA comments, the difference in the list of applicable LORS occurred because the city has recently adopted the Hillcrest Station Specific Plan which is not available on the Planning Department's website. The city's Planning Department staff also stated that the land use designations provided in the city's online GIS mapping system may not be based on the city's most recent data. As such, Energy Commission staff has revised the list of applicable LORS analyzed to include the following designations: Business Park, Public/Institutional, and the Residential Transit-Oriented Development from the Hillcrest Station Specific Plan. In addition, the C-3 zoning designation included in the PSA is not applicable, and the area is instead now identified as the Planned Business Center. Based on the information provided by the city, staff has revised the text in the land use section accordingly. (CEC 2011a)

Staff received comments related to land use from the proposed project applicant (GB 2011a). Below is each comment, followed by staff's response.

Comment: Page 4.5-25, Condition of Certification LAND-1 – In October 2009, the City of Oakley approved and recorded the lot line adjustment. Evidence of this was docketed at the Energy Commission on January 27, 2011. Therefore Condition of Certification LAND-1 is no longer necessary and should be deleted.

Response: Condition of Certification **LAND-1** has been deleted as well as the listing of the Subdivision Map Act as a LORS.

Comment: Page 4.5-25, Verification to Condition of Certification LAND-2 - In order to facilitate timely review of submittals to the City of Oakley and to facilitate the OGS construction schedule, CCGS requests modifications to the Verification timeline for compliance with this condition.

Response: Based on discussions between the city of Oakley and staff at the February 2, 2011 PSA Workshop, the city and staff agreed that Condition of Certification **LAND-2** is not applicable to the proposed OGS site, because the city's zoning code would not apply to the site. Therefore, the condition has been deleted. The comment no longer applies.

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would result in the conversion of Farmland of Statewide Importance (as classified by the FMMP) to a non-agricultural use; however, due to

low agricultural yields, the size of the conversion (21.95 acres), and the surrounding industrial development, this conversion would be less-than-significant.

- The proposed project would not 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 land use LORS. Please see **LAND USE Table 2**.
- The proposed project would be physically compatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses and the pattern of development in the area.
- The cumulative implementation of the planned developments would result in the conversion of lands that are currently in agricultural production to urban land uses; however, project-related cumulative land use impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are required.

REFERENCES

- CCGS 2009. Contra Costa Generating Station/B. Bertacchi (tn: 52219). Application for Certification for Contra Costa Generating Station, dated July 30, 2009. Submitted to CEC/Docket Unit on July 30, 2009.
- 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.
- CEC 2011a – California Energy Commission/S. Huerta (tn 59802). Report of Conversation Regarding City of Antioch Applicable LORS, dated February 24, 2011. Submitted to CEC/Docket Unit on February 25, 2011.
- CH2M Hill 2010a. CH2M Hill/D. Davy (tn: 58676). ROC Regarding Clarification of Transmission Line Crossing. Submitted to CEC/P. Martinez on September 29, 2010. Dated September 29, 2010.
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NOISE AND VIBRATION

Testimony of Erin Bright and Shahab Koshmashrab

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Oakley Generating Station (OGS) 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 noise-sensitive receptors¹ 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 (OGS) 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** immediately following.

¹ A sensitive noise receptor, also referred to as a noise-sensitive receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal (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	Establishes acceptable noise levels and limits hours of construction.
Contra Costa County Code (Title 7, §716-8.1008 Nuisances)	Requires that noise be controlled to prevent public nuisances.
City of Oakley General Plan, Noise Element	Establishes acceptable noise levels.
City of Oakley Municipal Code	Limits hours of construction.
City of Antioch General Plan, Noise Element	Establishes acceptable noise levels and limits hours of construction.
City of Antioch Noise Ordinances	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,² 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**.

² VdB is the common measure of vibration energy.

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.																				

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

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 OGS.

City of Oakley General Plan Noise Element

The City of Oakley has also adopted the State of California land use compatibility guidelines (shown above in **Noise Table 2**) in its general plan noise element (City of Oakley 2002, Policy 9.1.3). 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.

City of Oakley Noise Ordinances

One section in the City of Oakley Municipal Code is applicable to noise produced by construction of the project (City of Oakley 2010). Ordinance Section 4.2.208 regulates construction noise. This regulation limits construction activities to the following hours:

1. On weekdays between 7:30 a.m. and 7:00 p.m.
2. On weekends and holidays between 9:00 a.m. and 7:00 p.m.

Additionally, the City of Oakley has recommended that noise generating construction activities for the Oakley project be prohibited on city, state, and federal holidays (COO 2010a).

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 2003). 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 2003). 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 2008). 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:

3. On weekdays between 7:00 a.m. and 6:00 p.m.
4. On weekdays within 300 feet of occupied residences between 8:00 a.m. and 5:00 p.m.
5. 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

The OGS project would be constructed within the City of Oakley in Contra Costa County. The site and surrounding land are zoned for heavy industrial uses, however

there are a number of residential receptors within a mile of the project (OG 2009a, AFC §§ 1.0, 5.7.2.2).

The ambient noise regime in the project vicinity consists of highway traffic, train traffic, and air traffic. The nearest sensitive noise receptor is a mobile home park located approximately 900 feet southwest of the project site (OG 2009a, AFC § 5.7.2.1, Figure 5.7-1).

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;³
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

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.

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 (OG 2009a, AFC § 5.7.2.2, Tables 5.7-4 through 5.7-7; Appendix 5.7A). The survey was conducted on March 31 through April 2, 2009, and monitored existing noise levels at the following locations, shown on **Noise and Vibration Figure 1**:

1. Measuring Location M1: Within the confines of the Sportsman Yacht Club located approximately 1,940 feet north of the project site boundary. Long-term (25-hour) monitoring showed ambient noise levels typical of a light industrial environment.
2. Measuring Location M2: Within the mobile home park located on Bridgehead Road, located approximately 900 feet southwest of the project site boundary. This location represents the nearest sensitive receptors, the ones most likely to be impacted by project noise. Long-term (25-hour) monitoring showed ambient noise levels typical of a light industrial environment.
3. Measuring Location M3: Near the southwest corner of a residential development located approximately 4,000 feet east of the project site boundary. Long-term (25-hour) monitoring showed ambient noise levels typical of a residential environment.

³ 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.

Noise Table 3 summarizes the ambient noise measurements at the above-identified noise sensitive receptors (OG 2009a, AFC § 5.7.2.2, Tables 5.7-4 through 5.7-7; Appendix 5.7A):

**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
M1: Yacht Club	54	53	48
M2: Mobile Park (Nearest Residences)	58	55	45
M3: East Residences	64	57	35

Source: OG 2009a, AFC § 5.7.2.2, Tables 5.7-4 through 5.7-7; Appendix 5.7A

¹ Staff calculations of average of 15 daytime hours

² Staff calculations of average of 9 nighttime hours

³ Staff 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 OGS is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities (OG 2009a, AFC § 5.7.3.2).

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 estimated the noise impacts of project construction on the nearest sensitive receptors (OG 2009a, AFC § 5.7.3.2.1, Tables 5.7-8 through 5.7-10). A maximum construction noise level of 89 dBA L_{eq} is estimated to occur at a distance of 50 feet from the acoustic center of the construction activity (most often the power block) and attenuate to no more than 64 dBA L_{eq} at the nearest sensitive receptor, location M2 (OG 2009a, AFC Tables 5.7-8 and 5.7-9; 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)
M1 – Yacht Club	57	54 daytime	59 daytime	+5 daytime
		53 nighttime	58 nighttime	+5 nighttime
M2 – Mobile Park (Nearest Residence)	64	58 daytime	65 daytime	+7 daytime
		55 nighttime	65 nighttime	+10 nighttime
M3 – East Residences	51	64 daytime	64 daytime	+0 daytime
		57 nighttime	58 nighttime	+1 nighttime

¹ Source: OG 2009a AFC § 5.7.3.2.1, Tables 5.7-8 and 5.7-9; and staff calculations

² Source: OG 2009a AFC 5.7.2.2, Tables 5.7-4 through 5.7-7; Appendix 5.7A; and staff calculations of average of daytime and nighttime hours.

The applicable local noise LORS do not limit construction noise levels, but the City of Oakley Noise Ordinance limits noisy construction to daytime hours. Noisy construction work would be allowed only during the daytime hours of 7:30 a.m. to 7:00 p.m. on weekdays and 9:00 a.m. to 7:00 p.m. on weekends (City of Oakley 2010). The City has also recommended that noise generating construction activities for the OGS project be prohibited on city, state and federal holidays (COO 2010a). Also, the City of Antioch limits noisy construction to daytime hours. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-8**.

Compliance with Condition of Certification **Noise-8** will ensure that noise impacts associated with OGS 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 10 dBA. An increase of 10 dBA would be noticeable and potentially significant. Given that noisy construction activities would be limited to daytime hours, however, the noise effects of plant construction are considered to be less than significant.

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-8**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints regarding construction noise.

Compliance with proposed Conditions of Certification **Noise-1 and Noise-2**, will further ensure that noise impacts of OGS construction activities would be less than significant.

Linear Facilities

New offsite linear facilities include a 140-foot-long natural gas pipeline (OG 2009a, AFC §§ 2.1.6, 2.1.8). 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-8**.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed-water and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine. In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere.

High pressure steam is then raised in a heat recovery steam generator (HRSG) or a boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

High pressure steam blows can produce noise as loud as 130 dBA at a distance of 50 feet. This would attenuate to about 104 dBA, an unacceptably high level, at the nearest sensitive receptor (OG 2009a, AFC § 5.7.2, 5.7.3.2.1; staff calculations). In order to minimize disturbance from steam blows, the steam blow piping can be equipped with a silencer that will reduce noise levels by 20 to 30 dBA. However, this would mean that steam blow noise levels would still be between 74 to 84 dBA at the nearest noise sensitive receptor, M2, an exceedingly disturbing level that would produce an increase of at least 16 dBA over ambient levels at receptor M2 (see **Noise Table 5** below).

Alternatively, the applicant could employ a quieter steam blow process which utilizes lower pressure steam over a continuous period of approximately 36 hours. Resulting noise levels from the low pressure process reach only about 80 dBA at 100 feet. Steam blow noise levels at the nearest receptor, M2, would thus be about 61 dBA, resulting in an increase of no more than 5 dBA in the existing ambient at the nearest sensitive receptors, a significantly lesser impact than the high pressure steam blow process as described above.

Noise Table 5
Steam Blow Noise Impacts

Receptor	High Pressure Steam Blow Noise Level (dBA L _{eq})	Daytime Ambient Noise Level (dBA L _{eq}) ¹	Cumulative Level (dBA)	Change (dBA)
	Low Pressure Steam Blow Noise Level (dBA L _{eq})			
M1	68	54	68	+14
	54		57	+3
M2	74	58	74	+16
	61		63	+5
M3	62	64	66	+2
	48		64	+0

¹ Source: OG 2009a, AFC 5.7.2.2, Tables 5.7-4 through 5.7-7; Appendix 5.7A; and staff calculations

However, if the applicant chooses the high pressure procedure, they must ensure that the noise will not create a significant impact at the project's most noise-sensitive receptors. Therefore, staff proposes that any high pressure steam blows be muffled with an appropriate silencer to create a noise level no greater than 68 dBA at M2 and a noise level no greater than 64 dBA at M1. These levels will result in an increase over the daytime ambient levels of no more than 10 dBA; such an increase would be acceptable due to the temporary nature of steam blows. In addition, steam blows will be performed only during restricted daytime hours (see proposed Conditions of Certification **NOISE-6** and **NOISE-8** below) in order to minimize disturbance to residents.

Regardless of which steam blow process the applicant chooses, staff proposes a notification process (see proposed Condition of Certification **NOISE-7** below) to make neighbors aware of the impending steam blows.

Pile Driving

The applicant does not discuss whether pile driving would be necessary for construction of OGS, 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 approximately 79 dBA at Location M2, the nearest residential receptor (staff's calculation). This would combine to produce an increase of 21 dBA over ambient noise levels (see **Noise Table 6**, 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-8** to ensure that pile driving noise, should it occur, would be limited to daytime hours.

Noise Table 6
Pile Driving Noise Impacts

Receptor	Pile Driving Noise Level (dBA L _{eq})	Daytime Ambient Noise Level (dBA L _{eq})	Cumulative Level (dBA)	Change (dBA)
M1	72	54	72	+18
M2	79	58	79	+21
M3	66	64	68	+4

Source: OG 2009a, AFC 5.7.2.2, Tables 5.7-4 through 5.7-7 and 5.7-10; Appendix 5.7A; 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; it is likely that no vibration would be perceptible at any appreciable distance from the project site (for vibration associated with pile driving, see above). Staff therefore believes there would be no significant impacts from construction vibration at the project's noise-sensitive receptors.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (OG 2009a, AFC § 5.7.3.2.3). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Operation Impacts and Mitigation

The primary noise sources of OGS include combustion turbine generators, steam turbine generators, compressors, heat recovery steam generator (HRSG) exhaust stack, air-cooled condenser (ACC), and transformers (OG 2009a, AFC §§ 2.0, 2.1.4, 2.1.7). Staff compared the projected noise with applicable LORS and evaluated 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 (OG 2009a, AFC § 5.7.3.3.3):

- Noise barrier around combustion turbine;
- Lower noise combustion turbine ventilation fans;
- Noise barrier along the east, south, and west sides of the steam turbine structure;
- Noise barrier on south side of the HRSG inlet ducts;
- Low-noise ACC fans;
- Noise barriers around transformer.

Compliance with LORS

The applicant performed noise modeling to determine the project's operational noise impacts on sensitive receptors (OG 2009a, AFC § 5.7.3.3.3). Based on modeling, the applicant has estimated operational noise levels, summarized in **Noise Table 7** below.

Noise Table 7
Predicted Operational Noise Levels and Noise LORS

Receptor	Project Alone Operational Noise Level L_{eq} (dBA) ¹	City of Oakley General Plan and Noise Ordinances, CNEL (dBA) ²	Contra Costa County General Plan, CNEL (dBA) ²
M1	47	60	60
M2	51	60	60
M3	41	60	60

Sources: ¹ OG 2009a, AFC § 5.7.3.3.3

² Noise 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 receptors. The local planning policy guidelines for Contra Costa County and the City of Oakley require new projects to meet acceptable exterior noise level standards of 60 dB CNEL in residential areas.

As seen in **Noise Table 7**, the project's operational noise level at M2, the nearest and most noise impacted sensitive receptor, would be 51 dBA L_{eq} . 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 level of 51 dBA is equivalent to 58 dBA CNEL. The project noise level at M2 would thus be 2 dBA below the noise level that is deemed generally acceptable by both the county and the city. Therefore, the project's operational noise impacts at M2 comply with both the City of Oakley's and Contra Costa County's noise LORS. Noise levels from project operation at receptors M1 and M3 would be lower than those at M2 and would thus also be in compliance with the local 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 estimated operational noise levels; they are summarized here in **NOISE Table 8**.

Noise Table 8
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
M1	47	48	51	+3
M2	51	45	52	+7
M3	41	35	42	+7

¹ Source: OG 2009a, AFC § 5.7.3.3.3

² Source: OG 2009a, AFC § 5.7.2.2, Tables 5.7-4 through 5.7-7; Appendix 5.7A; and Staff calculation of four consecutive quietest hours of nighttime.

Combining the ambient noise level of 48 dBA L_{90} (**Noise Table 4**, above) with the project noise level of 47 dBA at M1 would result in 51 dBA L_{90} , 3 dBA over 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 impacts at M1 to be less than significant.

Combining the ambient noise level of 35 dBA L_{90} at M3 with the project noise level of 41 dBA at M3 would result in 42 dBA L_{90} , 7 dBA over the ambient. Staff regards an increase between 5 dBA and 10 dBA to be potentially significant. Given that this increase would occur at nighttime when people are trying to sleep, a 7 dBA increase would generally be considered significant and mitigation would be required; however, bearing in mind that the cumulative noise level (project plus ambient) would be less than 45, a level consistent with the recommended limit for rural environments and considered quiet in many locations, staff believes the noise impact at M3 would be insignificant. To ensure this noise level is not further exceeded, staff proposes Condition of Certification **NOISE-4**, below.

Combining the ambient noise level of 45 dBA L_{90} at M2 with the project noise level of 51 dBA at M2 would result in 52 dBA L_{90} , 7 dBA above the ambient. Staff regards an increase between 5 dBA and 10 dBA to be potentially significant. Given that this

increase would occur at nighttime when people are trying to sleep, staff viewed this 7 dBA increase as significant in the Preliminary Staff Assessment (PSA) and called for mitigation to reduce the project operational noise impact at location M2 to no more than 49 dBA, such that the project noise would not increase the existing nighttime ambient noise by more than 5 dBA. Based on additional information that the applicant provided to staff after publication of the PSA regarding the anticipated nighttime operating profile of the OGS project as well as a discussion of noise attenuation measures already included in the project design and the feasibility and impacts of additional noise mitigation, staff believes that a project operational noise of 51 dBA at location M2, a 7 dBA increase over ambient noise levels, would not result in significant impacts to receptors at that location. The proposed Condition of Certification **NOISE-4** would ensure that this noise level at M2 is not further exceeded.

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 (OG 2009a, AFC § 5.7.3.3.4). 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.

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 power plant consist of high-speed gas 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 as the OGS project, Energy Commission staff believes that ground-borne vibration from OGS 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. OGS's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as OGS, however, the exhaust must pass through the HRSG, which incorporates an 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 OGS 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 (OG 2009a, AFC § 5.7.3.3.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. 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 several commercial and light industrial projects in the vicinity of the OGS project. The most likely of these projects to have a cumulative impact with OGS, a retail development, would be separated from the OGS project site by railroad lines. OGS's contribution to cumulative noise is expected to be less than that of the railroad and would thus not be significant (OG 2009a, AFC § 5.7.4). The noise impacts of the nearby Gateway Generating Station have been accounted for in this analysis as that facility was in operation when ambient noise measurements were taken for the OGS project vicinity. The noise impacts of the Marsh Landing Generating Station, located approximately one mile to the west of the OGS project, would be less than the measured ambient noise levels for the receptors in the OGS vicinity. The impacts of OGS would thus be expected to be dominant and therefore, no cumulative noise above what is expected from OGS.

FACILITY CLOSURE

In the future, upon closure of OGS, all operational noise from the project would cease, and no further adverse noise impacts from operation of OGS 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comment: The applicant has commented that the receptors near measuring location M2 are non-conforming land uses and requests that the project operational noise

therefore be allowed to reach 51 dBA, resulting in a cumulative level 7 dBA over the measured nighttime ambient noise level (GB 2011a).

Response: The land use designation of a noise receptor is only one of the several factors that staff considers in determining a project's significance criteria. Staff may or may not consider an increase of more than 5 dBA in the ambient noise level at a residential receptor to be significant depending on the time of day or night during which the noise is to be heard, the frequency and duration of the noise, resulting combined (project plus ambient) noise level, the number of people affected, and feasibility of additional mitigation measures. Staff subsequently asked the applicant to consider additional mitigation measures into its noise prediction modeling. The applicant further commented that the noise modeling presented in the AFC already assumes as many noise attenuation measures as would be feasible for the project. By incorporating those noise attenuation measures into the noise modeling, the applicant states, it was able to balance the noise levels of all equipment, and thus, there remained no single piece of equipment that would contribute a significant level of noise above all others (GB 2011cc). The applicant concluded that it did not appear to be possible to significantly and meaningfully reduce plant noise further without resorting to a large turbine building enclosing the two combustion turbine generators and possibly the steam turbine generator. Given the minor noise attenuation of 1-2 dBA at M2 resulting from this mitigation measure, staff believes that completely enclosing these massive pieces of equipment would not be necessary.

Additional project attenuation measures were considered, but were found to potentially result in additional environmental impacts (GB 2011c). For example, the applicant considered erecting a sound wall near M2 along Bridgehead Road. The City of Oakley's Long Range Roadway Plan calls for Bridgehead Road to ultimately become a four-lane divided arterial. In this case, the right-of-way would need to increase, thus occupying the space that currently could be used for a sound wall. In addition, erecting a sound wall near M2 would only provide benefits to the residences close to the wall with those benefits quickly dissipating for residences further from the wall.

The applicant also asserted that further mitigation at the noise source (the power plant) would not offer meaningful benefits. For example, the use of extremely low-noise air-cooled condenser (ACC) fans would require that more cells be added to the ACC. The applicant asserted that it would be unable to accommodate additional ACC cells without removing the row of existing tall trees to the north. This would potentially result in adverse visual impacts.

Based on staff's experience with previous power plants, the applicant's reasoning for rejecting further mitigation measures is reasonable.

As described above, one of the major factors that staff considers in determining the significance of an increase of 5-10 dBA in ambient noise levels at residential receptors is the duration and frequency of the noise. The

OGS project would be expected to operate in a baseload capacity (the applicant states an anticipated annual capacity factor between 60 and 80 percent) and would thus presumably operate regularly at night and therefore result in potentially significant impacts to the residential receptors at M2. However, the applicant has asserted that, based on anticipated electricity demand and market conditions, the operating load of the project would be expected to be significantly lower at night than during the day for most nights, resulting in the turbine generators and their associated equipment operating at part load and thus generating lower noise levels at night. Additionally, the lower anticipated nighttime operating load would require fewer ACC cooling fans (one of the project's major noise sources) to operate at night, resulting in a nighttime operational noise that would be lower than the operational noise level stated in the AFC. Furthermore, lower ambient temperatures at night (compared to daytime ambient temperatures, which were assumed in the operational modeling in the AFC) would mean fewer fans operating even when the project is operating at a higher than average nighttime load, and thus a lower nighttime operational noise level.

The additional information that the applicant has provided about the assumptions used in modeling the operational noise levels of the project leads staff to agree that the operational noise level in the AFC is a conservatively high estimate for the nighttime noise level at measuring location M2 attributable to OGS project operation.

Due to the sound reasoning supporting the applicant's rejection of further mitigation measures, the relatively low expectation of the power plant's full-load or near full-load operation during the late night and early morning hours, the additional information that the applicant has provided about the assumptions used in modeling the operational noise levels of the project, and provided that the noise attenuation measures presented in the AFC and in the supplemental noise information are installed for the OGS project, staff believes that a project operational noise level of 51 dBA at measuring location M2, while resulting in a 7 dBA increase over the ambient nighttime level, would not constitute a significant adverse impact to the receptors at that location. Condition of Certification **NOISE-4** has been updated to reflect this conclusion. Additionally, staff has included the applicant's proposed mitigation measures in Condition of Certification **NOISE-4** to ensure these measures will be installed. Also, staff has modified the condition such that the required operational noise survey shall be performed when the project is operating at a minimum output of 90 percent of the rated capacity of the project (rather than 85 percent that was stated in the PSA). This will ensure that most of the ACC fans will be online during the survey.

Comment: Mr. Chris Aday, a resident near the proposed OGS site has stated a concern that the noise study submitted by the applicant does not reflect the true ambient noise levels at the residential development near measuring location M3, specifically the proximity of the railroad in relation to the measuring location and local weather conditions (CA 2011a).

Response: The applicant provided detailed long term measuring data for measuring location M3 as well as short term measuring data at two nearby locations within the residential development mentioned, listed as M3a and M3b in the AFC (OG 2009a, AFC Appendix 5.7A). Upon review of both the long term and short term measurement data, staff found the data for measuring location M3 to provide a more conservative estimation of the ambient nighttime noise environment in the vicinity. Additionally, as stated above, staff uses L_{90} nighttime ambient noise levels in comparison to the estimated project operational noise. Because high noise levels due to sporadic or intermittent events, such as train traffic, would not be included in an L_{90} measurement, the L_{90} value is considered by industry to be representative of ambient noise levels. Again, this approach is conservative. In other words, if staff had considered the higher ambient noise level (i.e., accounting for the railroad noise), then in order for the project to comply with the staff's significance criteria, the project would have been allowed to generate higher noise levels than currently allowed.

Regarding local weather conditions, based on experience with two other power projects in proximity to the OGS site, staff does not believe that local weather conditions would cause anomalous noise behavior. However, the noise complaint process outlined in Condition of Certification **NOISE-2** would ensure resolution of any unforeseen noise impacts caused by the project.

Comment: Mr. Aday has also expressed a concern that the quick start capabilities of the project design for the OGS may allow the applicant to manipulate or side step the noise survey outlined in Condition of Certification **NOISE-4** (CA 2011b).

Response: Project compliance would not be considered complete, and thus operation of the project would not be allowed to proceed, until the operation noise survey outlined in Condition of Certification **NOISE-4** has been submitted by the project owner and approved by Energy Commission staff. It is thus in the project owner's best interest to provide the required noise data as soon as the project is capable of producing the stated output. In staff's experience, project owners have been anxious to proceed with the operation of their project and have not intentionally caused delays to project schedules by withholding noise data. In addition, the report will include real time, hourly noise data that staff can analyze for any possible manipulation.

Comment: The City of Antioch has commented that a portion of construction of the project's electric transmission lines would be conducted within the City of Antioch and the construction schedule restrictions presented in Condition of Certification **NOISE-8** should reflect this, since the City of Antioch has different construction restrictions than the City of Oakley (COA 2011a).

Response: Staff acknowledges the omission and has corrected **NOISE-8** accordingly.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that OGS, 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 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 OGS, 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 (Exhibit 1), 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, or 72 hours if the complaint is made over the weekend;
- 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-calendar 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 51 dBA, measured at or near monitoring location M2 (approximately 900 feet south of the project site boundary), and an hourly average of 41 dBA, measured at or near monitoring location M3 (approximately 4,000 feet southeast 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.

The project owner shall design and construct the project with the following noise attenuation measures:

- Noise barriers around the noisy portions of the combustion turbines;
 - Lower noise combustion turbine ventilation fans;
 - Noise barriers along the east, south and west sides of the steam turbine structure;
 - Noise barriers on the south side of the inlets to the heat recovery steam generators;
 - Lower noise air-cooled condenser fans; and
 - Noise barriers around the generator step-up transformers.
- A. When the project first achieves a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a 25-hour (continuously) community noise survey at monitoring locations M2 and M3, 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 90 percent 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 percent 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.

STEAM BLOW RESTRICTIONS

NOISE-6 If a traditional, high-pressure steam blow process is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 68 dBA L_{eq} measured at monitoring location M2 and no greater than 64 dBA L_{eq} measured at monitoring location M1. The project owner shall conduct high pressure steam blows only between the hours of 9:00 a.m. to 7:00 p.m. If a low-pressure continuous steam blow process is employed, the project owner shall submit a description of this process, with expected noise levels and projected hours of execution, to the CPM.

Verification: At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule. At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

NOISE-7 At least 15 days prior to the first steam blow(s), the project owner shall notify all residents or business owners within one mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: Within five (5) days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

CONSTRUCTION TIME RESTRICTIONS

NOISE-8 Heavy equipment operation and noisy construction⁴ work relating to any project features, including pile driving, shall be restricted to the times delineated below:

Mondays through Fridays:	7:30 a.m. to 7:00 p.m.
Weekends:	9:00 a.m. to 7:00 p.m.
Holidays:	Not Allowed

⁴ Noisy Construction: "Noise that can potentially draw legitimate complaints"

Legitimate Complaint: "A legitimate noise complaint refers to a complaint about noise that is confirmed by the CPM to be disturbing, and that is caused by the OGS project as opposed to another source. A legitimate complaint constitutes a violation by the project of any noise condition of certification (as confirmed by the CPM), which is documented by an individual or entity affected by such noise."

For construction of linears taking place within the city limits of the City of Antioch, heavy equipment operation and noisy construction work shall be restricted to the times delineated below:

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

Mondays through Fridays within 300 feet of occupied residences:

8:00 a.m. to 5:00 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.

Variance from the above-noted restrictions may be allowed upon issuance of a variance or waiver by the CPM, in consultation with the City of Oakley for those aspects of construction being performed within the city of Oakley, (and in consultation with the city of Antioch for those aspects of construction being performed within the city of Antioch).

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, unless a variance or waiver from the above-noted restrictions has been approved by the CPM.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Oakley Generating Station (09-AFC-4)		
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

CA 2011a – Christopher Aday/ Public (tn 59534). Comment Letter from C. Aday, dated January 6, 2011. Submitted to CEC/Docket Unit on January 26, 2011.

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<http://www.ci.antioch.ca.us/>. 2008.

City of Oakley 2002. Noise Element of the City of Oakley 2020 General Plan, Amended January, 2010.

City of Oakley 2010. City of Oakley Municipal Code of Ordinances. Updated July 2010.

COA 2011a – City of Antioch/M. Gentry (tn 59733). City of Antioch Comments on PSA, dated February 10, 2011. Submitted to CEC/Docket Unit on February 18, 2011.

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.

COO 2010a – City of Oakley/R. Willis (tn 56232). City of Oakley Comments, dated April 5, 2010. Submitted to CEC/Docket Unit on April 14, 2010.

GB 2011a – Galati Blek, LLP/M. Mills (tn 59571). CCGS, LLC's Initial Comments on the PSA, dated January 28, 2011. Submitted to CEC/Docket Unit on January 28, 2011.

GB 2011c – Galati Blek, LLP/M. Mills (tn 59794). CCGS Supplemental Noise Information, dated February 22, 2011. Submitted to CEC/Docket Unit on February 22, 2011.

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009.
Submitted to the CEC/Docket Unit on June 30, 2009.

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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

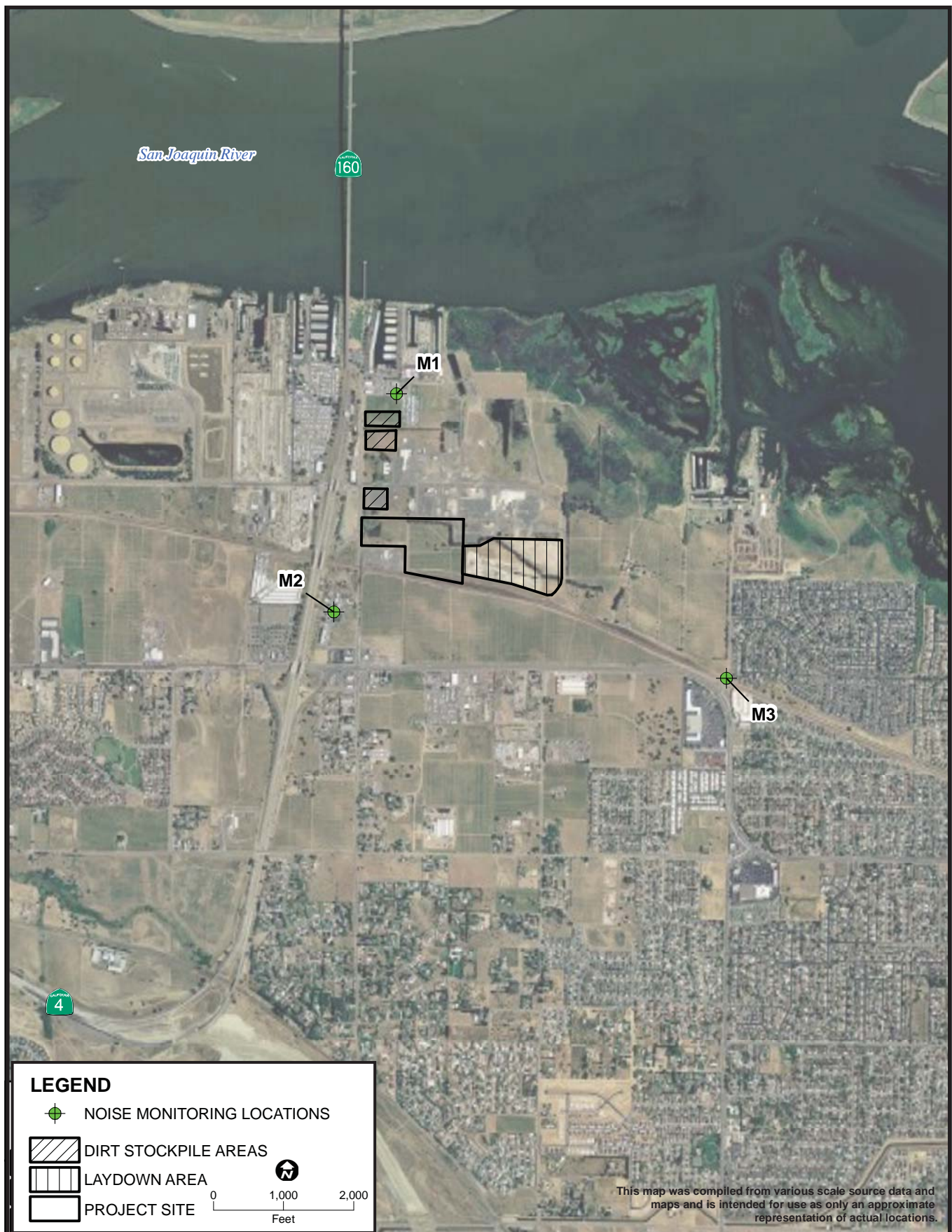
OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **NOISE Table A4**.

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.

NOISE AND VIBRATION - FIGURE 1
Oakley Generating Station - Noise Monitoring Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC Figure 5.7-1

PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D.

SUMMARY AND CONCLUSIONS

Staff has analyzed the potential public health risks from the toxic air pollutants associated with construction and operation of the proposed Oakley Generating Station (OGS) and does not expect that there would be any significant cancer or short- or long-term noncancer health effects. The toxic pollutants (noncriteria pollutants) considered in this analysis are pollutants for which there are no ambient established air quality standards. The potential for significant public health impacts from emission of the other group of pollutants for which there are specific air quality standards (criteria pollutants) is discussed in the **Air Quality** section with particular regard to those for which existing area levels exceed their respective ambient air quality standards.

INTRODUCTION

The purpose of this **Public Health** analysis is to determine if toxic emissions from the proposed OGS 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 ambient air quality standards. The other pollutants for which there are such ambient air quality standards are known as criteria pollutants. If potentially significant health impacts are identified for the noncriteria pollutants considered in this analysis, staff would evaluate mitigation measures to reduce such impacts to less-than-significant levels.

The discussion in the **Air Quality** section mainly focuses on the potential for exposure above the applicable standards and the regulatory measures necessary to mitigate such exposures with particular emphasis on carbon monoxide, ozone, and particulate matter for which existing area levels exceed their respective ambient 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 mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.
California Health and Safety Code section 41700	This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Code of Regulations, Title 22, section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system re-circulating water to minimize the growth of Legionella and other micro-organisms.
Local	
Bay Area Air Quality Management District (BAAQMD) Regulation 2, Rule 5.	Requires safe exposure limits for Toxic Air Pollutants (TACs), use of Best Available Control Technology (BACT) and New Sources Review (NSR).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section describes staff's method of analyzing the potential health impacts of toxic pollutants together with the criteria used to determine their significance.

METHOD OF ANALYSIS

The toxic emissions addressed in this **Public Health** section are those to which the public could be exposed during project construction and routine operation. If such toxic contaminants are released into the air or water, people may come in contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

The ambient air quality standards for the criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, are set to ensure the safety of everyone including those with heightened sensitivity to the effects of environmental pollution in general. Since noncriteria pollutants do not have such standards, a process known as a health risk assessment is used to determine if people might be exposed to them at unhealthy levels. The 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 OGS and other sources, a screening-level risk assessment is initially performed by each project proponent and the regulatory agencies 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 ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (CAPCOA 1993, p. III-36). This means that such exposure limits would serve to protect such sensitive individuals as infants, school pupils, the aged, and people suffering from illnesses or diseases, which make them more susceptible to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effects reported in the medical and toxicological literature, and include specific margins of safety, which address the uncertainties associated with inconclusive scientific and technical information available at the time of standard setting. They are, therefore, intended to provide a reasonable degree of protection against hazards that research has not yet identified. Each margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant exposures that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection can be expected if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety is assumed to exist between the predicted exposure and the estimated threshold for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of the individual substances are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (that is where the effects are greater than the sum), this approach may underestimate the health impact in question.

For carcinogenic substances, the health assessment considers the risk of developing cancer and conservatively includes the previously noted assumption that the individual would be continuously exposed over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in terms of chances per million of developing cancer and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (known as “potency factor”, and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for individual carcinogens are added together to yield the total cancer risk from the source being considered. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be considerably lower than those estimated.

The screening-level analysis is performed to assess worst-case public health risks associated with the proposed project. If the screening analysis were to predict a risk of no significance, no further analysis would be necessary. However, if the risk were to be above the significance level, further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate estimate of the public health risk in question.

SIGNIFICANCE CRITERIA

Commission staff assesses the health effects of exposure to toxic emissions by first considering the impacts on the maximally exposed individual. This individual is the person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above. If the potential risk to this individual is below established levels of significance, staff would consider the potential risk as also less than significant anywhere else in the project area. As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The potential significance of project health impacts is determined separately for each of the three categories of health effects.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a “hazard index” for the exposure being considered. A hazard index is a ratio obtained by comparing exposure from facility emissions to the reference (safe) exposure level for the toxicant. A ratio of less than one would signify a worst-case exposure below the safe level. The hazard indices for all toxic substances with the same types of health effect are added together to yield a total hazard index for the source being evaluated. This total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that the cumulative worst-case exposure would be within safe levels. Under these conditions, health protection would be assumed even for sensitive members of the population. In such a case, staff would assume that there would be no significant noncancer public health impacts from project operations.

Cancer Risk

Staff relies upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance in establishing the level of significance for its assessed cancer risks. Title 22, California Code of Regulations, section 12703(b) states in this regard, that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This risk level is equivalent to a cancer risk of ten in one million, or 10×10^{-6} . An important distinction from the provisions in Proposition 65 is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals from the source in question. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than with Proposition 65.

As noted earlier, the initial risk analysis for a project is normally performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows the cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, were to exceed the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures have been considered, a refined analysis still identifies a cancer risk of greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project’s potential for causing impacts on public health. An emission plume from a facility may affect elevated areas before lower terrain areas, because of a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influences population density and, therefore, the number of individuals potentially exposed to the project’s emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

According to the information from the applicant, Oakley Generating Station (OG 2009a pp. 2-1, 5.1-1 and 5.1-2), the proposed project site is in the city of Oakley, eastern Contra Costa County, at 6000 Bridgehead Road, northeast of the junction of State Route 4 (SR4) and SR 160. **See Project Description Figures 1 and 2.** The site is at the western city limits of Oakley and adjacent to the eastern city limits of Antioch. It is located on a 21.95-acre site. The site is zoned for heavy industrial use with surrounding land used for industrial and commercial activities and agriculture.

The applicant provided specific information identifying the sensitive receptor locations within a six-mile radius of the site. Sensitive receptor locations are those housing

sensitive individuals such as the elderly, school pupils and individuals with respiratory diseases who, as previously noted, are usually more sensitive to the effects of environmental pollutants than the general public. In this and most cases, these locations include schools pre-schools, daycare centers, schools, nursing homes, medical centers, and hospitals. The nearest residence is in a mobile home park 900 feet to the southwest (OG 2009a, p. 5.7-3).

According to census figures from 2000, the total population within the six-mile radius of the proposed site is 138,442 persons and the total minority population is 57,477 persons, or about 42 percent of the total population. (See **Socioeconomics Figure 1**). The population below poverty level was identified as 7.33 percent of the total.

As noted by the applicant, (CH2MHILL 2010d, p. 5.9-7, and OG 2009a, p. 5.9-6), there are no available studies on the specific health status of the potentially impacted population within the six-mile radius of potentially significant impact. The area's air quality management district is continuing with studies and 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. However, reduced vertical dispersion can result in greater horizontal travel before the plume would reach the ground, tending to reduce local exposure.

The proposed project site is in an area whose climate is strongly influenced by the large-scale warming and sinking of the air in the semi-permanent subtropical high-pressure center over the Pacific Ocean. This high-pressure system blocks out most mid-latitude storms except in the winter when most of the area's 13.17 inches of rainfall occurs. The yearly maximum summer temperature varies from the mid-50s to the low-90s while the winter temperature varies from the mid-30s to the high 50s (OG Appendix 5.1B).

When the area's winds are of low speeds, the atmosphere has a limited capacity to dilute the area's air contaminants while transporting them from the points of generation to other locations. Strong atmospheric temperature inversions would then occur especially in the late mornings and early afternoons. These inversions severely limit vertical air mixing and result in the buildup of air pollutants by restricting their movement from the ground level to the upper atmosphere out of the air basin.

Atmospheric stability is a measure of the turbulence that influences pollutant dispersion. Mixing heights (the height above ground level below which the air is well mixed and in which pollutants can be effectively dispersed) are lower during the morning hours because of temperature inversions, which are followed by temperature increases in the warmer afternoons. Staff's **Air Quality** section presents a more detailed discussion of the area's meteorology as related to pollutant dispersion.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). By examining average toxic concentrations from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual is about 1 in 3, or 330,000 in one million.

Based on the levels of toxic air contaminants measured within the BAAQMD Ambient Air Toxics Monitoring Network, an air toxics-related background cancer risk of 143 in one million was calculated for the Bay Area for 2003 (BAAQMD 2003). The pollutants, 1, 3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to this risk and together accounted for over half of the total. Formaldehyde (which is emitted directly from vehicles and other combustion sources, such as the proposed energy project) was identified along with carbon tetrachloride and hexavalent chromium as the other major contributors.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxic pollutants and associated cancer risks during the past few years. However, 2005 data from BAAQMD's Community Air Risk Evaluation Program identified diesel particulate matter as responsible for approximately 80% of this air toxics-related background cancer risk, pointing to the significance of the state's and air districts existing diesel particulate reduction program in the Bay Area and California in general (BAAQMD 2006). The noted toxic 143 in one million pollutant-related background risk estimate for 2003 can be compared with the normal background lifetime cancer risk (from all cancer causes) of one in three, or 330,000 in one million, as will be noted later. The potential risk from the proposed project and similar sources should best be assessed in the context of their potential addition to these background risk levels.

The criteria pollutant-related air quality for the project area is assessed in the **Air Quality** section by adding the existing background 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 (CH2MHILL 2010d, p. 5.9-4 and OG 2009a, pp. 5.1-12 through 5.1-14 and Appendix 5.1A), are

those from human exposure to the windblown dust from site excavation grading, and emissions from construction-related diesel-fueled equipment. The dust-related impacts may result from exposure to the dust itself as PM₁₀, or PM 2.5, or exposure to any toxic contaminants that might be adsorbed on to the dust particles. As more fully discussed in the **Waste Management** section, results of the applicant's site contamination assessments (OG 2009a, pp. 5.14-1 through 5.14-18 and Appendix 5.14A) showed that despite a history of industrial activities in certain areas around the proposed site, there are no contaminated spots that would pose a health danger during construction.

The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust as required by BAAQMD Regulation 6 (OG 2009a, p. 5.1-40). Such dust-related impacts could result from dust inhalation as PM₁₀, or PM 2.5 whose emissions would be minimized by implementing the related conditions of certification in the **Air Quality** section.

The exhaust from diesel-fueled construction and other equipment has been established as a potent human carcinogen. Thus, construction-related emission levels could be regarded as possibly adding to the carcinogenic risk of specific concern in this analysis. The applicant has presented these types of emission sources in Appendix 5.14E for the 33-month construction period (CH2MHILL 2010d, p. 5.9-4, OG 2009a, pp. 5.9-4 and 5.1-12). 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 gas-fired combustion turbine generators and the diesel-fired fire pump. **Public Health Table 2** lists the project's toxic emissions and shows how each could contribute to the risk estimated from the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde would not be of concern but, if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

As noted in a publication by the South Coast Air Quality Management District (SCAQMD 2000, p. 6), one property that distinguishes the air toxics of concern in this analysis from the criteria pollutants is that the impacts from air toxics tend to be highest in close proximity to the source and quickly drop off with distance. This means that the levels of OGS's air toxics would be highest in the immediate area and decrease rapidly with distance. One purpose of this analysis, as previously noted, is to determine whether or not such exposures would be at levels of possible health significance as established using existing assessment methods.

The applicant's estimates of the project's potential contribution to the area's carcinogenic and non-carcinogenic pollutants were obtained from a screening-level health risk assessment conducted according to procedures specified in the 1993 CAPCOA guidelines. The results from this assessment (summarized in staff's **Public Health Table 3**) were provided to staff along with documentation of the assumptions

used (CH2MHILL 2010d, pp.5.9-6 through 5.9-13, OG 2009a, pp.5.9-2 through 5.9-12 and Appendix 5.1D). This documentation included:

- pollutants considered;
- emission levels assumed for the pollutants involved;
- dispersion modeling used to estimate potential exposure levels;
- exposure pathways considered;
- the cancer risk estimation process;
- hazard index calculation; and
- characterization of project-related risk estimates.

Staff has found these assumptions to be acceptable for use in this analysis and has validated the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the hazard index for each non-carcinogenic pollutant, or a cancer risk for estimated levels of the carcinogenic pollutants. These analyses were conducted to establish the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

PUBLIC HEALTH TABLE 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Non-cancer	Inhalation Cancer	Non-cancer (Chronic)	Non-cancer (Acute)
Acetaldehyde			✓	✓	
Acrolein				✓	✓
Ammonia				✓	✓
Arsenic	✓	✓	✓	✓	✓
Benzene			✓	✓	✓
1,3-Butadiene			✓	✓	
Cadmium		✓	✓	✓	
Chromium			✓	✓	
Copper				✓	✓
Ethylbenzene				✓	
Formaldehyde			✓	✓	✓
Hexane				✓	
Lead	✓	✓	✓	✓	
Mercury		✓		✓	✓
Naphthalene		✓		✓	
Nickel			✓	✓	✓
Polynuclear Aromatic Hydrocarbons (PAHs)	✓	✓	✓	✓	
Propylene				✓	
Propylene oxide			✓	✓	✓
Toluene				✓	✓
Xylene				✓	✓
Zinc				✓	

Source: Prepared by staff using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993, SRP 1998.

As shown in **Public Health Table 3**, the chronic hazard index for the maximally exposed individual is 0.021 while the maximum hazard index for acute effects is 0.0807.

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.

PUBLIC HEALTH TABLE 3

Operational Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.0807	1.0	No
Chronic Noncancer	0.021	1.0	No
Individual Cancer	3.50×10^{-6}	10.0×10^{-6}	No

Source: Staff's summary of information from Oakley Generating Station 2009a pp. 5.9-3 through 5.9-10 and Appendix 5.1D.

The cancer risk to the maximally exposed individual from normal project operation is shown as 3.50 in one million, which is well below staff's significance criterion of 10 in one million for this screening-level assessment. Thus, project-related cancer risk from routine operations would be less than significant for all individuals in the project area.

The conservatism in these assessments is reflected in the noted fact that (a) the individual considered is assumed to be exposed at the highest possible levels to all the carcinogenic pollutants from the project for a 70-year lifetime, (b) all the carcinogens are assumed to be equally potent in humans and experimental animals, even when their cancer-inducing abilities have not been established in humans, and (c) humans are assumed to be as susceptible as the most sensitive experimental animal, despite knowledge that cancer potencies often differ between humans and experimental animals. Only a relatively few of the many environmental chemicals identified so far as capable of inducing cancer in animals have been shown to also cause cancer in humans.

Cooling Tower-Related Risk of Legionnaires' Disease

Legionella is a bacterium that is ubiquitous in natural aquatic environments and widely distributed in man-made water systems. It is the principal cause of legionellosis, more commonly known as Legionnaires' disease, which is similar to pneumonia. Transmission to people results mainly from the inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems have been associated with outbreaks of legionellosis since cooling water systems and their components can amplify and disseminate aerosols that contain Legionella.

The State of California regulates recycled water used for cooling tower operations according to requirements in Title 22, section 60303, California Code of Regulations. These requirements mandate the use of chlorine or other biocides to minimize the growth of Legionella and other microorganisms.

Legionella can grow symbiotically with other bacteria and infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Staff notes that most cooling tower water treatment programs are designed to minimize scale, corrosion, and biofouling, but not necessarily to control Legionella.

Effective mitigation measures should include a cleaning and maintenance program to minimize the accumulation of bacteria, algae, and protozoa that may contribute to the nourishment of Legionella. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE 1998) emphasizes the need for such programs in its specifications for Legionellosis prevention. Also, the Cooling Tower Institute has issued guidelines for the best practices for control of Legionella (CTI 2000). Preventive maintenance includes effective drift eliminators, periodically cleaning the system as appropriate, maintaining mechanical components, and maintaining an effective water treatment program with appropriate biocide concentrations.

Staff's recommended Condition of Certification **PUBLIC HEALTH-1** is intended to ensure the effective maintenance and bactericidal action necessary during the operation of the OGS cooling tower. This condition would specifically require the project owner to prepare and implement a cooling water management plan to ensure that bacterial growth is kept to a minimum in the cooling tower. With the use of an aggressive antibacterial program, coupled with routine monitoring and biofilm removal, the chances of Legionella growth and dispersal would be reduced to less than significant.

CUMULATIVE IMPACTS

The applicant considered the potential for cumulative impacts from the proposed OGS and other significant pollutant sources within a six-mile radius as a way of assessing the potential for significant health effects from emissions from identifiable pollutant sources in the immediate project vicinity (CH2MHILL 2010d, p.5.9-13 and OG 2009a, p. 5.9-12). OGS and the existing or proposed area sources could thus be seen as contributing to the existing background levels thereby adding to the normal background cancer and noncancer impacts. The present approach to regulating such carcinogenic and non-carcinogenic additions is to ensure that they are maintained within insignificant levels from any new source. Such cumulative impacts are best assessed in terms of their potential for cancer and noncancer health impacts.

As previously noted, the maximum impact locations for the proposed OGS and similar sources would be the spot where pollutant concentrations would theoretically be highest. Even at this location, staff does not expect any significant OGS-related changes in the lifetime risk to any person, given the calculated incremental cancer risk of only 3.50 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 0.021) 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 OGS 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

Staff has not received any agency or public comments on the public health aspects of the proposed project.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of the proposed natural gas-burning OGS 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. Implementation of staff's proposed condition of certification to reduce the likelihood of Legionella growth would ensure that the risk of Legionella growth and dispersion is reduced to an insignificant level. If the proposed project is approved, staff would recommend the following condition of certification to address the risk from Legionella in the cooling tower. 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

PUBLIC HEALTH-1 The project owner shall develop and implement a Cooling Water Management Plan that is consistent with either staff's *Cooling Water Management Program Guidelines* or the Cooling Technology Institute's *Best Practices for Control of Legionella* guidelines.

Verification: At least 30 days prior to the start of cooling tower construction, the Cooling Water Management Plan shall be provided to the Compliance Project Manager for review and approval.

REFERENCES

Bay Area Air Quality Management District (BAAQMD) 2006. Community Air Risk Evaluation Program, Phase I. Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area. BAAQMD, 939 Ellis Street, San Francisco, CA 94109.

Bay Area Air Quality Management District (BAAQMD), 2003. Status Report: Toxic Air Contaminant Control Program. BAAQMD, 939 Ellis Street, San Francisco CA 94109.

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

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

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

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

CH2MHILL 2010d – CH2MHILL/D. Davy (tn 56162). Supplemental Filing Air Quality & Public Health Revised April 2010. Submitted to CEC/Docket Unit on April 7, 2010.

OGS 2009a-Oakley Generating Station (tn 52219). Application for certification (09-AFC-4) for the Oakley Generating Station Volumes I and II. Submitted to the California Energy Commission on June 30, 2009.

Scientific Review Panel on Toxic Air Contaminants (SRP) 1998. Findings of the Scientific Review Panel on the Report on Diesel Exhaust as adopted at the Panel’s April 22, 1998 Meeting.

South Coast Air Quality Management District (SCAQMD) 2000. An Air Toxics Control Plan for the Next Ten Years. March 2000. South Coast Air Quality Management District publication, 2002.

SOCIOECONOMICS

Testimony of Kristin Ford

SUMMARY OF CONCLUSIONS

Staff concludes that construction and operation of the Oakley Generating Station (OGS) would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, and parks. Staff also concludes that the project would not induce substantial growth or concentration of population, substantial increases in demand for housing or public services, or displace a large number of people. Staff is proposing Conditions of Certification **SOCIO-1** and **SOCIO-2** to ensure that the project complies with the city of Oakley development fees and school impact fees.

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 OGS Application for Certification (AFC) on local communities, community resources, and public services, and provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomic laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

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

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	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.
Local	
City of Oakley Park Land Dedication In-Lieu Fee (Ordinance No. 03-03)	The Park Land Dedication was enacted pursuant to authority granted by Section 66477 of the Government Code of the State of California ("Quimby Act").
City of Oakley Park Impact Fee (Authorized by Ordinance No. 05-00, adopted by Resolution No. 19-03)	The Oakley City Council has determined that a park impact fee is needed to finance public facilities and to pay for each development's fair share of the construction and acquisition costs of improvements.
City of Oakley Public Facilities Fee (Authorized by Ordinance No. 05-00, adopted by Resolution No. 18-03)	The Oakley City Council has determined that a public facilities impact fee is needed to finance public facilities and to pay for each development's fair share of the construction and acquisition costs of improvements.
Fire Facilities Impact Fee (Ordinance No. 09-01)	The Oakley City Council has determined that a fire impact fee is needed to finance those fire-fighting facilities and to pay for each development's fair share of the construction and acquisition costs of those improvements.

SETTING

The project would be located on the former DuPont manufacturing facility, on land owned by DuPont within the city of Oakley, Contra Costa County, California. The three

most populated cities in Contra Costa County are Concord, Richmond, and Antioch; Oakley is the tenth largest city in the county.

Contra Costa County is one of the nine Bay Area Counties; San Joaquin, Alameda, Solano, Marin, Napa, San Francisco, Santa Clara, and Sonoma counties comprise the other eight (OG 2009a, 5.10-1). The proposed project would be located in a densely populated region with a large skilled workforce within commuting distance of the project. Sacramento and San Joaquin counties border Contra Costa County on the northeast and also have a large skilled workforce within commuting distance of the project (OG 2009a, 5.10-12).

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 when one or more U.S. Census blocks in the potentially affected area have a minority population greater than 50%.

For the OGS project, the total population within the six-mile radius of the proposed site is 138,443 persons and the total minority population is 57,477 persons, or about 42% of the total population. (See **Socioeconomics Figure 1**). Staff in several technical areas which are identified in the Executive Summary, of this document, have considered environmental justice in their environmental impact analyses.

Below-Poverty-Level Populations

Staff has 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 OGS project is 10,145 people, or about 7.85% of the population in that area.

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 **Soil and Water Resources** sections of this document.

**Socioeconomics Table 2
CEQA Environmental Checklist Form**

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING —Would the project:				
A. Induce substantial population growth in a new area, either directly or indirectly.				X
B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
C. Displace substantial numbers of people, necessitating construction of replacement housing elsewhere?				X
PUBLIC SERVICES —Would the project:				
Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Emergency medical services				X
Police protection				X
Schools				X
Parks				X
Other public facilities				X
RECREATION —Would the project:				
Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

DIRECT/INDIRECT IMPACTS AND MITIGATION

Induce Substantial Population Growth

For the purpose of this analysis, staff defines “induce substantial population growth” as workers permanently moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines “local workforce” as the Oakland-Fremont-Hayward Metropolitan Division (MD) (Alameda and Contra Costa Counties.). A metropolitan division is a subset of an MSA having a single core with a population of 2.5 million or more. A 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 Estimated Populations**

Area	2000 Population	2009 Population	2020 Population
Oakley	25,619	34,468	NA
Contra Costa County	948,817	1,060,435	1,237,544
Source: DOF 2009			

As reported by the Department of Finance (DOF), E5 City/County Housing and Population Estimates; the three most populated cities within Contra Costa County are Concord, Richmond, and Antioch; which are all within 45 minutes commuting time of the project. **Socioeconomics Table 4 and 5** show that total labor by skill in the Oakland-Fremont-Hayward MD is more than adequate to provide construction labor for the OGS project.

**Socioeconomics Table 4
Total Labor by Skill in the Oakland-Fremont-Hayward MD Annual Average for
2014**

Trade	Oakland-Fremont-Hayward MD	Total # of Workers for Project Construction by Craft
Boilermakers	280	124
Carpenters	17,230	27
Electricians	4,640	114
Sheet Metal Workers	940	5
Laborers	14,390	32
Pipefitter	4,210	216
Painters	6,610	9
Bricklayers/Masons	270	6
Millwrights	500	24
Scaffolders	NA	27
Pile Drivers	430	5
Operating Engineers	4,130	32
Insulators	270	25
Source: EDD Labor Market Information; Occupational Employment Projections 2006-20016.		

The applicant estimates that construction would last from the first quarter of 2011 to the fourth quarter of 2013 (about 33 months). As shown in Table 5.10-8 in the AFC, the number of construction workers would range from 24 workers in the first month to a maximum of 729 in the 23rd month. The average number of workers onsite for the 33-month period would be 303 (OG 2009a, 5.10-12). In addition, construction of a sanitary sewer force main would involve up to ten additional construction workers during months one through six of the construction period, for approximately one month. Construction of the sanitary sewer force main would include local purchases of fuel and supplies.

The project operation would have 22 full-time employees and the applicant expects to hire all 22 employees locally (OG 2009a, 5.10-18). Given the large labor force within two hours commuting distance of the project, staff expects the operations workforce to already reside within the project area. Staff does not expect construction or operations workers to relocate to the immediate project area.

Staff concludes that the construction and operation workforces would not induce substantial growth or concentration of population and the OGS would not encourage people to permanently move into the area. The OGS would have no direct or indirect impact on substantial population growth in a new area.

Housing Supply

There are about 67 hotels/motels with 6,363 rooms in Contra Costa County to accommodate workers who may choose to commute to the project site on a workweek basis. The average daily room rate is \$98. In addition to the available hotel/motel accommodation, there are numerous recreational vehicle parks in Oakley and neighboring cities close to the project site (OG 2009a, 5.10-16).

The applicant estimates the OGS would employ up to 22 full-time employees who would commute from within Contra Costa County and the region. Because of the large labor force within commuting distance of the project, staff expects that the majority of construction workers would commute to the project daily from their existing residences. No new housing construction would be required.

Staff concludes that the construction and operation workforces would not have a significant adverse impact on housing within the county-wide and regional areas of Contra Costa counties, and would not displace existing housing or necessitate construction of replacement housing elsewhere.

Displace Existing Housing and Substantial Numbers of People

The proposed project site is primarily occupied by a vineyard (OG 2009a, 5.6-9). The project site is bounded to the west by the PG&E Antioch Terminal, a large natural gas transmission hub, to the north by DuPont property that is either industrial or vacant industrial, to the east by DuPont's titanium dioxide landfill area, and to the south by the Burlington Northern Santa Fe railroad. Immediately south of the railroad is a large parcel currently in agriculture (OG 2009a, 2-2).

Land within a one mile radius of the proposed project is located within the northern portion of the cities of Oakley and Antioch in northeastern Contra Costa County. The proposed site is located in Oakley, California. The proposed project site land uses immediately east and south of the project site is farmed as a vineyard. South of the proposed project site consists of industrial and vineyards which transitions into residential. The DuPont property and Sacramento-San Joaquin River Delta is located north of the project site (OG 2009a, 5.6-1). The land uses transition from agricultural to high-density residential approximately 0.75 miles east from the project site.

The project site is designated by the Oakley General Plan as Utility Energy (UE) (OG 2009a, 5.6-1). The transmission line alignment is comprised of several different land use designations including; commercial in Oakley and residential, open space, and focus area (undeveloped) in Antioch (OG 2009a, Figure 5.6-3). The proposed project is located within the jurisdiction of the Contra Costa County zoning ordinance. The project property is zoned Heavy Industrial (H-I) (OG 2009a, 5.6-15). The transmission line alignment is comprised of several different zoning districts including; Planned Business Center, Light Industrial, Service-Regional Commercial District, Planned Development District and Light Industrial District (OG 2009a, Figure 5.6-4).

The project site is proposed to be built within a primarily existing occupied vineyard and would therefore not displace existing housing or necessitate construction of replacement housing elsewhere.

Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the OGS 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 and Fire Protection section of this document.

Emergency Medical Services

As stated in the AFC, the Hazmat Team of the East Contra Costa Fire Protection District (ECCFPD) is first responder to incidents involving hazardous materials. The Hazmat Team has 21 specialists and is stationed at 4333 Pacheco Boulevard, Martinez, California 94553. The response time is half an hour during the day and 1 hour if the incident occurs during off hours. There are Mutual Aid agreements with Hazmat Teams at Richmond and San Ramon Fire Departments (OG 2009a, 5.10-10).

All trauma injuries from the project location would be transported by helicopter to John Muir Medical Center in Walnut Creek. The Walnut Creek Campus is located 26 miles from the proposed project. John Muir Medical Center is designated as a Level II Trauma Center for Contra Costa County. Sutter Delta Medical Center is located 5.5 miles from the proposed project. The Emergency Department provides only Level II emergency. The Kaiser Permanente Walnut Creek Medical Center is located 27 miles from the proposed project. The Emergency Department has 52 private treatment rooms and is equipped to handle mass decontamination for chemical incidents (OG 2009a, 5.10-10).

As discussed in AFC Sections 2.0, **Project Description**, 5.16, **Worker Health and Safety and Fire Protection**, and 5.5, **Hazardous Materials Handling**, the OGS 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 Hazmat Team of the East Contra Costa Fire Protection District and the three local hospitals mentioned above would be adequate during construction and operation. Thus, the project would not require construction of new or physically altered emergency medical facilities.

City of Oakley Fire Facilities Impact Fee (Ordinance No. 09-01) and Public Facilities Fee (Authorized by Ordinance No. 05-00, adopted by Resolution No. 18-03)

Staff received the "Response of City of Oakley to Request for Agency Participation and Request for Comments and Recommendations" letter on April 5, 2010 (COO 2010a). Attachment 1 of this letter provides the city of Oakley Comments and Recommendations on the Oakley Generating Station Project, specific to the City of Oakley Fire Facilities Impact Fee and Public Facilities Fee. In addition, staff discussed the Fire Facilities Impact Fee and Public Facilities Fee amounts with the City of Oakley, Community Development Director, Rebecca Willis, who indicated that the fee amount is based on the square footage of "building structures" such as offices, control rooms, bathrooms, meeting rooms, etc. Because the final amount of square footage subject to these fees is currently not available to staff, the city of Oakley will determine the fee amount at the time the final site plan is submitted to the Chief Building Officer.

Staff's analysis shows that construction and operation of the OGS would not have substantial adverse physical impacts to government facilities. However, for the project to comply with the above cited city of Oakley LORS, staff is proposing Condition of Certification **SOCIO-1**. Also, Title 20, California Code of Regulations, Chapter 5, § 1715 (a) (1) (A) would allow reimbursement to local agencies for certain fees, including fire and public facilities fees.

Law Enforcement

The OGS proposed project site is within the jurisdiction of the Oakley Police Department (OPD) (<http://www.ci.oakley.ca.us>). The OPD has one station that serves as headquarters, located approximately 1.8 miles from the proposed project site. The OPD has 25 full-time officers. The response time to an emergency from the project location is between 2 and 6 minutes (OG 2009a, 5.10-10).

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 OGS during construction and operation. Thus, the project would not require new or physically altered law enforcement facilities.

Education

The OGS site is in the Antioch Unified School District (AUSD). As stated in the California Department of Education, Educational Demographics Unit website, for the 2008-2009 school year, the number of schools in the AUSD is 28 with an aggregate enrollment of 166,958 students.

During construction, staff expects the labor force would commute daily from the region. Due to the commuting habits of construction workers and the costs of housing relocation, staff does not expect construction workers to relocate their families to the area. Staff does not expect a significant adverse impact to the schools from construction of the proposed project.

A total of 22 workers are needed to operate the OGS. As previously stated, the applicant expects to hire the operation workforce from within the county or the larger regional area, which includes the Bay Area, Sacramento, and San Joaquin counties. Assuming a worst-case scenario where all 22 operation workers relocate to Oakley, and using an average family size of 2.72 persons per household for Contra Costa County (U.S. Census Bureau, Household and Families, 2000 for Contra Costa County), the project would add approximately 16 school children (assuming a two-parent household) to the schools within the AUSD. Given the number of schools within these school districts, staff does not expect a significant adverse impact from the possible addition of 16 school children.

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. Any industrial development within the AUSD is currently charged a one-time assessment fee of \$0.36 per square foot for industrial development. Based on 18,600 square feet of occupied structures, OGS would pay \$6,696 to the AUSD (OG 2009a, 5.10-20).

Given the small number of students who potentially could relocate to schools within the AUSD, staff does not expect the construction or operation of the project to have a significant adverse impact on schools.

Increase the Use of Existing Recreation Facilities

The 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 Contra Costa and surrounding 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.

City of Oakley Park and Land Dedication In-Lieu Fee (Ordinance No. 03-03) and Park Impact Fee (Ordinance No. 05-00, adopted by Resolution No. 19-03)

Staff received the “Response of City of Oakley to Request for Agency Participation and Request for Comments and Recommendations” letter on April 5, 2010 (COO 2010a). Attachment 1 of this letter provides the city of Oakley Comments and Recommendations on the Oakley Generating Station Project, specific to the City of Oakley Park and Land Dedication In-Lieu Fee and Park Impact Fee. Staff discussed the Land Dedication In-Lieu Fee and Park Impact Fee amounts with the City of Oakley, Community Development Director, Rebecca Willis, who indicated that the fee amount is based on the square footage of “building structures” such as offices, control rooms, bathrooms, meeting rooms, etc. Because the final amount of square footage subject to these fees is currently not available to staff, the city of Oakley will determine the fee amount at the time the final site plan is submitted to the Chief Building Officer.

Staff’s analysis shows that construction and operation of the OGS would not have substantial adverse physical impacts to government facilities. However, for the project to comply with the above cited city of Oakley LORS, staff is proposing Condition of Certification **SOCIO-1**. Also, Title 20, California Code of Regulations, Chapter 5, § 1715 (a) (1) (A) would allow reimbursement to local agencies for certain fees, including land dedication and park fees.

As discussed above, staff determined that construction and operation of the OGS would not have substantial adverse physical impacts to recreation facilities. However, in accordance with Title 20, California Code of Regulations, Chapter 5, § 1715 and the local laws, ordinances, regulations and standards, staff determined that the applicant would be required to comply with the City of Oakley Land Dedication In-Lieu Fee and Park Impact Fee to offset future development impacts to in the city. Implementation of Condition of Certification Socio-1 would ensure the payment of these fees.

CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, when the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [*Public Resources Code* Section 21083; *California Code of Regulations*, Title 14, Sections 15064(h); 15065 (c); 15130; and 15355]. Mitigation requires taking feasible measures to avoid or substantially reduce the impacts.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a

demand for workers that cannot be met locally. That increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, parks and recreation, law enforcement, and medical services.

As shown in **Socioeconomics Table 6**, the total construction labor force for the project and nearby MSA/MD would be more than sufficient to accommodate the labor needs for construction of power generation facilities and other large industrial projects. Based on the robust construction labor force, staff does not expect an influx of non-local workers and their dependents to the project area. Staff does not expect any significant and adverse impacts on housing, schools, parks and recreation, law enforcement, and emergency services. Staff does not expect construction or operation of the OGS to contribute to any significant adverse cumulative socioeconomic impacts.

Socioeconomics Table 6
Occupational Employment Projections by MSA/MD

Construction and Extraction Occupations for Selected MSA/MD	Average Annual Employment for 2006	Average Annual Employment for 2016
Vallejo-Fairfield MSA	14,070	11,200
Sacramento-Arden Arcade-Roseville MSA	74,290	81,940
Oakland-Fremont-Hayward MSA	80,120	84,380
Stockton MSA	15,870	16,550
TOTALS	184,350	194,070
Source: EDD 2009 Projections of Employment by Industry and Occupation		

NOTEWORTHY PUBLIC BENEFITS

Noteworthy public benefits include the direct, indirect, and induced impacts of a proposed power plant. For example, the dollars spent on or resulting from the construction and operation of the OGS would have a ripple effect on the local economy. This ripple effect is measured by an input-output economic model. 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.

OGS owners would employ workers and purchase supplies and services for the life of the project. Employees would use salaries and wages to purchase goods and services from other businesses. Those businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local and regional economy. This effect of indirect (jobs, sales, and income generated) and induced spending (employees' spending for local goods and services) 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 33 months, from the first quarter of 2011 to the fourth quarter of 2013 (OG 2009a, 5.10-12). Indirect and induced economic impacts from operation would begin in the fourth quarter of 2013. 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 7**.

Socioeconomics Table 7, OGS Economic Benefits (2009 dollars)	
Fiscal Benefits	
Estimated annual property taxes	\$5.9 to \$6.6 million annually
State and local sales taxes: Construction	\$342,250 to \$379,250
State and local sales taxes: Operation	\$4,465 annually in Contra Costa County
Non-Fiscal Benefits	
Total capital costs	\$450 to \$500 million
Construction payroll	\$111 to \$124 million
Operations payroll	\$3.5 million annually
Construction materials and supplies	\$371.25 to \$412.5 million of which \$3.7 to \$4.1 million would be spent in Contra Costa County
Operations and maintenance supplies	Annual estimate of \$1.5 million of which \$50,000 would be spent in Contra Costa County
Direct, Indirect, and Induced Benefits	
Estimated Direct Employment	
Construction	729 (peak employment)
Operation	22
Estimated Indirect Employment	
Jobs	21
Income	\$763,960
Estimated Induced Income	
Jobs	138
Income	\$5,773,980
Source: OGS, AFC, Socioeconomics 5.10	

PROPERTY TAX

The Board of Equalization (BOE) has jurisdiction over the valuation of a power-generating facility for tax purposes, if the power plant produces 50 megawatts (MW) or more. For a power-generating facility producing less than 50 MW, the county has jurisdiction over the valuation. The OGS would be a 624 MW power generating facility, therefore, BOE is responsible for assessing property value. The property tax rate is set by the Contra Costa County Assessor's office. The current property tax rate would be 1.3105% for fiscal year (FY 2007-2008). Assuming a capital cost of \$450 to 500 million, the OGS would generate between \$5.9 and 6.6 million in property taxes annually. The increase in property taxes resulting from the OGS project would be 0.1% of the city of Oakley's total FY 2008 property tax revenue. No significant adverse fiscal impacts are expected to result from project operations (OG 2009a, 5.10-20).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received comments from the city of Oakley and has incorporated its responses in this document.

CONCLUSIONS

Estimated gross public benefits from the OGS include employment and income for the project area and region. Staff concludes that construction and operation of the OGS 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 OGS 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 CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner shall pay to the city of Oakley the Park Land Dedication Fee, Park Improvement Fee, Public Facilities Fee and the Fire Facilities Fee.

Verification: At least 15 days prior to the start of project construction, the project owner shall provide the Compliance Project Manager (CPM) proof of payment to the city of Oakley for the Park Land Dedication Fee, Park Improvement Fee, Public Facilities Fee, and the Fire Facilities Fee.

SOCIO-2 The project owner shall pay the one-time statutory school facility development fee to the Antioch Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the Compliance Project Manager (CPM) proof of payment of the statutory development fee.

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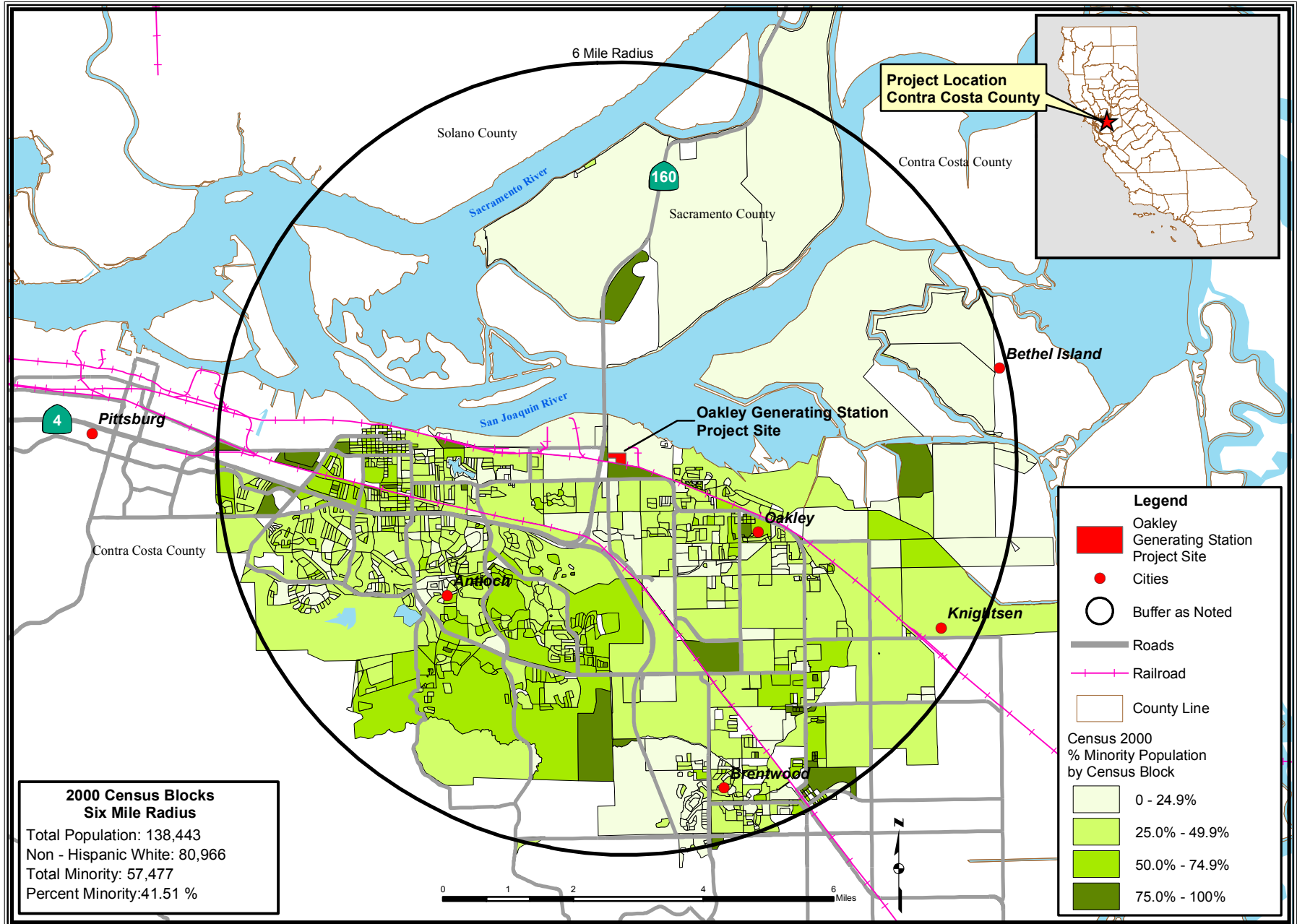
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SOCIOECONOMICS - FIGURE 1

Oakley Generating Station - Census Minority Population by Census Block - Six Mile Radius



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: ESRI and Tele Atlas Data - California Energy Commission Statewide Power Plant Maps 2010 - Census 2000 PL 94-171 Data

SOIL AND WATER RESOURCES

Testimony of Mark Lindley, P.E. and Paul Marshall, CHG, CEG

SUMMARY OF CONCLUSIONS

Energy Commission staff has not identified any immitigable potentially significant impacts to Soil and Water Resources for Oakley Generating Station (OGS) and believes that OGS would comply with all applicable Laws, Ordinances, Regulations and Standards (LORS) provided the proposed conditions of certification are implemented.

Energy Commission staff concludes the following:

- Implementation of Best Management Practices (BMPs) during OGS construction and operation in accordance with effective Storm Water Pollution Prevention Plans (SWPPP) and a Drainage Erosion and Sediment Control Plan (DESCP), would avoid significant adverse effects that could otherwise result in significant transport of sediments or contaminants to Mitigation Wetland E by wind or water erosion.
- Staff has recommended additional measures and minor adjustments to the applicant's proposed erosion control and stormwater quality Best Management Practices to help ensure that potential impacts to existing wetlands adjacent to the project site are reduced to less than significant levels.
- The project's use of recycled water when economically feasible would limit freshwater use and provide consistency with the Energy Commission and State Water Resources Control Board policies on the use of fresh inland water for industrial uses and power plant cooling. In-lieu of future conversion to use of recycled water, the applicant could offset their fresh water use through implementation of an approved water conservation plan.
- The project would not be located within the 100-year flood plain, and would not increase flood conditions downstream of the project.
- The discharge of wastewater under the conditions stipulated in the Ironhouse Sanitary District's Wastewater Discharge Permit would meet the Central Valley Regional Water Quality Control Board's standards.

Where the potential for impacts has been identified, staff is proposing mitigation measures to reduce the impact to less than significant. The mitigation measures, as well as specifications for LORS conformance, are included as conditions of certification.

INTRODUCTION

This section analyzes potential impacts to soil and water resources from the construction and/or operation of the OGS proposed by Contra Costa Generating Station, LLC (CCGS). The analysis specifically focuses on the potential for the project to cause impacts in the following areas:

- Whether the project's use of water would deplete existing supplies and impact current users or the environment.

- Whether project construction or operation would lead to degradation of surface or groundwater quality.
- Whether construction or operation would lead to accelerated wind or water erosion and sedimentation.
- Whether the project would exacerbate flood conditions in the project vicinity.
- Whether the project would impact the hydrology of the existing mitigation wetland in the northwest corner of the project site.
- Whether the project will comply with all applicable LORS.

Where the potential for impacts are identified, Energy Commission staff has proposed mitigation measures to reduce the significance of the impact, and as appropriate, has recommended conditions of certification to ensure that any impacts are less than significant and the project complies with all applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Federal, State, and Local LORS that apply to the OGS related to soil and water resources are summarized below in **Soil & Water Table 1**. Energy Commission staff has reviewed the project as proposed to determine if the proposed project will meet the requirements set forth in the Federal, State, and Local LORS.

Soil & Water Table 1

Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 U.S.C. Section 1251 et seq.)	The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of stormwater and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967. These are normally addressed through a general National Pollutant Discharge Elimination System (NPDES) permit. For OGS, regulation of water quality is administered by the Central Valley Regional Water Quality Control Board (CVRWQCB).
Resource Conservation and Recovery Act	The Resource Conservation Recovery Act (RCRA) of 1976 (42 USC§ 6901 et seq., implemented at 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.
40 Code of Federal Regulations, Part 423	The provisions of this part of the CFR are applicable to discharges resulting from the operation of a generating unit by an establishment primarily engaged in the generation of electricity for distribution and sale which results primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium.
National Resources Conservation Service (NRCS), National Engineering Handbook, Sections 2 and 3 (1983)	Sections 2 and 3 of the USDA-NRCS National Engineering Handbook (1983) provide standards for soil conservation and erosion prevention during construction activity.
State LORS	
California Constitution, Article X, Section 2	This section 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.
California Environmental Quality Act, Public Resources Code Section 21000 et seq.	Defines CEQA Guidelines which contain the definitions of projects that can be considered to cause significant impacts to soil and water resources if not mitigated. The Energy Commission is the authority responsible for administration.
California Public Resources Code Section 25523(a); CCR Sections 1752, 1752.5, 2300-2309 and Chapter 2.5. Article 1	Sections 1752, 1752.5, 2300-2309 and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i) provide for the protection of environmental quality. They further require submission of information related to possible environmental effects to the Energy Commission. The Energy Commission must include environmental protection in their decision on the AFC.
The California Safe Drinking Water and Toxic Enforcement Act	This Act (California Health & Safety Code Section 25249.5 et seq.) prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The Regional Water Quality Control Board (RWQCB) administers the requirements of the Act.
The Porter-Cologne Water Quality Control Act of 1967, Water	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements

Code Sec 13000 et seq.	specifying conditions for protection of water quality as applicable.
California Water Code Section 13260	Requires filing with the appropriate RWQCB a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.
California Water Code Section 13550	Identifies the use of potable domestic water for industrial uses as a waste or unreasonable use of water if a suitable supply of reclaimed water is available. The availability of reclaimed water is determined provided that the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.
California Water Code Section 13552.6	Specifically identifies the use of potable domestic water for cooling towers, if suitable reclaimed water is available, as a waste or unreasonable use of water. The availability of reclaimed water is determined based on criteria listed in Section 13550 by the SWRCB.
California Code of Regulations, Title 17	Title 17, Division 1, Chapter 5, addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines for projects that utilize reclaimed water.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15, requires the California Department of Public Health (DPH) to review and approve the wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of recycled water for industrial processes such as steam production and cooling water. DPH also specifies Secondary Drinking Water Standards in terms of Consumer Acceptance Contaminant Levels, including TDS ranging from a recommended level of 500 mg/l, an upper level of 1,000 mg/l and a short term level of 1,500 mg/l.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15, requires the RWQCB to issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
Delta Protection Act of 1992	Created mandates for the formation of primary and secondary Zones within the Sacramento-San Joaquin Delta and created the Delta Protection Commission to provide jurisdiction over all development activities within the primary zone. OGS is located in the secondary zone.
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.
City of Oakley Municipal Code	Provides standards of design for construction of drainage and erosion control elements. Requires permits for construction activities occurring within the limits of the City's jurisdiction. Permits are required for: grading, erosion control, encroachment, and onsite paving.
State Policies and Guidance	
SWRCB Resolution 77-1	State Water Resources Control Board Resolution 77-1 encourages and promotes recycled water use for non-potable purposes.
SWRCB Resolutions 75-58 and 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

	<p>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 brackish waters as “all waters with a salinity range of 1,000 to 30,000 mg/l” and 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”. In a May 23, 2002 letter from the Chairman of the SWRCB to Energy Commission Commissioners, the principal of the policy was confirmed ‘that the lowest quality cooling water reasonably available from both a technical and economic standpoint should be utilized as the source water for any evaporative cooling process utilized at these facilities’.</p> <p>Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must exceed 3,000 mg/L for it not to be considered suitable, or potentially suitable, for municipal or domestic water supply.</p>
SWRCB Res. 2009-0011 (Recycled Water Policy)	<p>This policy supports and promotes the use of recycled water as a means to achieve sustainable local water supplies and reduction of greenhouse gases. This policy encourages the beneficial use of recycled water over disposal of recycled water. This policy states the following recycled water use goals: “Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (AF/y) by 2020 and by at least two million AF/y by 2030; Increase the use of stormwater over use in 2007 by at least 500,000 AF/y by 2020 and by at least one million AF/y by 2030; Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020; and Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.”</p>
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq)	<p>In the 2003 IEPR, consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they 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.” Additionally, the Energy Commission will require zero liquid discharge technologies unless such technologies are shown to be “environmentally undesirable” or “economically unsound”.</p>
California Water Code Section 461	<p>Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas with limited water supply.</p>

REGIONAL SETTING

The OGS project site is located in the City of Oakley, in eastern Contra Costa County. The project site is generally located at the southern edge of the Sacramento-San Joaquin Delta (Delta) at an elevation of approximately 32 feet above mean sea level (MSL). The land uses of the areas surrounding the site are a mix of industrial, vacant industrial, commercial, and agricultural.

Climate

The project area has a moderate climate that is influenced by coastal fog and the San Francisco Bay. The average annual precipitation, recorded at the Antioch meteorological station is 13.2 inches, with the majority of rainfall occurring between October and April (OG 2009a). The average daily temperature ranges from 48 to 73 degrees Fahrenheit (California Climate Data Archive, website accessed 4-21-2010).

The average annual reference evapotranspiration as measured at Brentwood is approximately 53.5 inches (CIMIS 2010). The mean freeze-free period is approximately 250 to 275 days (OG 2009a).

Surface Water

The San Joaquin River is located immediately north of the OGS site and flows northward towards the Sacramento-San Joaquin Delta, which subsequently discharges into the San Francisco Bay. The San Joaquin River has a drainage basin of approximately 15,880 square miles and contributes approximately 13 percent of the flow in the Delta. The Delta is a freshwater tidal estuary covering approximately 1,150 square miles. The Delta has been highly modified by channelization and diversions for municipal, industrial and agricultural uses. As a result of these modifications, the Delta is considered an impaired water body. Wetlands adjacent to the San Joaquin River are present approximately 0.5 mile north and 0.4 mile northeast of the project site. The project site is located in Zone X as defined by the Federal Emergency Management Agency (FEMA). Zone X is outside of the 100-year and 500-year floodplains (OG 2009a).

Groundwater

The OGS is located in the San Joaquin Valley Basin, Tracy subbasin. The Tracy subbasin is “defined by the areal extent of unconsolidated to semi-consolidated sedimentary deposits that are bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin-Stanislaus County line on the south” (DWR, 2006). The total surface area of the Tracy subbasin is approximately 539 square miles, with an estimated storage capacity of 1.3 million acre-feet (DWR, 2006).

The water-bearing deposits include the Tulare formation, older and younger alluvium and flood basin deposits. Groundwater levels have remained relatively stable over the past 10 years, with seasonal fluctuations due to pumping and recharge. The basin is used for municipal and industrial supply with average well yields of 500 to 3,000 gallons per minute and average well depths of 188 feet for domestic wells and 352 feet for irrigation and municipal wells.

The quality of the groundwater varies throughout the basin with the areas of high chloride occurring near the San Joaquin River and areas of high nitrate in the northwestern portion of the basin. Elevated total dissolved solids (TDS) levels are also found in this subbasin with an average concentration of approximately 1,190 mg/L (DWR, 2006).

Water Supply & Treatment

Municipal water in the project vicinity is provided by the Diablo Water District (DWD). The primary source of water for DWD is from the Delta, purchased from the Contra Costa Water District. Water supplied to the City of Oakley is a blended mix of pumped groundwater and Delta water (CCWD, 2008).

The Ironhouse Sanitation District (ISD) receives and treats wastewater in the area. ISD is currently constructing a tertiary treatment plant to provide recycled water to the

region. Upon completion in the fall of 2011, the ISD plant will be capable of producing up to 3.5 million gallons per day of recycled water for industrial and irrigation uses.

PROJECT, SITE AND VICINITY DESCRIPTION

The proposed OGS project would construct a natural gas-fired, combined-cycle electrical generating facility with a nominal generating capacity of 624 megawatts. The facility would consist of two 213 MW combustion turbine-generators (CTG) with evaporative inlet cooling, one steam turbine generator (STG), heat recovery system generators (HRSGs), an air cooled condenser for process cooling, and an evaporative fluid cooler to supplement the air-cooled heat exchanger during hot weather (OG 2009a).

The OGS site is located to the northeast of the junction of Highway 160 and Highway 4 in the City of Oakley. The site is bounded to the west by PG&E's Antioch Terminal, a large natural gas transmission hub, the vacant and industrial DuPont property to the north, DuPont's titanium oxide disposal area to the east and the Burlington Northern Santa Fe railroad to the south (OG 2009a). The OGS site is located within the "Western Development Area" (WDA) of what was a 210-acre parcel owned by DuPont. The 21.95 acre project site has since been created as a separate legal lot from the parent 210-acre DuPont property. The WDA is a green field site within a brown field site (OG 2009a). The project area is currently zoned Heavy Industrial with a land use designation of Utility Energy in the Oakley General Plan.

The 21.95-acre project site is currently used as a vineyard and was never developed for industrial uses as part of the DuPont property. The site is relatively flat and generally slopes to the west. A 1.6-acre conservation area, which includes a 0.62-acre mitigation wetland (Wetland E), is adjacent to the western property line (OG 2009a).

The construction laydown and parking area would be located east and immediately adjacent to the project site. This area is outside of the WDA in an area that was used by DuPont for titanium oxide disposal during manufacturing activities. The titanium oxide landfill is still present and is approximately 3 feet thick. Approximately 6 acres of the 20-acre laydown area are currently paved, with the remaining 14 acres supporting non-native grassland (CH2MHILL 2010c).

Natural gas would be supplied to the OGS by a 140 foot pipeline connection to the Antioch Terminal, just south of the project site. The OGS will connect to an existing 24-inch potable water supply line located within the DuPont property that is served by DWD. The project would construct a new 6-inch diameter, 0.44-mile long force main to connect to an existing ISD sewer line with sufficient capacity located south of the project site on Main Street (CH2MHILL 2010c).

Electricity generated by OGS would be transported from a 230-kilovolt (kV) onsite switchyard and delivered to the grid via a 2.4-mile long 230 kV transmission line. The transmission line would be constructed within Pacific Gas and Electric's (PG&E) 80-foot-wide right-of-way that runs from the project site to the south and west to the Contra Costa Substation.

Soils

The soils at the proposed OGS site generally consist of sands. The entire site, construction laydown area, and the majority of the transmission corridor are located within a single Natural Resources Conservation Service (NRCS) soil map unit – Delhi sand. These soils are somewhat excessively drained with a low shrink-swell potential. The soils at the site are in Hydrologic Soil Group A. Two additional soil map units, Sycamore silty clay loam and Zamora silty clay loam, are present in a portion of the transmission corridor. These soils have a moderate to moderately slow permeability with a moderate shrink-swell potential. The primary soil types located at the proposed project site, laydown area and transmission corridor are described below in **Soil & Water Table 2**. Additional soil characteristic data can be found in Table 5.11-1 of the Application for Certification (AFC) (OG 2009a).

Soil & Water Table 2
Primary Soil Types Potentially Affected & Characteristics

Primary Soil Name	Slope Class	Water Erosion Potential	Wind Erosion Potential	Permeability	Land Capability Class
Delhi Sand	2 to 9%	Low	High	Rapid	6e (non-irrigated)
Sycamore Silty clay loam	0 to 2%	Moderate	Moderate	Moderate – Moderately slow	4c (non-irrigated)
Zamora Silty clay loam	0 to 2%	Moderate	Moderate	Moderately slow	4c (non-irrigated)

OGS, 2009a, Table 5.11-1

A preliminary geotechnical investigation was conducted to evaluate engineering characteristics of the soils. The Preliminary Geotechnical Report, dated June 2009, indicates that a potentially liquefiable layer exists at the OGS site. A final geotechnical investigation will be conducted during development of the final design to confirm the presence or absence of this soil and recommend mitigation measures (OG 2009a).

Phase I and II Environmental Site Assessments (ESA) were conducted by DuPont for the 44.4 acres of the DuPont property known as the WDA area that includes the project site. The Phase I ESA indicates that no manufacturing processes were ever conducted within the WDA, which includes the OGS site but not the laydown area (OG 2009a). The report found no indications of contaminants released to soils within the WDA parcel and found low potential for soils to be contaminated by offsite sources. However, due to the planned future development of the site and its proximity to the DuPont manufacturing facility a Phase II ESA was recommended.

As part of the Phase II investigation, 39 soil samples were collected from 21 locations at between zero and 6 feet below the ground surface. The samples were analyzed for volatile organic compounds (VOCs) and inorganic compounds, polychlorinated biphenyls (PCBs), petroleum compounds, dioxins, and furans. No compounds were found to be present above screening levels or risk-based screening concentrations (RBSCs). One exception was arsenic which is naturally occurring at the site and was

not found above background levels for this site. The Phase II ESA found that the WDA parcel does not require any further investigation prior to redevelopment (OG 2009a).

The construction laydown area was previously used by DuPont as a disposal area for titanium oxide (TiO₂) which is still present in a layer approximately 3 feet thick (OG 2009a). The location of this layer relative to existing grade and proposed grades is not clear at this time. However, excavation below ground surface is not proposed for the laydown area, so the likelihood of encountering the titanium dioxide landfill during construction activities is low.

During construction, OGS proposes to lower the site grades by up to 7 feet to generate fill for future development on the DuPont property. Approximately 94,000 cubic yards (CY) of material would be removed from the project site and stockpiled in three areas on the DuPont property north of the project site. The stockpiles would be up to 20 feet high with slopes of 4:1 (horizontal to vertical).

Groundwater

The OGS site is located approximately 0.6 mile from the San Joaquin River and has a relatively shallow groundwater table. There are three hydrostratigraphic layers of groundwater at the project site identified as the surficial, upper and lower aquifers (OG 2009a). This water bearing unit consists of a 120 foot thick layer of unconsolidated alluvial deposits underlain by the relatively impermeable Montezuma Formation. Groundwater flow at the site is generally north toward the San Joaquin River. The groundwater levels vary seasonally with high levels following the spring runoff period and low levels at the end of the dry season. The depth to groundwater ranges from approximately 5 to 15 feet below ground surface (CH2MHILL 2010c). There are no groundwater wells located at the OGS site.

The Phase I and II ESA for the WDA area includes an evaluation of groundwater contamination adjacent to the WDA. This investigation found a groundwater plume present at the eastern boundary of the WDA with source areas that are cross-gradient to the WDA. Groundwater samples were collected and analyzed. Concentrations of chlorofluorocarbons (CFCs), carbon disulfide and 1,1-dichloroethane were detected in the upper and lower aquifers. In 2004, two additional groundwater monitoring wells were installed to confirm that concentrations were below site-specific water quality objectives. One well was installed in the surficial aquifer and one in the upper aquifers. Groundwater sampling was conducted and analysis results indicated that only CFC-113 was detected in either well. The concentration found was below the water quality objective and the California Maximum Contaminant Limit (MCL). It was determined that there is a low likelihood of contamination from the area east of the WDA to migrate cross-gradient into the WDA (and OGS) site. As of 2004 additional wells were to be installed to continue monitoring of the groundwater plume. No additional information is known of the installation and monitoring of these wells.

It is likely that groundwater will be encountered during construction and may fluctuate seasonally. The OGS would not make use of groundwater for construction activities or during operation.

Stormwater

The entire OGS site is currently a vineyard that is tilled biannually with a row of eucalyptus trees at the northeastern edge. Surface runoff from rainfall events currently infiltrates or flows toward the northwest corner of the proposed OGS site. All of the surface runoff from the site is discharged to an existing mitigation wetland (Wetland E) located at the northwest corner of the project site. Wetland E receives runoff from a 25-acre area which includes the 22-acre OGS site and approximately 3 acres at the adjacent Antioch natural gas terminal site located to the east and south of the OGS site.

Wetland E has an area of approximately 0.62 acres and was found to be an isolated non-jurisdictional wetland by the USACE (CH2MHILL 2010c). The wetland was constructed as mitigation for a nearby project and is located in a 1.6-acre conservation easement. The California Department of Fish and Game (CDFG) is the grantee for the easement and maintains the right to restrict or prevent activities that would be deleterious to the intended function of the wetland (OG 2009a). The wetland does not currently have an outlet and in the event of an extreme runoff event, any discharge would flow over the low point in the existing road at the northern boundary of the easement (CH2MHILL 2010c). A culvert currently connects the wetland to a stormwater sump at a nearby DuPont parking lot. The culvert functions as an emergency spillway for the sump and has not been operated in the past five years. This connection would be removed as part of the proposed project to eliminate potential input of untreated stormwater from the nearby parking lot (CH2MHILL 2010c). Two additional non-jurisdictional wetlands are located near the proposed stockpile areas. Wetland D and F are 0.38 acres and 0.37 acres, respectively.

Stormwater runoff from the bare soil and vegetated portion of the construction laydown area either infiltrates or sheet flows toward an existing stand of eucalyptus trees. Runoff from the paved portion of the laydown area sheet flows to the north and out of the laydown area.

The project stormwater system is intended to maintain the hydraulic connection to Wetland E while providing additional treatment for the runoff discharged to the wetland. The applicant has committed to maintaining the hydrologic function of Wetland E in the Wetland E Management Plan prepared for the California Department of Fish and Game (CH2MHILL 2010k). OGS proposes to use three vegetated bioswales and a detention pond to provide water quality treatment for runoff from the project site prior to discharge to Wetland E. The proposed detention pond also provides additional detention storage to limit the potential for flood related impacts downstream of the project site. OGS proposes to use a single vegetated bioswale in the central portion of the laydown area to capture and infiltrate runoff generated within the laydown area.

Project Water Supply

The OGS project would require water for construction and operational uses. During construction, water would be required for dust control, moisture conditioning (for compaction), and other uses. The proposed source of water for construction would be the existing potable water main at the site (OG 2009a).

During operations, the OGS would require water for process and potable uses. Process water uses would include CTG inlet evaporative cooling, Reverse Osmosis (RO) permeate makeup, and blowdown makeup. Plant makeup water would be fed directly from the DWD connection, or an Ironhouse recycled water connection, to a 400,000 gallon service water/fire water storage tank. The storage tank would provide approximately eight hours of operational storage and two hours of fire protection storage. This water would be used directly for plant service water, irrigation, fire protection, and makeup to the RO system and CTG inlet air evaporative coolers. The RO system would be used to demineralize makeup water for the steam cycle and combustion turbine wash water (OG 2009a). The OGS would include a 130,000-gallon demineralized water storage tank to provide 48 hours of storage to meet peak demands.

During periods of high ambient temperatures, the air cooled heat exchanger would not be able to sufficiently cool the closed loop cooling water. To supplement the cooling system during these periods the OGS would use evaporative fluid coolers. This results in higher water use during peak demand periods, which typically coincide with high temperatures.

Initially, project water supply would be potable water provided by DWD from an existing 24-inch water main that runs north-south through the project site. The water usage rates are summarized below in **Soil & Water Table 3**. Operational fresh water use is estimated to be about 240 acre-feet per year (AFY) with about 124 afy dedicated to evaporative cooling and inlet air cooling.

**Soil & Water Table 3
OGS Water Usage Rates**

OGS Water Use	Average Daily Use Rate (gpm)	Maximum Daily Use Rate (gpm)	Average Annual Use* (acre-feet)
Construction - DWD Potable Water Supply	150	400	96
Operations - DWD Potable Water Supply	95	369	240
HRSG	41	41	64
Evaporative Fluid Cooler	0	147	41
Inlet Air Cooling	31	158	83
Equipment Washdown / Irrigation	4.7	4.7	7.3
Potable Supply	0.5	0.5	0.8
Wastewater Discharge	68	159	132

* Assumes 8,449 hours of operation with 1,500 hours at peak use rates.

The applicant received a will-serve letter from DWD stating that sufficient potable water is available for the OGS project. DWD would provide up to 250 acre-feet per year to the OGS with peak flow rates of approximately 370 gallons per minute (OG 2009a). The OGS has no planned source for backup water supply for the project.

The applicant has indicated their commitment to the use of recycled water for process needs when it becomes available. The OGS facility would be constructed with additional space to accommodate installation of a microfiltration system to treat recycled water.

The ISD is currently constructing a new wastewater treatment plant to provide tertiary treated recycled water. The new ISD wastewater treatment plant is located about 2.5 miles from the proposed OGS water treatment building and is scheduled to be completed in October 2011.

Preliminary plans developed by ISD call for 3.6 mile long, 14-inch dia. recycled water pipeline running along Main Street and Bridgehead Road to Wilber Avenue, passing by the OGS project site. A 150-hp pump station at the ISD wastewater treatment plant would be required to deliver up to 3.5 million gallons per day (MGD) to the Wilber Avenue industrial users. The majority of the pipeline would be installed in open trenches with at least one railroad crossing, which would likely require jack and bore techniques (CH2MHILL 2010c). There are other potential alignments that could more directly connect the new WWTP with the OGS site.

When OGS converts to a recycled water supply, water use at the plant would increase by about 11 percent due to the additional micro- and ultra-filtration required to treat the recycled water prior to use in the plant. Peak water demand at OGS would increase to about 409 gpm or about 0.58 MGD, which is about 22 percent of ISD's current dry weather flow (CH2MHILL 2010c). Average recycled water demand would be about 105 gpm or about 247 AFY.

Process and Sanitary Wastewater

The OGS would generate wastewater streams during construction and facility operation. Potential construction wastewater streams include sanitary wastewater, equipment washing, line testing, and excavation dewatering. It is anticipated that water applied for dust suppression and compaction will be controlled such that there would be no discharge. Sanitary waste would be collected in portable toilets and hauled offsite for disposal at a receiving facility. Wastewater from equipment washing activities would be collected and disposed of offsite. In total, approximately 510,000 gallons of wastewater would be generated by construction activities (OG 2009a).

Wastewater streams from plant operations include reject from the RO system, blowdown condensate, wash water and stormwater from equipment containment areas. This wastewater will be directed to the plant process drain system. Wastewater from process areas that could include oil or lubricants will be directed to an oil-water separator for treatment. The effluent from the oil-water separator would be combined with the other plant wastewater streams and sanitary wastes before being directed to the wastewater lift station. The wastewater would be pumped from the OGS and discharged into ISD's existing sanitary sewer system.

The industrial wastewater generated by OGS would be approximately 68 gpm on average and 159 gpm as a maximum when using fresh water supplied by DWD. The total annual average wastewater volume from OGS would be approximately 43 million gallons or 132 acre-feet (OG 2009a) when using the fresh water supply.

If OGS converts to a recycled water supply, wastewater discharge would be expected to increase by 15-19 percent due to the additional filtration required and backwash returned to the wastewater treatment facility. Peak wastewater discharge would increase to about 200 gpm, and average discharge would be about 78 gpm. On an annual basis, about 51 million gallons or 157 acre-feet of wastewater would be discharged when using the recycled water supply (CH2MHILL 2009c). In addition, the quality of the wastewater discharge would decrease and salinity levels and concentrations of aluminum and other constituents would be outside of the ISD wastewater discharge requirements. Additional wastewater treatment may also be required at OGS if the facility converted to a recycled water supply.

The applicant has received a will serve letter from ISD indicating that they will have capacity to accept and treat a wastewater flow up to 200 gallons per minute from the OGS. Wastewater discharged from the OGS would need to meet all requirements set forth by ISD. Wastewater would be discharged to a new 6-inch force main and pumped 0.44 miles to ISD's 18-inch gravity sewer line near the intersection of Bridgehead Road and Main Street (CH2MHILL 2010c).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect and cumulative impacts to soil and water resources caused by construction, operation and maintenance of the proposed OGS project. Energy Commission staff's analysis of potential impacts consists of a brief description of the potential effect, an analysis of the relevant facts, and application of the threshold criteria for significance to the facts. If mitigation is warranted, Energy Commission staff provides a summary of the proposed mitigation and a discussion of the adequacy of the proposed mitigation. If necessary, Energy Commission staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation measures. Mitigation is designed to reduce potentially significant project impacts to a level that is less than significant.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The proposed OGS project was evaluated to determine whether its construction or operation would result in erosion of soils, the deposition of sediments into surface waters or the contamination of either groundwater or surface water. Staff also evaluated the potential of the project's proposed water use to cause a significant depletion or degradation of local and regional water resources.

There are extensive regulatory programs in effect designed to prevent or minimize these types of impacts. Compliance with these programs, absent unusual circumstances, will ensure that significant impacts do 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.

To evaluate potential significant impacts to soil or water resources, staff assessed:

- If construction or operation would lead to accelerated wind or water erosion and sedimentation.

- If the project would exacerbate flood conditions in the vicinity of the project.
- If the project would significantly impact the hydrologic function or water quality in mitigation Wetland E and other wetlands in the vicinity of the project.
- If the project's water use would cause a substantial, or potentially substantial, adverse change in the quantity or quality of water supplies including those derived from groundwater or surface water.
- If project construction or operation would lead to degradation of surface or groundwater quality.
- If the project would comply with all applicable LORS.

These criteria are based on the California Environmental Quality Act (CEQA) Guidelines and performance standards. The threshold of significance for project impacts is based on the ability of the project to be built and operated without violating applicable erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards.

The federal, state, and local LORS and policies presented in **Soil & Water Table 1** represent the applicable standards used for the OGS analysis. These LORS support a comprehensive regulatory system, with adopted standards and established practices designed to prevent or minimize adverse impacts to soil and water resources. For those project impacts that exceed standards or result in a significant adverse impact, conditions of certification may be necessary to ensure compliance with standards or require mitigation measures to reduce the impacts to a less than significant level.

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of direct and indirect impacts associated with the construction and operation of the proposed OGS is presented below. Potential impacts to soil, storm water, water quality, and water supply 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 OGS project will include vegetation removal; soil excavation and stockpiling; grading; building and pipeline construction; and the installation of utility connections. Water will be used primarily for dust suppression, moisture conditioning, and pipeline testing during construction. Potential impacts to soils related to increased erosion or the release or migration of hazardous materials are possible during construction activities. Water quality could be impacted by the discharge of eroded sediments from the site or hazardous materials released during construction. Flood hazards could increase as a result of construction of impervious surfaces at the project site.

Water and Wind Erosion

The OGS site is currently a vineyard that would be covered by pavement, gravel, and structures during construction. The paved portions of the construction laydown area

would remain unchanged during and following construction. The unpaved portions of the laydown area would be graded and covered with gravel during construction and hydroseeded following construction.

The OGS project site would be subject to water and wind erosion during construction, which is expected to occur over a 33-month period. The project site is relatively flat and the sandy soils at the OGS site have relatively low water erosion potential and relatively high wind erosion potential. Construction of OGS would permanently disturb the entire 22-acre OGS site and temporarily disturb 14 acres of the 20-acre construction laydown area. Active grading would occur over a two month period. The disturbed soil would remain exposed at the site over a period of approximately 25 months with about 50 percent of the exposed area being bare soil (CH2MHILL 2010c).

Earthwork activities at the site would include removal of topsoil and vegetation; foundation excavation; excavation and compaction for site grades; and trenching for underground systems. The applicant indicates that about 94,000 CY of soil would be excavated to lower the site by 6 to 7 feet. This material would be stockpiled in three areas (approximately 7 acres) at the DuPont facility located just north of the project site. The material placed in the stockpile areas would be up to 20 feet high and sloped at 4H:1V. The stockpiles would be surrounded by soil berms or fiber rolls, covered with geotextiles, and hydroseeded. The applicant plans to stabilize the stockpiles before handing control and responsibility of the stockpiles to DuPont. (OG 2009a).

Site linear construction would include installation of about 2.4 miles of new 230-kV transmission lines. Transmission line work would occur within an existing PG&E right of way requiring the replacement of 17 existing steel lattice towers with steel monopole towers. The towers are located on land with a variety of uses including industrial and commercial property, non-native grasslands, vineyards, and landscaped residential properties. The applicant did not specify erosion control BMPs for transmission line construction.

A 0.44-mile long, 6-inch diameter sanitary sewer force main would be installed within existing streets using standard open trench methods. The force main would be installed within short segments of open trench, limiting the potential for wind and water erosion during construction. The applicant did not specify erosion control BMPs for site linear construction.

The applicant prepared a draft Drainage Erosion and Sediment Control Plan / Stormwater Pollution Prevention Plan (DESCP/SWPPP) that provides conceptual plans for erosion and drainage control measures including BMPs to be implemented during construction of the OGS. This plan was prepared to comply with the new SWPPP Construction General Permit requirements that took effect July 1, 2010 (CH2MHILL 2010c). The following erosion control measures are proposed: scheduling to minimize disturbed areas exposed during the rainy season; preservation of existing vegetation; hydroseeding; placement of geotextiles and mats; soil stabilization; non-vegetative stabilization; application of water or dust palliative to control dust at disturbed areas haul roads and parking areas; and stockpile management. Additionally, sediment control measures are planned to trap detached sediment particles and prevent off-site migration. The following sediment control measures are proposed: silt fence; fiber rolls;

gravel bags berms; sand bag barriers; straw bale barriers; street sweeping or vacuuming; stabilize construction and site entrance/exits.

The applicant believes that the relatively flat site and the use of construction BMPs will reduce the potential for soil loss and erosion to a negligible level. The applicant estimated that soil loss at the site due to water erosion would be reduced from approximately 63.4 tons without mitigation to about 1.5 tons with the implementation of erosion and sediment control BMPs during construction. The most likely mechanism for erosion during construction is wind erosion of exposed soils during grading activities. The applicant estimated wind borne soil loss at the site would be reduced from about 12 tons without mitigation measures to about 5.4 tons through the use of dust control BMPs (OG 2009a).

Energy Commission staff agrees that proper application of erosion control and sediment control BMPs can reduce the impact to soil resources from wind and water erosion to a level that is less than significant. During active excavation and along construction roads, watering may need to be applied as often as several times per hour to limit significant wind erosion and fugitive dust emissions, especially during periods of high winds or frequent vehicle traffic.

One area that is of particular concern to Energy Commission staff, are the proposed stockpiles. Given the sandy, non-cohesive nature of the soils at the site, the relatively steep 4H:1V slopes, and proposed stockpile height of 20 feet, the potential for wind and water erosion is relatively high. Adding to the concern is the close proximity of the proposed stockpiles to sensitive wetlands. In addition to the BMPs identified by the applicant in the draft SWPPP, Energy Commission staff recommends a number of additional measures to ensure that these soil stockpiles do not lead to significant erosion related impacts. Staff recommends that fiber rolls should be placed on the stockpile slopes every 15 feet in accordance with California Stormwater Quality Association (CASQA) guidelines (BMP SE-5) (CASQA 2009). The stockpile areas should be watered following hydroseeding as necessary to develop a good stand of grass prior to the onset of the rainy season. Staff is also concerned that the hand off of responsibility for maintenance of the soil stockpiles to DuPont, could occur prior to full stabilization. The applicant should maintain responsibility for the maintenance and management of the stockpiles for at least two full wet seasons to ensure that the stockpiles are fully vegetated and stabilized prior to passing responsibility to DuPont or provide documentation indicating DuPont would maintain the stockpiles and ensure they remain stabilized after they are handed over.

Proper implementation and maintenance of the BMPs outlined in an approved DESCP would limit erosion and migration of soils from the OGS site and into the nearby wetlands and the San Joaquin River. With the additional efforts recommended by Energy Commission staff for the proposed soil stockpiles, Energy Commission staff believes the proposed plans are reasonable at this level of project planning to avoid significant adverse impacts due to wind and water erosion. The applicant should also identify specific erosion control and sediment trapping BMPs for transmission line construction prior to construction. Condition of Certification **SOIL&WATER-1** would require OGS to prepare a final DESCP for both construction and operations, to assure these BMPs are implemented, and to identify post-construction BMPs to stabilize the

project site. Similar to the DESC and in accordance with federal law, the RWQCB specifies that OGS is to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activity required under Condition of Certification **SOIL&WATER-2**. The applicant may develop a single DESC/SWPPP to satisfy Conditions of Certification **SOIL&WATER-1** and **-2**, provided that the report fully addresses the requirements for both documents.

Soil and Groundwater Contamination

The Phase I & II ESAs did not identify contaminants at the project site above screening levels or risk-based screening concentrations (RBSCs). The groundwater plume located east of the boundary of the WDA was determined to be unlikely to migrate to the project site. The applicant has indicated that the TiO₂ landfill at the laydown area is not expected to present a human health or wildlife risk (CH2MHILL 2010c). As part of the final DESC and SWPPP, the applicant should include information indicating the magnitude and extent of any planned disturbance of this TiO₂ material and provide mitigation measures to limit migration of TiO₂ material if necessary.

During construction, there is also the potential for hazardous chemicals to be released from construction equipment or materials storage areas. The applicant identified a number of BMPs related to construction equipment and materials storage in the draft SWPPP including: good housekeeping practices for storage of construction materials and chemicals, the use of a designated washing and fueling areas for construction equipment, and concrete waste management practices.

Energy Commission staff believes that these measures will be effective to limit the potential for migration soil impacted by TiO₂ material and existing groundwater contamination or a release of hazardous materials to cause adverse impacts to soil and groundwater during construction of the proposed OGS project. Condition of Certification **SOIL&WATER-2** requires the applicant to prepare and implement a final SWPPP for construction activity as specified by the RWQCB. The construction SWPPP would provide details on BMPs for construction equipment maintenance and fueling, hazardous materials storage, and other waste management practices.

Groundwater – Dewatering

The groundwater table at the OGS site fluctuates seasonally and ranges from approximately 5 to 15 feet below ground surface. The near perennial ponding in Mitigation Wetland E is reflective of the high water tables at the project site. (Wetland E went dry in October 2010 following several years of drought, OGS, 2011). It is likely that groundwater would be encountered during excavation and construction of the OGS facilities and transmission line. The applicant indicates that dewatering may be required for construction of the replacement transmission towers (CH2MHILL 2010c). At this time, the applicant has not provided a specific dewatering plan or an estimated volume of discharge from construction dewatering activities. An additional geotechnical investigation is planned for the project site to support detailed design activities. The applicant would need to provide a plan for management and discharge of water from construction dewatering activities. The applicant should include groundwater sampling in its dewatering plan to ensure that the cross-gradient contaminant plume identified in the Phase II ESA has not migrated to the project site as a result of construction

activities. The applicant would need to address any potential groundwater dewatering in the final SWPPP in order to meet the Conditions of Certification **SOIL&WATER-2**. This should include a detailed dewatering plan for construction including information on anticipated volumes and discharge methods.

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 and implementation of the dewatering BMPs in the final SWPPP, the Central Valley RWQCB will determine the adequacy of the planned BMPs to protect water quality and will impose more stringent discharge requirements if necessary. Compliance with Conditions of Certification **SOIL&WATER-2** and **-3** would prevent significant impacts to both groundwater and surface water resources from construction dewatering activities (CVRWQCB 2008).

Stormwater

OGS's proposed stormwater management BMPs would be installed early in construction and prior to the onset of the wet season. OGS proposes to utilize bioswales and a detention basin to capture and treat stormwater runoff prior to discharge to existing Mitigation Wetland E. The RWQCB considers Mitigation Wetland E to be a Water of the State, and a protected water body.

Three bioswales are proposed for the project site (Bioswales 1-2, 4, and 5). In the most recent stormwater management plans, Bioswale 1-2 that was originally proposed as two separate bioswales was combined into one long swale, and Bioswale 3 was deleted to expand the proposed detention basin.

Each bioswale would incorporate a perforated riser to control outflows from the swale. The risers are intended to pass lower flow rates generated during small frequent storm events through the swales and onto either Mitigation Wetland E or the proposed detention basin while detaining runoff from larger runoff events. The risers would allow the water quality flowrate (discharge generated by a rainfall intensity of 0.2 inches/hour) to flow through the swale at about 1 foot of depth. The Bioswales are each designed to detain runoff up to 3 feet deep before overtopping and passing additional runoff directly to Mitigation Wetland E or the proposed detention basin (CH2MHILL 2010u).

Bioswale 1-2 would be approximately 1,320 feet long with a base width of 2 feet. This bioswale would capture and treat runoff from the northern and eastern portions of the project site and discharge directly to Mitigation Wetland E. Bioswale 4 would be about 320 feet in length with a 2 foot base width. Bioswale 4 captures runoff from the southwestern portions of the project site and discharges directly into Bioswale 5. Bioswale 5 would be about 150 feet long and captures runoff from the existing Antioch natural gas terminal. Bioswale 5 discharges into the proposed detention basin (CH2MHILL 2010u).

The proposed detention basin would be located on the western end of the project site adjacent to Mitigation Wetland E. The basin would provide water quality treatment for runoff from the southern and eastern portions of the project site and stormwater storage to augment the flood storage provided in Mitigation Wetland E. The basin would have about 2 acre-feet of storage capacity within a 0.6-acre area. The basin would utilize a perforated riser to control lower flow rates for small frequent storm events and to pass larger flow rates directly to Mitigation Wetland E. The proposed riser includes perforations beginning 0.25 foot above the basin floor and is intended to drain the pond within 24 hours. The detention basin would be separated from the mitigation wetland by a berm that would be up to 3 feet above existing grade (CH2MHILL 2010u). The berm is intended to be planted with trees to provide visual cover for the OGS plant.

Within the construction laydown area, a 1,350-foot long bioswale is proposed to capture and infiltrate stormwater runoff. The proposed bioswale would be centrally located within the laydown area, and the graded portions of the laydown area would be graded to drain towards the proposed bioswale (CH2MHILL 2010c).

The applicant developed a Stormwater Monitoring Plan with the draft SWPPP (CH2MHILL 2010c). Stormwater discharges to existing wetlands including Mitigation Wetland E and the wetlands adjacent to the proposed soil stockpiles would be visually inspected for high turbidity following storm events greater than 0.5 inches because the proposed project is a Risk Level 1 site. If there were issues that could indicate the potential for non visible contamination such as the failure of a BMP or a hazardous materials spill, samples would be collected at the monitoring point where impacted stormwater is suspected and submitted to a certified laboratory for analysis (CH2MHILL 2010c).

Energy Commission staff believes that the proposed stormwater BMPs would generally be adequate to limit potential impacts related to increases in stormwater runoff volumes and flow rates or water quality impacts. To improve sediment trapping during construction, Staff recommends the use of filter fences around the outlet structure risers with the bioswales and detention basin. The filter fences would be removed following completion of construction and revegetation. Trapping suspended sediments and contaminants with filter fences prior to discharge to the wetland would limit potential impacts to the wetland to a less than significant level. Depending upon the level of sedimentation in the bioswales and detention basin, accumulated sediments may need to be removed and the BMPs may need to be reseeded following construction.

Proper implementation and maintenance of the BMPs outlined in an approved DESCOP would limit flood and water quality impacts related to increases in stormwater runoff and changes in runoff patterns during construction. With the additional efforts recommended by Energy Commission staff to improve sediment trapping within the bioswales and detention basin, Energy Commission staff believes the proposed plans are reasonable at this level of project planning to avoid significant adverse impacts due to increases in stormwater runoff and changes in drainage patterns. Condition of Certification

SOIL&WATER-1 would require OGS to prepare a final DESCOP for both construction and operations, to assure these BMPs are implemented, and to maintain these BMPs following construction. Similar to the DESCOP and in accordance with federal law, the RWQCB specifies that OGS is to prepare and implement a Storm Water Pollution

Prevention Plan (SWPPP) for construction activity required under Condition of Certification **SOIL&WATER-2**. The applicant may develop a single DESCP/SWPPP to satisfy Conditions of Certification **SOIL&WATER-1 & -2**, provided that the report addresses the requirements for both documents.

Construction Water Supply

The OGS project would require water for dust suppression, compaction, and miscellaneous activities during construction. It is estimated that the total water use would be approximately 100,000 gallons per day with an average annual use of 31.3 million gallons or 96 afy (CH2MHILL 2010c). The proposed construction water supply would be potable water provided by Diablo Water District (DWD). The primary source of this water is untreated water purchased from the Contra Costa Water District (CCWD) through the United States Bureau of Reclamation (USBR) Central Valley Project (CVP) which relies on the Sacramento-San Joaquin Delta (DWD, 2005). DWD also currently uses local groundwater for a portion (less than 20 percent) of its supply (DWD, 2005).

The CVP has experienced frequent reductions in water allocations to water supply districts due to regulatory restrictions during drought periods. During periods of pumping restrictions in the Delta, the CVP restricts water allocations to municipal, industrial and agricultural users including CCWD and DWD. As water supplies are restricted, CCWD asks its customers (including DWD) to limit their use of water and to pay premium rates for water use over a baseline level. If construction is performed during a period of allocation cuts, DWD would need to seek additional conservation from its other customers or purchase additional water at premium rates to accommodate the additional 96 afy construction requirements for OGS above current demands. Based on the historic restrictions over the past several years and anticipated restrictions into the future, staff believes that other water users could potentially be impacted by the use of fresh water for OGS construction (See Operational Water Use discussion for more details). Staff recommends Condition of Certification **SOIL&WATER-4** that limits the use of freshwater to the construction period to 100 afy. The CPM may increase the freshwater limit during construction if approved prior to water use above the limit and if necessary to limit impacts associated with excessive dust.

Wastewater

Construction wastewater generated onsite would include equipment washdown water, water from pressure testing the service utilities, and concrete washout wastewater. Wastewater generated from pipe cleaning and flushing (10,000 gallons) would be tested and discharged to the sanitary sewer. Wastewater from the hydrotesting (300,000 gallons) would be tested and discharged to the Mitigation Wetland E if clean. If sampling indicates the presence of hazardous liquids, the wastewater will be disposed of offsite. Additionally, it is estimated that the construction of the OGS project would generate approximately 200,000 gallons of sanitary waste (OG 2009a) to be disposed of offsite.

Improper handling or containment of construction wastewater could cause a broader dispersion of contaminants to soil, groundwater or surface water. Potential contaminants could reach Wetland E via surface transport if not properly contained. The shallow groundwater and water table fluctuation at the site could transport spilled contaminants into the wetland via subsurface flow.

Staff is concerned that wastewater from hydrostatic testing may contain low level contaminants that may or may not be detected prior to discharge to the stormwater system that drains to Mitigation Wetland E. The applicant should provide a more detailed description of the planned disposal location, sampling, and analysis of the hydrotesting water as part of the final DESCP/SWPPP. The planned approach should be developed in accordance with Condition of Certification **SOIL&WATER-3** or described otherwise if not applicable to the requirements of this Condition of Certification.

During construction, wastewater would be managed with BMPs identified and implemented in accordance with the construction SWPPP required by the RWQCB, consistent with Condition of Certification **SOIL&WATER-2**. Energy Commission staff concludes that no significant impacts from construction wastewater will occur provided that all construction wastewater is handled in accordance with BMPs described in the project's construction SWPPP and Notice of Intent.

Operation Impacts and Mitigation

Operation of the OGS could lead to potential impacts to soil, stormwater runoff, and surface and groundwater quality. Soils may be potentially impacted through erosion or the release of hazardous materials used in the operation of OGS. Stormwater runoff from the OGS could result in potential impacts if increased runoff discharged from the site increases downstream flooding. Water quality could be impacted by discharge of eroded sediments or hazardous materials released during operation. Potential impacts to soil, stormwater, water quality, flooding, water supply, and wastewater related to the operation of the OGS including proposed mitigation measures, are discussed below.

Soil

The operation and maintenance of the proposed OGS would not involve soil-disturbing activities. During operation of the OGS, the site would be covered with impervious surfaces, gravel, or landscaping limiting exposed soil. Normal vehicular traffic would be limited to roadways that would be paved or graveled. Hazardous materials used in OGS operations would be stored in areas equipped with curbs or containment dikes to contain spills or leaks. As a result, impacts to soils related to erosion or hazardous materials handling during operations would not be significant.

OGS would develop an Industrial SWPPP that includes BMPs for refueling and maintenance of equipment, protection of hazardous materials from stormwater exposure, and the preparation and implementation of spill contingency plans for hazardous materials storage areas. The applicant expects that with proper implementation of these and other BMPs identified in the Industrial SWPPP, no significant impacts to soil resources or surface water quality would occur during the long-term operation of the OGS (OG 2009a).

The Industrial SWPPP would include BMPs to protect stormwater from impacts related to soil erosion and hazardous materials release including the preparation and implementation of spill contingency plans for hazardous materials storage areas. With implementation and maintenance of the BMPs detailed in the Industrial SWPPP and DESCP, Energy Commission staff believes there would be no significant impacts to soil

resources during operation of OGS. Staff recommends Condition of Certification **SOIL&WATER-5** that requires the project owner to comply with the General NPDES Permit for Discharges of storm water associated with industrial activity. In addition, the DESCP required in Condition of Certification **SOIL&WATER-1** also requires implementation and maintenance of erosion control BMPs during operations. These plans may be integrated to meet the Energy Commission requirements for the DESCP and Regional Board requirements for the SWPPP. This combined document shall be approved by the CPM and implemented in accordance with Condition of Certification **SOIL&WATER-1** and **SOIL&WATER-5** to reduce soil related impacts to less than significant during operation of the facility.

Stormwater

During operations, OGS would route stormwater runoff through a series of bioswales and a detention basin prior to discharge to Mitigation Wetland E. Contact runoff from areas with oil or other lubricants would be directed to an oil-water separator and directed to the sanitary sewer system. The proposed stormwater management plans for OGS must meet the requirements of the NPDES Permit, Contra Costa County Clean Water Program, and the City of Oakley.

Staff reviewed the proposed stormwater management plans to determine if the plans would meet the local design requirements and mitigate potentially significant impacts. Staff reviewed the proposed plans and identified two primary areas of concern:

1. Water Quality Treatment – The proposed BMPs for OGS need to meet the minimum water quality treatment standards required by Contra Costa County under the County's NPDES Permit issued by the Regional Water Quality Control Board. Since the proposed project plans to discharge all runoff to Wetland E, adequate water quality treatment is particularly important to limit the discharge and concentration of pollutants in Wetland E.
2. Mitigation Wetland E – To limit impacts to the hydrologic function of Wetland E, the proposed stormwater management plans must limit changes in delivery of runoff to Wetland E. In particular, proposed stormwater BMPs should not impede the delivery of runoff to Wetland E through capture and infiltration during small, frequent rainfall events.

The applicant provided a revised stormwater drainage design that addressed comments provided by Energy Commission staff in a technical memorandum dated August 17, 2010 (PWA 2010a, CH2MHILL 2010u). The plans reviewed to date are preliminary. The final plans will need to meet the performance standards outlined in the Conditions of Certification and will be subject to review by the Compliance Project Manager (CPM) and Chief Building Official (CBO) as part of Conditions of Certification **SOIL&WATER-1** and **CIVIL-1**.

During operations at the 22 acre OGS project site, about 25 percent (5.4 acres) would be impervious surfaces (paved, concrete pads, or buildings) and about 37 percent (8.2 acres) would be compacted rock (CH2MHILL 2010u). This increase in impervious surface would result in increases in the volume and peak flow rate of stormwater runoff from the site. The proposed stormwater management system aims to reduce potential

impacts due to increases in peak flows and volumes by using stormwater features to capture, detain, and infiltrate the increased runoff to a level less than or equivalent to existing conditions. Additionally, the OGS project is required to provide water quality treatment for the stormwater runoff generated by the project to protect Wetland E from adverse water quality impacts. The proposed stormwater management system is also intended to maintain or improve the current hydrologic function of Wetland E following construction of the OGS.

The proposed stormwater management plan would direct surface runoff to three bioswales (linear bioretention) facilities for conveyance and water quality treatment and/or to a detention basin (pond) prior to releasing the runoff to Wetland E. The proposed layout of these facilities is presented in Figure 163994-SS-3001, Rev 2, (CH2MHILL, 2010u). Each of the bioswales and the detention basin would have an outlet structure with a vertical standpipe. The outlet structures would discharge low flows via orifices and high flows via weir flow into the top of the vertical circular standpipe.

The proposed stormwater system is intended to:

- Provide water quality treatment for stormwater runoff
- Maintain the existing function and hydrologic connection to Wetland E
- Capture and detain runoff such that there is no discharge from the wetland (discussed under Flooding Potential, below)

Energy Commission staff reviewed the sizing of the proposed BMPs and confirmed that the BMPs have sufficient area and capture volume to meet Contra Costa Counties water quality requirements. Energy Commission staff also examined the proposed BMP outlet designs to confirm that the proposed BMPs would maintain the existing function and hydraulic connection to Wetland E. Energy Commission staff has identified a number of concerns related to the proposed outlet structure designs (discussed in greater detail below):

1. Bioswale 5 riser/low flow orifice design does not take into account the full contributing watershed to the bioswale resulting in orifices that are too small, which would limit discharge of runoff to Wetland E potentially impacting the hydrologic connection.
2. Detention Pond riser/low flow orifice design includes orifices located 3 inches above pond bottom which would result in the capture and infiltration of a significant portion of runoff from small frequent events, limiting discharge to Wetland E.
3. Detention Pond riser/lowflow orifice design limits flows from efficiently passing to Wetland E.
4. All risers include a single row of orifices either at the riser base (Bioswales) or 3 inches above the base (Pond) which could be subject to clogging further limiting the hydraulic connection to Wetland E.

Water Quality Treatment/BMP Sizing

The applicant developed the design for the proposed bioswales and pond based on the procedure for Low Impact Development (LID) and Integrated Management Practices (IMP) set forth in the Contra Costa Clean Water Program (CCCWP) *Stormwater C.3 Guidebook* (C.3 Guidebook). Provision C.3 of the RWQCB NPDES permit for new and redevelopment requires minimization of impervious areas; protection from sources of stormwater pollutants; treatment prior to discharge from the site; runoff less than or equal to pre-project peaks and durations; maintenance of treatment and flow-control features (CCCWP, 2008). The CCCWP developed a LID approach to meet these requirements and the C.3 Guidebook provides a methodology to ensure consistent implementation of the C.3 requirements. The C.3 guidebook provides two options for BMP sizing: Option 1 – treatment control which results in smaller BMPs and Option 2 – treatment and flow control which results in larger BMPs with increased treatment and mitigation of flow increases associated with smaller rainfall events. The applicant selected Option 2: to develop the BMPs to meet treatment and flow control standards. Given that OGS would discharge directly to a mitigation wetland with no outlet, Staff agrees with the applicant's selection of treatment and flow control because this approach results in improved water quality treatment as compared to a treatment only approach.

The C.3 Guidebook provides sizing factors for selected BMPs based on local hydrologic soil groups. The entire project is located in Hydrologic Soil Group A due to the sandy soils at the site. These sizing factors and the planned surface conditions (paved, gravel, landscape) for each drainage area were used to estimate the minimum surface area and treatment volume required for each IMP. The design criteria were used to size BMPs to meet the treatment requirements by capturing the treatment volume over a required minimum treatment area.

Bioswale #1-2 would treat runoff from about 11.3 acres in northern and eastern portions of the OGS project site. Using the C.3 sizing factors, the required treatment volume would be about 0.25 acre-feet, the minimum treatment area would be about 0.30 acres, resulting in a maximum average depth of 0.83 feet (CH2MHILL, 2010u). Bioswale #1-2 would be about 1,323 feet long with a 2 foot wide base and 3H:1V side slopes. With an average depth of 0.81 feet and maximum depth of 1.35 feet, Bioswale #1-2 would meet the CCCWP requirements for treatment volume and minimum area.

Bioswales 4 and 5 and the proposed pond would provide water quality treatment for runoff generated on about 12.02 acres in the southwest portion of the project site and the adjacent PG&E Antioch terminal. Due to site constraints, Bioswales 4 and 5 would not have sufficient area to meet the CCCWP treatment requirements, and the proposed pond would provide the required treatment capacity for the southwest areas of the project site. While Bioswales 4 and 5 would not fully meet the required treatment capacity, these swales would augment the treatment capacity provided in the pond.

The pond was sized based on a volumetric sizing methodology using the CCCWP's Unit Basin Storage Size for 80% Capture. Based on an estimated directly connected impervious area of about 50 percent and the mean annual precipitation at the project site, the applicant estimated that the required treatment volume was about 0.3 acre-feet.

The proposed pond would provide 0.3 acre-feet of storage volume at a depth of about 0.84 feet (CH2MHILL, 2010u).

Staff concurs with the applicant's proposed sizing of the pond and bioswales for water quality treatment, and believes that the facilities have adequate volume and treatment area to meet the guidelines set forth by CCCWP.

Hydrologic Connection to Wetland E/Hydraulic Structure Design

To maintain the hydraulic connection with the Mitigation Wetland, the applicant proposes to incorporate low flow orifices in risers at the outlet structures to each of the bioswales and the pond. The low flow orifices are intended to meter the discharge from each BMP to control flows while allowing smaller frequent flows to pass on to Mitigation Wetland E. With the sandy soils at the project site, this approach is important to limit infiltration losses during extended periods of detention with the bioswales and the pond.

The low flow orifices proposed for each of the bioswales would be located at the base of the swale. Bioswale #4 would discharge into Bioswale #5 which would discharge into the pond. The pond and Bioswales #1-2 would discharge to a floodplain bench just above the permanent pool within the Wetland E. The low flow orifices for each bioswale were sized to allow the water quality flow rate (flow generated by a 0.2 inch/hour rainfall intensity) with 1 foot of depth (CASQA 2009). This sizing approach allows for smaller frequent stormflows to pass through the bioswales without excessive detention and infiltration.

Staff concurs with the applicant's sizing calculations for Bioswales #1-2 and # 4. However, the sizing on Bioswale #5 did not account for the additional flow from Bioswale #4, and the orifices for Bioswale #5 would be too small to allow for the water quality flow rate to pass on to the pond. Thus, Staff recommends that the applicant revise orifice sizing for Bioswale #5 to account for the entire contributing watershed including the watershed that discharges into Bioswale #4.

The proposed outlet structure for the pond would have orifices located about three inches above the pond bottom. This would result in the capture and infiltration of the first 0.09 acre-feet of runoff that reached the pond including the runoff that is generated at the PG&E Antioch terminal and currently comprises the majority of flows to the Mitigation Wetland. The orifices for the pond were sized to allow the remaining water quality volume ($0.30 - 0.09 = 0.21$ acre-feet) to drain within 24 hours. The proposed orifice configuration and sizing would be generally acceptable, and would be appropriate for a facility with a deeper treatment depth.

However, staff is concerned that the proposed design for the pond outlet structure could significantly limit the hydraulic connection to Mitigation Wetland E. The applicant's hydrology analysis of the existing site indicates that runoff from the paved and gravel surfaces of PG&E's Antioch Terminal is the primary contributor of surface discharge to Mitigation Wetland E due to the sandy nature of the existing soils. Following construction, runoff from the project site areas and PG&E's Antioch Terminal generated during small typical storms would also be subject to infiltration within the proposed bioswales and pond. Since the proposed stormwater management plan would route all runoff from PG&E's Antioch Terminal through the detention basin, it will be critical that

runoff efficiently pass through the basin without significant losses to infiltration to maintain the hydrologic function of Mitigation Wetland E. With a 24-hour draw down time, shallow treatment depth, elevated orifices, and sandy soils, much of the surface runoff delivered to the pond would be infiltrated into the subsurface.

As proposed, the riser significantly limits flows to the mitigation wetland until the riser overtops (during a 100-year event). For instance, in a 10-year event, the applicant's analysis indicates that flows discharged from the detention basin would be reduced to 0.27 cfs. By comparison, the water quality flow rate for the pond's contributing watershed would be about 1.5 cfs for a relatively low rainfall intensity of 0.2 inch/hour. Energy Commission staff believes that the proposed pond, with a relatively shallow 0.84 feet treatment depth for the water quality volume, could function more like flow based BMP similar to the bioswales. Given the concern regarding the hydraulic connection to the Mitigation Wetland, Staff recommends that the orifices be lowered to the base of the pond and sized to pass the water quality flow rate for the pond contributing watershed (including portions that pass through Bioswales #4 & #5) with about 1 foot of depth. This approach would allow for water quality treatment by shallow flow through the vegetated pond base, and pass much of the surface runoff on to Mitigation Wetland E.

Staff is also concerned that the proposed orifice configuration with a number of small orifices located in a single row at the base of the bioswales (or pond), could be subject to clogging as a result of sediment deposition. Staff recommends that the orifices on all of the risers (bioswales and pond) be spaced vertically to accommodate sediment deposition. Ideally, the orifice rows would be spaced vertically 2 to 3 inches on center so that as sediment deposits in the base of the bioswales (or pond), the riser maintains the hydraulic performance. To limit the need for frequent maintenance including sediment removal and reseeding, orifice spacing should also extend vertically above the 1 foot flow depth, to maintain hydraulic performance as the bioswales (and pond) trap sediment.

Monitoring and Adaptive Management

The applicant provided a wetland management plan to the California Department of Fish and Game for Mitigation Wetland E (CH2MHILL, 2010k). In the management plan the applicant committed to an adaptive management strategy to protect the hydraulic function of Mitigation Wetland E. The adaptive management plan includes pre- and post-construction monitoring of the hydrologic conditions in the wetland. If hydrologic impacts including a decrease in ponding depth or duration are observed during post-construction monitoring, the applicant has indicated that a drainage pipe can be added to Bioswale #1-2 (or the pond) to increase delivery of runoff to the wetland. The adaptive management plan should include monitoring of water levels. In addition the monitoring and adaptive management plan should include sampling and analysis of stormwater discharge and water retained to Mitigation Wetland E for key constituents including pH, Total Suspended Solids, Specific Conductance, Oil & Grease, and key metals (Iron, Lead, Arsenic, Selenium, Chromium, Mercury, etc) to gage the performance of the project's stormwater treatment BMPs. If water quality parameters exceed RWQCB Benchmark Values or US EPA Freshwater Quality Criteria, the stormwater BMPs shall be improved or augmented to address any deficiencies.

The Contra Costa Countywide NPDES Stormwater Permit Amendment 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. R5-2010-0029 (CVRWQCB 2010). In addition, the City of Oakley also requires compliance with the NPDES permit and the Stormwater C.3 requirement of the CCCWP. Staff recommends Condition of Certification

SOIL&WATER-1 that requires the project owner to prepare and implement a DESC. The DESC shall provide sufficient detail to meet the requirements for a Stormwater Control Plan as required by CCCWP and a Hydrology and Hydraulics Report as required by the City of Oakley. Specific details related to the contributing watershed characteristics, stormwater BMP plan, BMP designs, and sizing shall be clearly presented in a well organized report. Back up calculations shall be provided as appendices to the report. Submission of only back up calculations is not acceptable for Energy Commission, County, and City review. In addition, the Industrial SWPPP required in **SOIL&WATER-5** also requires implementation and maintenance of drainage control BMPs during operations. Staff also recommends Condition of Certification **SOIL&WATER-6** that requires the project owner to prepare and implement a Wetland Monitoring and Adaptive Management Plan as detailed in the applicant's wetland management plan approved by DFG.

Proper implementation and maintenance of the BMPs outlined in approved SWCP, DESC, and Industrial SWPPP would limit water quality impacts related to increased stormwater runoff and changes in runoff patterns during operations. With the additional efforts recommended by Energy Commission staff to improve the hydraulic performance of the outlet structures proposed for the bioswales and pond, Energy Commission staff believes that the proposed plans are reasonable at this level of project planning to avoid significant adverse impacts due to increases in stormwater runoff and changes in drainage patterns. Post-construction monitoring and adaptive management will ensure that potential impacts to Mitigation Wetland E would be less than significant.

Flooding Potential

During operations, the OGS site would be comprised of buildings, paved surfaces, and gravel surfaces which would increase stormwater runoff volumes and peak flow rates. The proposed project must limit increases in stormwater discharge from the project site to meet flood control standards and to limit flood related impacts to downstream properties associated with development of the project site. OGS proposes to discharge all runoff to Mitigation Wetland E and other onsite detention facilities with no offsite discharge. For retention facilities without offsite discharge the City of Oakley requires storage of runoff from a 100-year event plus a factor of safety. Contra Costa County directed the applicant to size the detention basin to contain the 100-year storm event without discharge. Additionally, they recommended the applicant evaluate the 100-year +10-year event with an empty basin initial condition.

The applicant provided a revised stormwater drainage design in the Response to Energy Commission staff comments provided in a technical memorandum (PWA 2010a and CH2MHILL 2010u). The stormwater design calculation package included HEC-HMS analyses to estimate the changes in runoff volumes from the project site between the existing conditions as a vineyard and the proposed conditions during operations of

the OGS site. Runoff volumes from a 10-year event would increase from 1.17 acre-feet to 1.98 acre-feet following development. Runoff volumes would increase from 2.79 acre-feet to 4.05 acre-feet in a 100-year event. The applicant utilized the HEC-HMS runoff volume results to demonstrate that the proposed detention basin combined with Wetland E would have adequate capacity to contain the 100-year + 10-year runoff volumes (6.03 acre-feet).

Mitigation Wetland E has a storage capacity of 6.13 acre-feet and the proposed detention basin (pond) would have a storage capacity of about 0.57 acre-feet. Under high stage conditions, the water surface elevation in the wetland and pond would eventually equalize across the connecting culvert to provide storage required for large runoff events. The elevation-area-storage of the equalized pond and wetland is presented in Table 4. The volumetric flood control analysis did not include any storage in the bioswales or account for infiltration, thus assuming that the total site runoff would reach the pond or wetland. The results of the analysis indicate that the pond and wetland can contain the runoff generated by the 100-year + 10-year event at a water surface elevation of about 10.8 feet with about 0.9 foot of freeboard below the 11.7 feet elevation of the low spot in the roadway berm adjacent to the wetland.

**Soil & Water Table 4
OGS Stormwater Storage Volume
Mitigation Wetland E and Detention Basin (Pond)**

Elevation (feet)	Wetland Area (acres)	Pond Area (acres)	Wetland Storage (acre-feet)	Pond Storage (acre-feet)	Total Storage (acre-feet)
5.0	0.40	-	-	-	-
7.5	0.62	-	1.28	-	1.28
8.5	0.95	0.33	2.06	-	2.06
9.0	1.11	0.35	2.58	0.17	2.75
10.0	1.44	0.41	3.86	0.55	4.41
11.0	1.55	0.48	5.36	0.99	6.35
11.5	1.60	0.51	6.15	1.24	7.39

Taken from CH2MHILL 2010u

Staff reviewed the applicant's analysis and believes that the proposed stormwater storage facilities would capture and retain all runoff from the project site. The volumetric capacity analysis indicates that the wetland and detention basin have sufficient capacity to contain all of the runoff generated from the OGS site for a 100-year + 10-year storm event to meet the requirements of Contra Costa County and the City of Oakley. The assumption that all runoff would ultimately be discharged to the proposed detention basin and Wetland E is conservative for flood control purposes. In reality, some runoff would be captured and infiltrated within the bioswales reducing the total runoff delivered to the Pond and Wetland E. The applicant has indicated that the existing culvert connection between the parking lot to the north and Wetland E would be removed to eliminate this source of runoff to the wetland.

The project site is located in Zone X as defined by the Federal Emergency Management Agency (FEMA). This zone is not within the 100-year floodplain and is outside the 500-year floodplain (AFC, 2009). With the combined storage provided by the proposed pond and Mitigation Wetland E, the OGS site would not discharge stormwater generated by a 100-year plus rainfall event during operations and would not increase flooding potential in the vicinity of the site.

Staff recommends Condition of Certification **SOIL&WATER-1** that requires the project owner to prepare and implement a DESC. The DESC shall provide sufficient detail to meet the requirements for a Stormwater Control Plan as required by CCCWP and a Hydrology and Hydraulics Report as required by the City of Oakley. The plan should include specific details related to the contributing watershed characteristics, stormwater BMP plan, BMP designs, and sizing for flood control shall be clearly presented in a well organized report. This report should specifically document the 10-year, 100-year, and 100-year + 10-year runoff events for the OGS site and assess the impacts to the onsite storm drain system and mitigation wetland. The City of Oakley and Contra Costa County would provide review and comment on the onsite stormwater facilities and may request additional analyses as part of the final design. Staff recommends that the applicant conduct a hydraulic analysis of the detention pond outlet structure and the connection to the wetland to ensure that the system will perform hydraulically as anticipated.

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 Joaquin River just upstream of Suisun Bay and 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 OGS site. The OGS 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 OGS site is the Suisun Bay. A seiche originating in Suisun Bay would have to travel up stream to the proposed OGS site and would flood the low-lying areas of Suisun Marsh causing the seiche to rapidly dissipate prior to reaching the proposed OGS site.

Sea Level Rise

The San Joaquin River is 0.6 miles north of the proposed OGS site, which is located within the estuarine transition zone between the Suisun Bay and the San Joaquin River. The lowest finished grade elevations at the OGS site adjacent to the river would be about 12-feet msl, which would be approximately 5 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.

According to 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 recommends the use of 16 inches of sea level rise through 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 (CCCC 2009).

Based on a maximum projected sea level rise of approximately 18 inches by 2050, staff finds that the finished grade elevation of about 12-feet msl would prevent flooding of the proposed OGS 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 OGS in the event flood flows or the sea level begin to rise above the BFE of 7 feet msl as shown on the 1987 Flood Insurance Rate Map (FEMA, 1987).

Operations Water Supply

The applicant has indicated that OGS would use up to 250 afy of water for all project water needs during normal operations. The applicant proposes to utilize fresh, potable water to provide the project's water supply. DWD confirmed that they have the ability and can meet the OGS facility demand in a June 2009 will serve letter (OG 2009a). OGS proposes to obtain potable water from DWD via a connection to an existing 24-inch water main that runs through the project site. Operational fresh water use is estimated to average about 240 acre-feet per year (AFY) with about 124 afy dedicated to evaporative fluid cooling and inlet air cooling based on 8,449 hours of operation.

The majority of DWD's supply is untreated water purchased from the Contra Costa Water District (CCWD) through the United States Bureau of Reclamation (USBR) Central Valley Project (CVP) which relies on the Sacramento-San Joaquin Delta (DWD, 2005). DWD also uses local groundwater to supply a portion (less than 20 percent) of its supply (DWD, 2005). DWD delivered about 5,250 acre-feet in 2004. Based on 2005

growth projections, DWD projected to deliver about 7,100 acre-feet in 2010 and 9,100 acre-feet in 2015 (DWD, 2005). OGS operational water usage would represent 3-5 percent of DWD's total water deliveries. However, DWD's 2005 Urban Water Management Plan indicates that DWD is relying on increased water purchases of CVP water from CCWD to provide much of the additional supplies required to meet future demand including that of OGS.

The CVP has experienced frequent reductions in water allocations to water supply districts due to regulatory restrictions during drought periods. During periods of limited allocations, water users serviced by CVP contractors including DWD are required to limit their use of water. South of the Delta, agricultural users have had full allocations only one of the past ten years and have had their allocations cut by 25-60 percent in seven of the past ten years and cut by 90 percent in 2009. Urban users have only seen full allocations three of the past ten years and had their allocations cut by more than 20 percent in four of the past ten years. Water supplies derived from the CVP project are significantly limited. As new users take up a portion of the limited water available, the potential for shortages and limitations increases and other users would need to further limit water usage to make up for the additional supply requirements.

For instance, in 2009, CCWD faced a 55 percent cut in their CVP allocation. To limit the impacts to their water users, CCWD met the allocation cuts through mandatory conservation measures and purchase additional supplies at a cost of four times normal rates. In response, DWD was forced to cut their use of CCWD water by 20 percent. DWD met this allocation cut by increasing groundwater pumping and through a 10 percent reduction in water use by their customers. If OGS adds an additional 5 percent to DWD's total water demand, DWD would need to increase the water supply cuts to other customers by 50 percent (to a total reduction of 15 percent), increase groundwater pumping by about 24 percent, or charge a premium to its existing customers who continue to utilize water at their historic rates to balance water supplies with demand during similar drought years.

In Resolution 2010-0039, the State Water Resources Control Board has recently determined that the Sacramento-San Joaquin Delta is in ecological crisis and that recent Delta flows have been inadequate to support aquatic habitat for endangered native fish species (SWRCB 2010). Returns of salmon on the Sacramento River have declined by 97 percent since 2002, reaching critical levels that required the suspension of commercial and recreational fishing in 2008 and 2009 (PMFC, 2010). The Delta Stewardship Council's Draft Delta Plan concluded that California's total water supply is oversubscribed (DSC, 2011). When water exports from the Delta are reduced, the consequence is increased demand on an already overused and unsustainable groundwater system (DSC, 2011). The Stewardship Council also concluded that the Delta system has already been altered to the extent that some native species may not survive (DSC, 2011).

In addition, as required in the Delta Reform Act (SBX7 1), the SWRCB released new flow criteria for the Delta in Resolution 2010-0039 designed to protect federal and state listed endangered species that depend upon aquatic habitat in the Delta for survival (SWRCB 2010). These criteria indicate that the Delta outflows should be increased to about 75 percent of natural unimpaired flows from November through June to support

endangered fish species (SWRCB 2010). By comparison, during drought years in the early 1990s and early 2000s, outflows were reduced to about 30 percent of natural flows (SWRCB 2010). Thus, the SWRCB is recommending that Delta diversions would need to be cut by about 65 percent from the historic levels during drought years to address the significant impacts to the Delta.

The SWRCB indicated that the determinations in Resolution 2010-0039 do not have regulatory or adjudicatory effect (SWRCB 2010). When the SWRCB develops Delta flow objectives with regulatory effect, it must ensure the reasonable protection of beneficial uses, which may entail balancing of competing beneficial uses of water, including municipal and industrial uses, agricultural uses, and other environmental uses (SWRCB 2010). The SWRCB will evaluate the effect of any changes in flow objectives on the environment of the Delta, the upgradient watersheds, and the areas where Delta water is used, as well as, an evaluation of economic impacts (SWRCB 2010). The SWRCB indicated that it may amend the terms and conditions of water right permits and licenses to impose further limitations on the diversion and use of water by water rights holders to protect the Delta or to meet water quality and flow objectives in Water Quality Control Plans it has adopted (SWRCB 2010). The SWRCB also indicated that it may impose restrictions in diversions by the CVP and SWP when the Department of Water Resources and US Bureau of Reclamation seek to change points of diversion for the CVP and SWP as part of a proposed peripheral canal (SWRCB 2010). The report will also be used for development of the 'Delta Plan', also required in the Delta Reform Act, which will identify policies and actions responsible resource agencies must implement for improved water supply reliability and protection of the Delta ecosystem.

As new Delta flow criteria or other regulatory means are adopted in the future to protect the environment within the Delta, CVP allocations are likely to significantly decline to levels at or below the allocation restrictions seen over the past 10 years. As CVP restrictions on water allocations to municipal, industrial and agricultural become more frequent and significant due to pumping restrictions in the Delta, Staff believes that other existing water users may be impacted by the proposed use of fresh water for OGS operations.

OGS has committed to conversion to a recycled water supply when it becomes available. The proposed water treatment building has been sized to accommodate the potential future installation of a microfiltration or ultrafiltration system to provide additional treatment of the recycled water supply upstream of the RO system (CH2MHILL 2010c). Recycled water would be used to supply the RO system, landscape irrigation, plant washdown water, combustion turbine inlet air coolers, and evaporative cooler. When OGS converts to a recycled water supply, peak water demand would be expected to increase by about 11 percent to account for losses in the water treatment required to use recycled water. Operational use of recycled water would increase to a maximum of about 409 gpm or about 0.59 MGD and an average of about 105 gpm or about 247 AFY.

Ironhouse Sanitary District (ISD) is currently constructing a new wastewater treatment plant less than two and one-half miles from the OGS site. The new plant will provide tertiary treated recycled water in close proximity to OGS. At this time, ISD is planning to

complete construction of the new wastewater treatment plant in October 2011 with an initial dry weather flow of about 2.64 MGD.

ISD participated in the development of an East County Industrial Recycled Water Plan in conjunction with other wastewater agencies including Delta Diablo Sanitation District, Central Contra Costa Sanitary District, Contra Costa Water Agency, the City of Pittsburg, and the City of Antioch to provide recycled water to a number of potential industrial users in the vicinity of the OGS site. ISD considered a 3.6 mile long, 14-inch diameter recycled water pipeline, passing by the OGS site along Bridgehead Road from ISD's new wastewater treatment plant to industrial users on Wilber Avenue. This proposed recycled water supply pipeline has gone through preliminary planning by ISD, however, construction of the proposed recycled water pipeline is not currently scheduled (CH2MHILL 2010c). ISD also has other, more direct routes for a recycled water supply pipeline to OGS that would result in substantial cost savings. One potential route could utilize Walnut Meadows Drive to Vintage Parkway to Big Break Road and across the existing vineyard and DuPont property. This route would be about 2.5 miles to the OGS water treatment building and would eliminate two expensive crossings of the Burlington Northern Santa Fe railroad right-of-way. Based on the availability of an adequate, tertiary treated, recycled water supply within close proximity of the OGS site, Energy Commission staff believes that use of recycled water would be technically and economically feasible. See the **ALTERNATIVES** section for a complete analysis of the recycled water sources.

Delta Diablo Sanitation District's WWTP is about 5.5 miles from the project site that also produces recycled water. Delta Diablo Sanitation District's discharge point is closer to San Francisco Bay, which allows for discharge of higher salinity waste water than at the ISD plant. It may be more economically feasible to build a recycled water supply line and/or a waste water discharge line to the Delta Diablo Sanitation District WWTP to limit the need to additional wastewater treatment to meet the more stringent wastewater discharge requirements at the ISD facility.

Staff is recommending Condition of Certification **SOIL&WATER-4** to limit the OGS facility to maximum water use of 250 acre-feet per year of fresh water supplied by DWD.

Conditions of Certification **SOIL&WATER-4** in conjunction with **SOIL&WATER-8** require that OGS convert to recycled water supplied by the new ISD wastewater treatment plant (or Delta Diablo Sanitation District) within a prescribed time after the Energy Commission determination that recycled water is economically feasible and a project amendment is approved by the Energy Commission for use of recycled water. Recycled water use is limited to 280 AFY. Up to 25 AFY of fresh water supplied by DWD would be allowed as a backup water supply. Condition of Certification **SOIL&WATER-4** requires the project owner to install metering devices on all water supply pipelines and submit monthly water usage data to confirm the site is in compliance with the annual water use limit.

Condition of Certification **SOIL&WATER-8** requires OGS to submit for Energy Commission consideration recurrent recycled water economic feasibility analyses starting within 18 months of receiving a license. The 18-month period will allow the new ISD wastewater treatment plant to come online and allow for ISD and OGS to develop a

better understanding of the recycled water quality produced by the new treatment plant and the constraints associated with conversion to a recycled water supply. This 18-month period will also allow OGS and ISD to work together to develop a cost effective plan for implementing a change to recycled water. Condition of Certification **SOIL&WATER-8** also requires that the economic feasibility analysis be updated biennially until the Energy Commission determines that recycled water has become economically feasible.

Staff believes that in-lieu of complying with Condition of Certification **SOIL&WATER-8**, the applicant be provided the option to implement a water conservation plan which would offset the project fresh water use rather than replace it with recycled water. Staff recommends the applicant be required to comply with Condition of Certification **SOIL&WATER-9** if this option is chosen. Should the project owner subsequently determine that use of recycled water is more economical than the use of freshwater, the project owner may submit a project amendment at that time and eliminate the water conservation program.

As alluded to above, conversion to the recycled water supply would also require a project amendment and it would include among other things, reviewing the proposed pipeline and recycled water treatment system (including an Engineer's Report and Dual Plumbing Plan). Additionally, Condition of Certification **SOIL&WATER-8** requires the project owner to submit for Energy Commission consideration a project amendment for conversion to recycled water use within one year of the Energy Commission's determination that recycled water use is economically feasible.

Project Wastewater

The wastewater generated by the OGS project during operations would include both industrial wastewater and stormwater runoff from the power block area. The primary sources of wastewater would be the reject from the RO system, blowdown condensate, and system wash waters. Stormwater runoff from the power block area would be directed to an oil/water separator prior to being discharged to the sanitary sewer. These wastewater streams would be directed to the Ironhouse Sanitation District's (ISD) wastewater treatment facility. The applicant has received a will serve letter from ISD indicating that they will have capacity to accept and treat a wastewater flow up to 200 gallons per minute from the OGS following completion of the ISD plant expansion. This is sufficient to meet the anticipated average (68 gpm) and peak (159 gpm) wastewater flows including sanitary wastewater from OGS while using freshwater supplied by DWD. If the project switches to a recycled water supply, wastewater discharge would increase by about 15 percent with an average discharge of 78 gpm and a peak of about 200 gpm. Wastewater would be delivered to ISD's existing gravity sanitary sewer system via a new 0.44-mile long sanitary sewer force main.

If the project adopts a recycled water supply, the wastewater discharge stream may exceed ISD's wastewater discharge limits for TDS, electrical conductivity, and select metals without additional treatment. The applicant has indicated that a high-TDS wastewater discharge line routing wastewater to Pittsburg (where wastewater discharge limitations allow higher levels of TDS) would be required to switch the project to a recycled water supply. Staff believes that the project could meet ISD's wastewater discharge limitations using onsite treatment to treat the wastewater stream to meet the

ISD's wastewater discharge limitations. A portion of the waste water stream could be treated with a reverse osmosis or cation exchange system, and the treated water could be blended as necessary to allow the total wastewater stream to meet the wastewater discharge limits. Another possible option would be implementation of a Zero Liquid Discharge (ZLD) system to treat project wastewater as required by Energy Commission policy. Alternatively, OGS could work with ISD to fund the District's salinity reduction program to help reduce salinity from other dischargers in the ISD service area. ISD's salinity reduction program includes buy out of water softeners to limit salinity inputs to ISD's wastewater treatment plant.

Based on the will serve letter from ISD, Energy Commission staff believes that there would be sufficient treatment capacity within the planned expansion of the ISD treatment facility to handle the industrial wastewater and stormwater generated by the proposed project. Additionally, Energy Commission staff believes that by meeting the requirements of the existing industrial waste discharge requirements set forth for the ISD wastewater treatment plant (or through an alternative salinity reduction program), the impact of the proposed project on existing wastewater treatment systems and water quality downstream of the site would be less than significant.

Staff recommends Condition of Certification **SOIL&WATER-7** requiring OGS to limit wastewater discharge to a maximum of 200 gpm and meet the wastewater discharge requirements at the ISD wastewater treatment plant as required by the Central Valley Regional Water Quality Control Board. Condition of Certification **SOIL&WATER-8** requires OGS to examine the economic feasibility of conversion to recycled water including additional wastewater treatment or discharge pipelines as needed to meet ISD (or DDSD) wastewater discharge requirements on a biennial basis. Once the Energy Commission determines that recycled water is economically feasible, Condition of Certification **SOIL&WATER-8** requires OGS to submit a project amendment that outlines recycled water delivery, treatment, and wastewater discharge plans for environmental review.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts consist of impacts that may occur as a result of the proposed project in combination with impacts from other past, present and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant actions taking place over time.

Surface Water / Stormwater

The OGS site is outside of the 100-year floodplain and stormwater runoff from the OGS site would be retained onsite. OGS would not increase flood flows or alter the water quality within the San Joaquin River and no significant cumulative impacts to surface water resources are expected.

Groundwater

OGS would utilize freshwater supplied by DWD for construction and operation for no longer than two years after the Energy Commission has determined feasibility of connection to a recycled water supply and Energy Commission approval of a project amendment requiring such connection, unless the project owner chooses to participate

in a water conservation program. DWD water supplies include a blend of surface water supplied by the CVP and locally pumped groundwater (less than 20 percent). DWD monitors operation of the local groundwater supply well related to groundwater quality and quantity.

OGS would utilize about 3 to 5 percent of DWD's total water supply. During periods of shortage, DWD relies on increased groundwater pumping to make up for shortfalls in surface water allocations. Thus, during periods of allocation cuts, OGS's operational water supply could result in a 24 percent increase in groundwater pumping.

DWD would need to closely monitor groundwater pumping to ensure that the increased demands associated with OGS do not contribute to significant impacts to groundwater levels or groundwater quality. Through DWD's monitoring of the groundwater resource in the region, no significant cumulative impacts related to groundwater quantity or quality are anticipated as a result of OGS.

Project Water Supply

The project would utilize fresh, potable water primarily derived from the Sacramento-San Joaquin Delta for construction and operational water supply until recycled water becomes economically feasible. The project's proposed fresh, potable supply would increase existing freshwater use from the Delta by up to 250 afy. The proposed freshwater supply would be provided by DWD through existing water rights agreements with CCWD and ultimately the USBR's CVP. The proposed fresh water use is consistent with the beneficial use requirements and within the permitted limits of the DWD and CCWD to provide water under the existing requirements for water rights and diversions from the Delta.

However, the SWRCB in Resolution 2010-0039 has determined that diversions from the Delta have reduced Delta outflows to levels that have been inadequate to support aquatic habitat for endangered native fish species and that the Delta is in "ecological crisis" (SWRCB 2010). The Delta Stewardship Council concluded that California's total water supply is oversubscribed and that the Delta system has already been altered to the extent that some native species may not survive in their Draft Delta Plan (DSC, 2011). These determinations indicate that current levels of diversions from the Delta are resulting in cumulative impacts to the ecology of Sacramento-San Joaquin Delta. The SWRCB currently allocates water supplies to the State Water Project and CVP in the Delta in accordance with a complex set of water rights decisions and water quality control plans that are designed to mitigate impacts to Delta resources while providing supplies for reasonable and beneficial uses. The surface water supply allocated to DWD is currently administered in accordance with these decisions and plans. Since the project water supply would be provided by a water supply district in accordance with their approved allocations under an adopted regulatory framework, staff cannot find that there is a cumulative significant impact due to project water use. Staff notes that under the auspices of the Delta Reform Act of 2009, the 'Delta Plan' will have a primary purpose of meeting the coequal goals of providing a more reliable water supply and protecting, restoring, and enhancing the Delta ecosystem. This plan will identify policies and actions the agencies affecting resources in the Delta must take to achieve these goals including the SWRCB. In order to achieve these goals the SWRCB may reduce

existing and future allocations of the Delta water supply. Without this plan and the necessary SWRCB decisions, staff cannot anticipate how cumulative impacts and the project water supply might be affected.

Project Wastewater

Wastewater including cooling tower blowdown and stormwater from the power block will be routed to Ironhouse Sanitary District's wastewater treatment plant under an existing Industrial Wastewater Discharge Permit. Ironhouse Sanitary District has indicated that it has sufficient capacity to treat wastewater discharged from OGS and no significant cumulative impacts related to wastewater discharge are anticipated as a result of OGS.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

Ironhouse Sanitary District (February 2011)

Energy Commission staff had numerous discussions with Ironhouse Sanitary District (Tom Williams, General Manager). Mr. Williams expressed ISD's commitment to supply recycled water to OGS. However, Mr. Williams also expressed concern that any waste water discharged back to ISD needed to meet their wastewater discharge requirements because ISD's existing discharge is close to the discharge limitations particularly for salt. Mr. Williams also indicated that there could be grant funding available to help ISD implement a recycled water distribution pipeline to offset a portion of the costs associated with the recycled water conversion. In response to ISD's input, Energy Commission staff has recommended Conditions of Certification **SOIL&WATER-8** and **-4**, requiring OGS to examine the economic feasibility on a biennial basis until an economically feasible approach to a recycled water supply can be developed and to switch to recycled water once it becomes economically feasible.

COMPLIANCE WITH LORS

Energy Commission staff reviewed the proposed project to determine if the project would adhere to the requirements of LORS and state and local policies related to soils and water resources.

Water Supply

Of particular concern to Energy Commission staff was OGS's proposed water supply and determination that the proposed water supply met state laws and policies. Under the California Constitution (Section 2, Article X), California Water Code encourages the conservation of water resources and the maximum reuse of wastewater particularly in areas of limited supply. The Water Code (Sections 13550 and 13552.6) indicates that use of potable water for industrial uses including power plant cooling is a waste and unreasonable use of water if sources of recycled water are available. Water Code Section 13550 includes conditions for the requirement to utilize recycled water:

1. Source of the water is of adequate quality and available. Also, the state shall consider the impact of the use of recycled water on the quality of wastewater discharge.

2. Recycled water may be furnished at a reasonable cost. The state shall consider the present and projected cost of the use of recycled water is comparable to or less than the cost of potable, domestic water.
3. The use of recycled water would not be detrimental to public health.
4. The use of recycled water shall not impact downstream water rights.

SWRCB Resolutions 75-58 and 2009-0011 supports and promotes the use of recycled water and encourages the substitution of recycled water for potable sources to the extent possible. The SWRCB indicates that the lowest quality cooling water reasonably available from technical and economic standpoint should be utilized for industrial processes including evaporative cooling processes. The Energy Commission in its 2003 IEPR adopted a policy pursuant to SWCRB Resolution 75-58, indicating that approval of fresh water sources for power plant cooling would only be acceptable if alternative water supply sources are economically unsound or environmentally undesirable. The 2003 IEPR also requires the use of Zero Liquid Discharge technologies to limit waste water discharge from power plants unless it is shown to be economically unsound or environmentally undesirable. The Energy Commission has indicated that it interprets the term “economically unsound” to be equivalent to economically infeasible.

OGS has proposed the use of dry cooling to significantly limit water use pursuant to SWRCB Resolutions 75-58 and the Energy Commission’s 2003 IEPR.

OGS has proposed the use of potable water supplied by DWD until recycled water supplied by ISD becomes available. More than half of OGS’s estimated annual water use is dedicated to power plant cooling through use for inlet air cooling and evaporative fluid cooling. Tertiary treated recycled water from ISD will become available to OGS beginning in October 2011. This tertiary treated source will be available in adequate volumes and with sufficient quality to be OGS’s primary water supply.

ISD’s new wastewater tertiary treatment plant is located about 2.5 miles from the proposed OGS water treatment building. ISD has identified a 3.6-mile pipeline route that limits impacts to existing neighborhoods and avoids the Burlington Northern Sante Fe railroad right of way. The proposed pipeline route would travel along Main Street and pass by the OGS site on Bridgehead Road. OGS’s proposed 0.44-mile sanitary sewer force main has a similar alignment.

An alternative, more direct alignment would be possible passing through the OGS site and laydown area. ISD and Energy Commission staff have identified a 2.5 mile route along Walnut Meadows Drive and Vintage Parkway to Big Break Road, across the existing vineyard and DuPont property to the OGS laydown area and project site. Given the close proximity to the OGS site, Energy Commission staff believe that recycled water is readily available and economically feasible as the primary water supply for OGS.

One constraint identified by OGS for conversion to recycled water, would be the creation of a wastewater stream with a high salinity. OGS indicated that construction of a 7-mile long high-TDS wastewater line to allow discharge of wastewater to the Delta Diablo Wastewater Treatment plant was required for wastewater disposal. However,

Energy Commission staff believes that there may be other lower cost options. For instance, OGS could provide additional treatment of the wastewater stream to remove excess salts for offsite disposal to the proposed connection to the ISD wastewater treatment plant. OGS could also implement a ZLD system as required to meet existing Energy Commission policies. Finally, OGS could work with ISD to help fund their salt reduction program aimed at reducing salt loads in the service area through water softener buyouts. Staff does not believe that the wastewater quality issue would present a technologic or economic feasibility issue significant enough to prevent the use of recycled water.

Pursuant to Water Code Section 13550 and SWRCB Resolution 2009-0011, Energy Commission staff has included requirements in Condition of Certification

SOIL&WATER-8 that OGS prepare an economic feasibility assessment for recycled water use on a biennial basis until the Energy Commission finds that recycled water use is economically feasible. Once recycled water use is deemed economically feasible, OGS is required to convert to the recycled water supply no longer than two years after Energy Commission approval of a project amendment to do so. The time period required to make feasibility approval and obtain Energy Commission project amendment approval provides OGS with adequate time to 1) develop plans for a recycled water pipeline and onsite treatment of recycled water and waste water, 2) document their proposed plans in a project amendment, 3) gain Energy Commission approval of the project amendment, and 4) implement the recycled water pipeline and onsite treatment.

Staff believes another option in-lieu of the recycled water use would be for the applicant to implement an approved water conservation plan which would offset their fresh water use. If this option is chosen, staff recommends the applicant be required to comply with Condition of Certification **SOIL&WATER-9**.

Based on Energy Commission staff's analysis and review, OGS would comply with all applicable LORS associated with soil and water resources, including:

- The Clean Water Act through the authority granted to the State to enforce coverage under the NPDES by the Central Valley Regional Water Quality Control Board through the requirements for the preparation and implementation of the SWPPPs, and Drainage Erosion and Sedimentation Control Plan which would include the requirements of the Contra Costa Clean Water Program's Stormwater Control Plan;
- The Clean Water Act through the discharge of wastewater under the requirements of Ironhouse Sanitary District's Wastewater Discharge Requirements set forth by the Central Valley Regional Water Quality Control Board.
- The Resource Conservation Recovery Act of 1976 by the proper handling and discharge of wastewater and potentially contaminated soils;
- The Porter-Cologne Water Quality Control Act through the implementation of the DESCP and SWPPP;
- The California Safe Drinking Water and Toxic Enforcement Act by establishing secondary containment in chemical storage areas;

- Title 23 of the California Code of Regulations requiring the Regional Board to specify conditions for protection of water quality as applicable: In the case of the OGS, the project would be permitted under the General NPDES Permits for Discharge of Stormwater associated with both construction and industrial activity;
- The Energy Commission's 2003 Integrated Energy Policy Report and SWRCB Resolution 75-58, by using dry cooling technology and through the use of recycled water for plant operations once the Energy Commission deems that it is economically feasible and a project amendment requiring connection to a recycled water supply is approved.

The City of Oakley's standard conditions of approval related to stormwater and drainage and NPDES compliance through the development and implementation of a DESCP that addresses Contra Costa County Clean Water Program's requirements for stormwater treatment and the City of Oakley requirements for management of 10-year and 100-year rainfall/runoff events.

CONCLUSIONS

Energy Commission staff has not identified any immitigable potentially significant impacts to Soil and Water Resources for OGS and believes that OGS would comply with all applicable Laws, Ordinances, Regulations and Standards (LORS) provided the proposed conditions of certification are implemented.

Energy Commission staff concludes the following:

- Implementation of Best Management Practices during OGS construction and operation in accordance with effective Storm Water Pollution Prevention Plans, a Drainage Erosion and Sediment Control Plan, would avoid significant adverse effects that could otherwise result in significant transport of sediments or contaminants to Mitigation Wetland E by wind or water erosion.
- Staff has recommended additional measures and minor adjustments to the applicant's proposed erosion control and stormwater quality Best Management Practices to help ensure that potential impacts to existing wetlands adjacent to the project site are reduced to less than significant levels.
- The project's use of recycled water as required by Conditions of Certification **Soil&Water-4** and **Soil&Water-8** would limit freshwater use in the region, limit potentially significant adverse impacts on current or future users of the water supply, and provide consistency with the Energy Commission and State Water Resources Control Board policies on the use of fresh inland water for industrial uses and power plant cooling. In-lieu of future conversion to use of recycled water, the applicant could offset their fresh water use through implementation of an approved water conservation plan.
- The project would not be located within the 100-year flood plain, and would not increase flood conditions downstream of the project.
- The discharge of wastewater under the conditions stipulated in the Ironhouse Sanitary District's Wastewater Discharge Permit (or through implementation of a salt

reduction program) would meet the Central Valley Regional Water Quality Control Board's standards.

Where the potential for impacts has been identified, staff is proposing mitigation measures to reduce the impact to less than significant. The mitigation measures, as well as specifications for LORS conformance, are included as conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: Prior to site mobilization, the project owner shall obtain compliance project manager (CPM) approval for a site-specific Drainage, Erosion and Sedimentation Control Plan / Stormwater Control Plan (DESCP / SWCP) that ensures protection of water quality and soil resources of the project site for both the construction and operational 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 off-site flooding potential, meet local requirements (including Contra Costa County Clean Water requirements), and identify all monitoring and maintenance activities. The plan shall be presented in an organized report format with clear descriptions of the proposed stormwater management plans, design and intended function of major stormwater control and water quality treatment Best Management Practices, and flood control facilities. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and may incorporate by reference any SWPPP developed in conjunction with any NPDES permit.

The DESCP shall contain elements 1 through 11 below outlining site management activities and erosion- and sediment-control and water quality treatment BMPs to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

1. **Vicinity Map** – A map(s) at a minimum scale 1"=100' shall be provided indicating the location of all project elements (construction site, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.
2. **Site Delineation** – All areas subject to soil disturbance for the OGS project (project site, laydown and parking area, and any other project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
3. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the OGS construction, laydown and parking areas.
4. **Drainage Map** – The DESCP shall provide a topographic site map(s) at a minimum scale of 1"=100' showing existing, interim, and proposed

drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

- 5. Narrative of Project Site Drainage** – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage(s) on and downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres including a breakdown of surface treatments (paved, buildings, gravel, landscape, etc) that was used in the sizing of drainage features. The hydraulic analysis shall be used to support the selection and sizing of BMPs and structural controls to divert off-site and on-site drainage around or through the OGS site and laydown areas.
- 6. Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.
- 7. Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements (project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.
- 8. Best Management Practices Plan** – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). The DESCP shall identify appropriate water quality treatment BMPs to target sediment, metals, and hydrocarbons that are numerically sized to meet the requirements of the Contra Costa County Clean Water Program. The proposed BMPs shall include three Bioswales around the site perimeter and an extended detention basin at the western boundary of the project site. Outlet structures and BMP designs shall allow low flows to pass through the BMPs to Mitigation Wetland E to maintain the hydraulic function of the Wetland including passing the Water Quality Flow Rate with 1 foot of flow depth. Orifices within each outlet structure shall be spaced vertically to maintain hydraulic function as sediment deposits within the base of the structure. Outlet structures shall incorporate filter fencing to trap eroded sediments during construction. If necessary, trapped sediments may need to be removed from the Bioswales and detention basin following construction, and the BMPs reseeded.

- 9. Best Management Practices Narrative** – The DESCPC shall show the location (as identified in 8 above), timing, and maintenance schedule of all erosion- and sediment-control and water quality treatment BMPs to be used prior to initial grading, during all project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement indicating when such information will be available.
- 10. Soil Stockpile BMP Plan** – The DESCPC shall include specific BMPs to stabilize soil stockpiles and capture eroded sediments to protect adjacent wetlands. The BMPs shall include appropriately spaced fiber rolls, geotextile erosion control fabrics, hydroseeding with a local native grass mix, watering as necessary to maintain a healthy stand of grass, and a regular monitoring and maintenance plan for a period of at least two years. Monitoring and maintenance shall continue until the all stockpiles are fully stabilized. If DuPont takes possession of the stockpiles to utilize the soil prior to completion of the two year maintenance period, the project shall provide notice from DuPont indicating that DuPont will assume responsibility for the stockpiles and maintain the stockpiles in accordance with the approved Soil Stockpile BMP Plan.
- 11. Hydrology and Hydraulic Reporting** – The DESCPC shall include final hydrology and hydraulic calculations demonstrating that the proposed stormwater management plans have the capacity to convey, capture, and control runoff from a 10-year, 100-year, and 10+100-year events as required by Contra Costa County and the City of Oakley. A 1-inch rainfall event shall also be analyzed to demonstrate that the delivery of runoff to Mitigation Wetland E would not be impacted during small frequent rainfall events. Losses due to infiltration in sandy soils (Hydrologic Soil Group A) within all bioswales and the proposed detention pond shall be estimated and accounted for in analyses of the 1-inch rainfall event.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCPC for construction activity and operations to the City of Oakley, Contra Costa Clean Water Program, and the Central Valley RWQCB (CV RWQCB) for review and comment. No later than 60 days prior to start of site mobilization, the project owner shall submit the DESCPC with any comments received from the City, CCCWP and/or CV RWQCB's to the CPM for review and approval. The CPM shall consider comments by the City, CCCWP and CV RWQCB before approval of the final DESCPC. The DESCPC shall be consistent with the grading and drainage plan as required by condition of certification **CIVIL-1**, and relevant portions of the DESCPC shall clearly show approval by the chief building official. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities. No later than 14 days prior to the transfer of ownership of the soil stockpiles to DuPont,

the project owner shall submit a letter to the CPM from DuPont indicating that DuPont will assume responsibility to maintain the stockpiles in accordance with the approved Soil Stockpile BMP Plan.

SOIL&WATER-2: The project owner shall comply with the requirements of the general National Pollutant Discharge Elimination System (NPDES) permit for discharge of stormwater associated with construction activity (NPDES Permit No. CAS083313). The project owner shall develop and implement a construction stormwater pollution prevention plan (construction SWPPP) for the construction of the OGS site, laydown area, and all linear facilities.

Verification: The project owner shall submit to the CPM a copy of the construction SWPPP prior to site mobilization and retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the CV RWQCB regarding the NPDES permit for the discharge of stormwater associated with construction activity within 10 days of its receipt or submittal. Copies of correspondence shall include the notice of intent sent to the State Water Resources Control Board, and the board's confirmation letter indicating receipt and acceptance of the notice of intent.

SOIL&WATER-3: If groundwater is encountered during construction or operation of the OGS, 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: Freshwater supplied by the potable connection with Diablo Water District (DWD) shall be used as the primary water supply for project operation for construction, process, sanitary, and landscape irrigation purposes until recycled water is determined economically feasible. Freshwater use during construction shall be limited to 100 acre-feet per year. Freshwater use during operations shall not exceed the annual water-use limit of 250 acre-feet per year.

After the Energy Commission's determination that recycled water is economically feasible and no longer than two (2) years after the Energy Commission has approved a project amendment requiring connection to a recycled water supply pursuant to **SOIL&WATER-8**, the primary water supply for project operations including all process and landscape irrigation shall be exclusively recycled water provided by Ironhouse Sanitary District (ISD) or Delta Diablo Sanitation District (DDSD). Use of recycled water shall be limited to 280 acre-feet per year (or as determined in review of the project amendment). After the project switches to the primary recycled water supply, the backup water supply for project operation for process and landscape

irrigation shall be freshwater provided by the potable connection with DWD. The use of freshwater from DWD shall be limited to 25 acre-feet per year. The Project owner shall notify the CPM of any disruptions in the primary recycled water supply exceeding 24 hours. For any planned disruptions in the primary recycled water supply that will exceed 7 days, the Project owner shall obtain CPM approval on a water supply disruption plan that outlines the reasons and duration for the planned disruption, and the volume of secondary water that will be utilized during the planned disruption. Sanitary water shall be supplied by the potable connection with DWD. Use of groundwater other than that provided by DWD as a part of their supply is prohibited for operational uses.

Prior to using potable and/or recycled water for construction or operational uses, the project owner shall install and maintain metering devices as part of the water supply and distribution systems to monitor and record, in gallons per day, the total volume(s) of water supplied to OGS from DWD. Those metering devices shall be operational for the life of the project.

The project owner shall monitor and record the total water used on a monthly basis including recycled water from ISD and potable water from DWD. For calculating the annual water use, the term "year" will correspond to the date established for the annual compliance report (ACR) submittal. For the first year of operation, the project owner shall prepare an annual Water Use Summary, which will include the monthly range and monthly average of daily potable and recycled water usage in gallons per day, and total water used by the project on a monthly and annual basis in acre-feet. For subsequent years, the annual Water Use Summary shall also include the yearly range and yearly average water use by the project. The annual Water Use Summary shall be submitted to the CPM as part of the ACR.

Verification: At least sixty (60) days prior to commercial operation of OGS, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the water supply and distribution systems. When the metering devices are serviced, tested and calibrated, the project owner shall provide a report summarizing these activities in the next annual compliance report. The project owner, in the annual compliance report, shall provide a Water Use Summary that states the source and quantity of potable and recycled water used on a monthly basis and on an annual basis in units of acre-feet. Prior annual water use including yearly range and yearly average shall be reported in subsequent annual compliance reports (ACR).

Should the project owner choose to participate in a water conservation program in-lieu of connection to a recycled water supply as outlined in **Soil&Water-4** and in conjunction with **Soil&Water-8** then the project owner may do so as prescribed in **Soil&Water-9**.

SOIL&WATER-5: The project owner shall comply with the requirements of the general NPDES permit for discharges of stormwater associated with industrial activity. The project owner shall develop and implement an industrial stormwater pollution prevention plan for the operation of OGS project.

Verification: The project owner shall submit to the CPM a copy of the industrial SWPPP for operation of the OGS project prior to commercial operation, and shall retain

a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the CV RWQCB regarding the general NPDES permit for discharge of stormwater associated with industrial activity within 10 days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the project owner to the State Water Resources Control Board.

SOIL&WATER-6: Upon project approval, the project owner shall develop and implement a Wetland E Monitoring and Adaptive Management Plan (Plan) (see **BIO-19**). The Plan shall include:

1. Monitoring of water levels within Mitigation Wetland E on a daily basis for at least one rainy season prior to construction, during construction, and during operations. Water level monitoring shall demonstrate no adverse impacts to ponding extent or duration as compared to pre-project conditions. Adverse impacts to ponding extent, shall be determined by a decrease in daily water levels following similar rainfall events of 1-inch or greater or a decrease in average monthly water levels during the dry season. Adverse impacts to ponding duration shall be defined by an increase in the number of days recorded without ponding of greater than 30 days for years with similar annual rainfall.
2. Water quality shall be sampled and analyzed quarterly. Samples shall be collected from the wetland pond and at the discharge point to Wetland E during the rainy season. Discharge samples shall be collected following rainfall events (0.5 inch or greater). Sample analyses shall include tests for pH, Dissolved Oxygen, Total Suspended Solids, Specific Conductance, Oil & Grease, and metals (Arsenic, Chromium, Iron, Selenium, Lead, Mercury, etc.). Sample analysis results shall be compared to Regional Water Quality Control Board (RWQCB) Benchmark Values and US Environmental Protection Agency (US EPA) Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life. If analysis results exceed RWQCB Benchmark values or US EPA Water Quality Criteria, contingency plans should be implemented to improve or augment the stormwater quality treatment Best Management Practices on site. The plan should describe the sampling and analysis methods proposed.
3. Contingency plans to address adverse impacts to the duration or extent of ponding or water quality in Wetland E.
4. Identify the responsible parties and funding source(s) for the implementation of the Monitoring and Adaptive Management Plan for the life of the project.
5. Annual monitoring reports shall be submitted to the CPM for review and approval for the life of the project. If adverse impacts to the duration or extent of ponding or water quality are documented, the annual monitoring report shall outline measures to be implemented to address the adverse impacts. The annual monitoring report shall provide an update on the implementation of any contingency measures identified in previous annual monitoring reports.

Verification: At least 60 days prior to the start of any construction related ground disturbance, the project owner shall submit a copy of the Draft Wetland E Monitoring and Adaptive Management Plan to the Compliance Project Manager (CPM), California Department of Fish and Game (DFG), and the Central Valley RWQCB (CV RWQCB) for review and comment. The CPM in consultation with DFG and the CV RWQCB, will determine the plan's acceptability. At least 15 days prior to the start of any construction related ground disturbance, the project owner shall provide the CPM with the final version of the Wetland E Monitoring and Adaptive Management Plan that has been reviewed and approved by the CPM, in consultation with DFG and the CV RWQCB.

The Wetland E Monitoring and Adaptive Management Plan shall be implemented prior to construction, including a minimum of one rainy season of pre-construction data collection. During construction, the project owner shall provide all monitoring data in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control measures and the results of monitoring and maintenance activities. The project owner shall submit copies to the CPM of all correspondence between the project owner and DFG and/or the CV RWQCB regarding the Wetland E Monitoring and Adaptive Management.

The project owner shall submit annual reports to the CPM, DFG, and the CV RWQCB detailing the results of water level monitoring and water quality sampling and analysis. The annual reports shall also document all maintenance activities implemented and compliance with all goals, objectives and performance standards in the Wetland E Monitoring and Adaptive Management Plan. The annual monitoring reports shall fully describe the status of the hydrology and water quality at Wetland E and any adaptive management measures implemented. Annual monitoring reports shall be submitted for review and approval annually within 30 days of the anniversary date of the commencement of habitat improvements for the life of the project.

SOIL&WATER-7: The project owner shall limit wastewater discharge to a maximum of 200-gpm and comply with the Ironhouse Sanitary District's Wastewater Discharge Requirements stipulated under Central Valley Regional Water Quality Control Board Order Number R5-2008-0057 NPDES Number CA0085260. The project owner shall develop and implement a Wastewater Discharge Sampling and Analysis Plan to demonstrate compliance with the Wastewater Discharge Requirements. The plan shall identify sampling location(s), frequency, and methods, and identify appropriate water quality analyses to be performed by a state-certified analytical laboratory.

Verification: No later than 90 days prior to operation, the project owner shall submit to the Ironhouse Sanitary District a copy of the Wastewater Discharge Sampling and Analysis Plan for review and comment. No later than 60 days prior to operation, the project owner shall submit the Wastewater Discharge Sampling and Analysis Plan with the Ironhouse Sanitary District's comments to the CPM for review and approval. The CPM shall consider Ironhouse Sanitary District's comments before approval of the final Wastewater Discharge Sampling and Analysis Plan. The project owner shall provide information on the results of sample analysis results for wastewater discharge in the annual compliance report. The project owner shall submit copies to the CPM of all

correspondence between the project owner and Ironhouse Sanitation District DFG and/or the CV RWQCB regarding wastewater discharge.

SOIL&WATER-8: The project owner shall submit a recurrent recycled water supply economic feasibility assessment to the CPM for review and approval following project license.

The economic feasibility assessment shall compare the costs of the use of recycled water provided by Ironhouse Sanitary District (ISD) and Delta Diablo Sanitation District (DDSD) vs. freshwater supplied by Delta Water District (DWD) on a per acre-foot basis. The recycled water economic feasibility assessment shall include capital and operational costs related to the conversion to a recycled water supply including:

- Recycled water supply pipeline (and pump station(s)) required to deliver recycled water to the project site from ISD, DDSD, or the nearest recycled water supply line.
- Additional onsite treatment to treat recycled water to levels similar to the fresh, potable supply from DWD.
- Wastewater disposal including additional onsite treatment needed to meet ISD or DDSD wastewater discharge standards and/or a separate wastewater disposal pipeline (and pump station).
- Costs for tertiary treated, Title 22, recycled water delivered to the OGS supply pipeline connection point.
- Annual maintenance costs including disposal of wastewater treatment brine.

Capital costs shall be amortized over a 30 year period using current interest rates. The economic feasibility assessment shall be updated on a biennial basis to reflect actual costs for freshwater (over the previous year), local improvements in the recycled water infrastructure, changes in capital and operational costs, and current interest rates.

Within one year of the Energy Commission finding recycled water economically feasible, the project owner shall submit for Energy Commission consideration a recycled water supply project amendment. The project amendment shall provide a project description and environmental analysis for the implementation of the recycled water supply from Ironhouse Sanitary District (ISD). The project amendment should include documentation of the planned recycled water pipeline, treatment of recycled water and wastewater, wastewater discharge plans, backup water supply plans. The project amendment shall also include a Dual Plumbing Plan and Engineer's Report as required by the California Department of Public Health and Regional Water Quality Control Board.

The amendment should detail how wastewater discharge will meet ISD's wastewater discharge standards. If the project amendment includes implementation of a salinity reduction program, the amendment shall provide

details of the program. The program shall be developed by ISD to reduce salt loading within the District sufficient to offset salt loading from OGS above ISD's wastewater discharge limits on a 1:1 per pound of salt basis. The program shall include the methods to compute excess salt loading, methods of salinity reduction, verification of salinity reduction achieved, and rates for salinity reduction.

Verification: No later than 18 months following project approval, the initial recycled water economic feasibility assessment shall be submitted to the Energy Commission for review and approval. Following Energy Commission determination on the feasibility analysis, should the Energy Commission determine that connection to a recycled water supply is not feasible, then the recycled water economic feasibility assessment shall be updated and submitted biennially from the previous Energy Commission determination of infeasibility until feasibility is determined. The project owner shall provide additional information as requested by the CPM. If the project owner opts to implement a water conservation program for the life of the project, the project owner shall provide a written commitment to the CPM and shall be obligated to a water conservation program as prescribed in **Soil&Water-9**.

Within 1 (one) year of the Energy Commission finding that recycled water is economically feasible, the project owner shall submit a recycled water project amendment to the Energy Commission for review and approval. Within two (2) years of project amendment approval, the project shall operate with a primary recycled water supply as required in **SOIL&WATER-4**.

SOIL&WATER-9: If the project owner chooses to implement a water conservation program in-lieu of the recurrent recycled water feasibility studies and potential conversion to recycled water for project operation, the project owner shall work with DWD (or Contra Costa Water District, CCWD) to fund and implement a local water conservation program to offset fresh water used during construction and operations. The project owner shall contribute to DWD's (or CCWD's) water conservation program to fund implementation of new water conservation measures intended to conserve a volume of water equivalent to the volume of fresh water consumed annually by OGS on a per acre-foot basis. Recycled water used during construction and operation are not to be included in the calculation of volume of fresh water consumed annually by OGS on a per acre-foot basis. An initial payment shall be made to DWD (or CCWD) to offset construction water use and to fund the creation of the water conservation program. The water conservation program shall include the methods for conservation, verification of the volume of water conserved, and the water conservation costs (per acre-foot) to be charged to OGS. The water conservation program shall be provided to the CPM for review and approval.

Verification: At least sixty (60) days prior to commercial operation of OGS, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the water supply and distribution systems. When the metering devices are serviced, tested and calibrated, the project owner shall provide a report summarizing these activities in the next annual compliance report. The project owner, in the annual compliance report, shall provide a Water Use Summary that states

the source and quantity of potable and recycled water used on a monthly basis and on an annual basis in units of acre-feet. Prior annual water use including yearly range and yearly average shall be reported in subsequent annual compliance reports (ACR).

At least 30 days prior to construction, the project owner shall submit the water conservation program to the CPM for review and approval. The water conservation program shall include:

- a. Identification of the methods intended to achieve water conservation, including how the total volume of water conserved in a given year will be measured or estimated.
- b. Verification that the water conservation methods that have been funded by OGS have been implemented and that the intended water conservation has been achieved.
- c. Water Conservation Funding on a per-acre foot basis shall be calculated based on the estimated costs to implement, maintain, and monitor the water conservation efforts. For longer return period projects, water conservation fees may be aggregated to support financing or matched by other sources.
- d. Reporting to the project owner and CEC on an annual basis to demonstrate that the water conservation program has resulted in a conservation of water equal to or greater than the total water use at OGS from the previous year. For longer return period projects involving a one-time capital investment, water conservation shall be allocated based on the portion of funding provided by OGS.

The project owner shall provide proof that the initial contribution to the water conservation program was paid to a CPM-approved water conservation program prior to site operations. Annual conservation funding shall be determined based upon the approved rate on per acre-foot of freshwater reported annually in the ACR. Annual conservation funding to the water conservation program, shall be made no later than 60 days following CPM approval of the ACR and confirmed by the CPM. The project owner shall provide data and a report to the CPM describing the water conservation program with estimates of the annual “calculated” water saved in acre-feet in the subsequent ACR. Conservation funding history, annual OGS water use, and annual conservation shall be documented in the ACR.

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CIMIS 2010 – California Irrigation Management Information System. Average Monthly ETo. <http://www.cimis.water.ca.gov/cimis/monthlyEToReport.do>.

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TRAFFIC AND TRANSPORTATION

Testimony of Scott Debauche

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff has analyzed the traffic-related information provided in the Application for Certification and other sources to determine the potential for the proposed project, the Oakley Generating Station (OGS) to have adverse traffic- and transportation-related impacts. Staff has also assessed the availability of mitigation measures that could reduce or eliminate the significance of these impacts. Staff concludes that the OGS would not result in unmitigable significant adverse direct or indirect traffic or transportation impacts.

The OGS is a natural gas-fired combined-cycle electrical generating facility rated at a nominal capacity of 624 megawatts (MW), located within Contra Costa County in the city of Oakley. The OGS also includes offsite electrical transmission and sanitary sewer linear facilities. Construction of the OGS will add traffic to local roadways during the construction period. Unmitigated, this short-term increase in traffic would result in significant impacts to the existing traffic load and capacity of the street system. Construction activities could also result in encroachment and damage to public roadways and introduce oversize and overweight vehicles on the local street system. Once the project is operational, minimal daily traffic would be generated and no impact would occur to the local transportation network. If the Energy Commission elects to grant certification for this project, staff is proposing five conditions of certification. These conditions of certification are recommended to prevent significant adverse traffic and transportation-related impacts from project construction and to ensure that the project would comply with all applicable laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation. Energy Commission staff concludes that with implementation of proposed Conditions of Certification **TRANS-1** through **TRANS-5**, the OGS would not generate a significant impact under the California Environmental Quality Act (CEQA) guidelines with respect to Appendix G issues, "Transportation and Traffic."

INTRODUCTION

In the **Traffic and Transportation** section, staff addresses the extent to which the proposed project may affect the traffic and transportation system within the vicinity of the project site. This analysis focuses on whether construction and operation of the OGS would cause traffic and transportation impact(s) under CEQA and whether the project complies with the applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation relevant to the proposed project.

Traffic and Transportation Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Aeronautics and Space Title 14 Code of Federal Regulations (CFR), part 77 Objects Affecting Navigable Airspace (14 CFR 77)	Establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; and provides for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace.
State	
California Vehicle Code (CVC), 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.
California Street and Highway Code §§117, 660-711	Requires permits from California Department of Transportation (Caltrans) for any roadway encroachment during oversize truck transportation and delivery. Such encroachment permits are also needed for roads that would include construction from new sewer line connections or be crossed by overhead transmission line stringing, as well as for parallel roads where transmission line construction activities would require the use of any public right-of-way (e.g., temporary lane closures).
California Street and Highway Code §§660-711	Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.
Local	
Contra Costa County 2009 Countywide Comprehensive Transportation Plan	<p>The city of Oakley is located within the East County planning area of the Contra Costa County 2009 Countywide Comprehensive Transportation Plan (CTP). As designated in the Contra Costa County 2009 Countywide CTP, multimodal transportation service objectives for the East County planning area indicate the following performance standards:</p> <ul style="list-style-type: none"> • <u>SR 4 and the SR 4 Bypass</u>: Delay Index should not exceed 2.5 during the AM or PM Peak Period for these facilities; HOV lane utilization should exceed 600 vehicles per lane in the peak direction at peak hour. • <u>Signalized Suburban Arterial Routes</u>: Level of Service D (by Contra Costa County Transportation Authority Level of Service methodology). • <u>All other Signalized Suburban Arterials</u>: Peak hour volume to capacity ratio no worse than 0.85. • <u>Rural Unsignalized Roadways</u>: Level of Service D (by roadway segment). • <u>Traffic Management Plan (TMP) Sites</u>: Roadway segments subject to a TMP may be analyzed using a measure other than Level of Service or V/C during TMP operations.
Contra Costa County Oversize Vehicle Permit	Contra Costa County requires a permit before operating any extra-legal loaded vehicles within the County.
City of Oakley General Plan Circulation Element	<ul style="list-style-type: none"> • <u>Policy 3.1.1</u>: Strive to maintain Level of Service D as the minimum acceptable service standard for intersections during peak periods (except those facilities identified as Routes of Regional Significance). • <u>Policy 3.1.2</u>: For those facilities identified as Routes of Regional Significance,

	maintain the minimum acceptable service standards specified in the East County Action Plan Final 2000 Update, or future Action Plan updates as adopted.
City of Oakley Long Range Roadway Plan	This Long Range Roadway Plan supports the determination of major roadway improvements that have been incorporated into the General Plan, and summarizes the analysis conducted to ensure that the roads adequately serve Oakley's growth. The Long Range Roadway Plan has adopted Level of Service D, or a volume-to-capacity (V/C) ratio of 0.90, as the threshold of acceptability for signalized intersections. Routes of Regional Significance are subject to special performance standards. The level of service established for a route of regional significance in Oakley is a peak hour Level of Service D at signalized intersections, and a peak hour Level of Service E for any individual movement at unsignalized intersections.
City of Oakley Transportation Permit	The city of Oakley's transportation permit requires approval from the Public Works Department before operating any oversized loads on city roads.

SETTING

The Oakley Generating Station will be located in Contra Costa County near the junction of State Route (SR) 4 and SR 160 in Oakley, CA. The project site is located in the southwestern corner of the existing DuPont property bordered by the San Joaquin River to the north and east, vineyards and the Burlington Northern Santa Fe (BNSF) railroad corridor to the south, and industrial facilities and the SR 160 corridor to the west. The OGS will also require off-site utility service facilities, including electrical transmission line and sanitary sewer connections traveling along adjacent public roadways and existing utility right-of-way (ROW).

CRITICAL ROADS AND FREEWAYS

The transportation network within the project area consists primarily of city arterials, local roadways, and state-maintained freeways. The following describes the main regional and local roadways that would be used for construction and operational related traffic accessing the proposed project site.

Existing Regional and Local Transportation Facilities

State Route 4 / Main Street

SR 4 is an east-west highway that connects Contra Costa County to the San Francisco Bay Area to the west and San Joaquin County to the east. Near the project site, it is called Main Street and joins SR 160 approximately half a mile south of the project site. According to 2007 traffic counts (most recent available) published by Caltrans, the average daily traffic (ADT) on SR 4 in the vicinity of the project site is 39,000 vehicles per day with 5.4% being truck traffic (OG 2009a, p. 5.12-1). It should be noted, however, that a construction effort for Pacific Gas and Electric Company's Gateway Generating Station may have resulted in artificially high traffic count numbers recorded during portions of this time frame (OG 2009a, p. 5.12-1).

State Route 160

SR 160 is a north-south highway that connects Contra Costa County with Sacramento

County via the Antioch Bridge. 2007 ADT on SR 160 near the project site was 12,800 vehicles per day, with truck traffic accounting for approximately 6.5% of all traffic (OG 2009a, p. 5.12-1).

Bridgehead Road

Bridgehead Road is a north-south roadway that provides direct access to the project site. In the vicinity of the project site, it is an undivided two-lane road (OG 2009a, p. 5.12-2). As Caltrans ADT data is unavailable for this roadway segment, the Marsh Landing Generating Station AFC included traffic counts that indicated the average daily traffic in 2007 was approximately 9,800 vehicles per day near Wilbur Avenue (OG 2009a, p. 5.12-2).

Wilbur Avenue

Wilbur Avenue is an east-west roadway that provides access to the project site via Bridgehead Road and is under the city of Antioch's jurisdiction (OG 2009a, p. 5.12-1). Wilbur Avenue is currently a four-lane road near SR 160 ramps (OG 2009a, p. 5.12-2). As Caltrans ADT data is unavailable for this roadway segment, studies conducted for the Marsh Landing Generating Station Application for Certification (AFC) included traffic counts that indicated the average daily traffic in 2007 was approximately 8,800 vehicles per day near the SR 160 ramps (OG 2009a, p. 5.12-2).

Current Roadway Conditions

Level of Service

To quantify the existing baseline traffic conditions, roadways and intersections anticipated to be used by project related traffic were analyzed in the Application for Certification (AFC) to determine existing operating conditions. These roadway segments and intersections comprise the traffic study area. Based on the traffic volumes, turning movement counts, and the existing number of lanes, the roadway segment volume/capacity (V/C) ratios, intersection delay in seconds, and corresponding levels of service (LOS) have been determined for study area roadway segments and intersections.

LOS is a qualitative measure describing operational conditions within a traffic stream. It is used to describe and quantify the congestion level on a particular roadway or intersection and generally describes these conditions in terms of such factors as speed or vehicle movement. **Traffic and Transportation Table 2** summarizes roadway LOS for associated V/C ratios.

Traffic and Transportation Table 2
Level of Service Criteria for Roadways and Intersections

Level of Service	Volume/Capacity	Unsignalized Intersection Delay per Vehicle (seconds)	Signalized Intersection Delay per Vehicle (seconds)	Description
A	0.00 – 0.60	≤ 10	≤ 10	Free flow; insignificant delays
B	0.61 – 0.70	> 10 and ≤ 15	> 10 and ≤ 20	Stable operation; minimal delays
C	0.71 – 0.80	> 15 and ≤ 25	> 20 and ≤ 35	Stable operation; acceptable delays
D	0.81 – 0.90	> 25 and ≤ 35	> 35 and ≤ 55	Approaching unstable flow; queues develop rapidly but no excessive delays
E	0.91 – 1.00	> 35 and ≤ 50	> 55 and ≤ 80	Unstable operation; significant delays
F	> 1.00	> 50	> 80	Forced flow; jammed conditions

Source: OG 2009a, pp. 5.12-9 and 5.12-12

Current Roadway Segment Conditions — LOS

Traffic and Transportation Table 3 summarizes both the existing LOS for locally operated roadway segments; and the morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak hour LOS for state operated roadway segments located within the proposed project study area. As shown in **Table 3**, under existing conditions all study area locally operated roadway segments operate at LOS D or better, while state operated roadway segments operate at LOS C or better.

Traffic and Transportation Table 3
Existing¹ Roadway Segment Level of Service Summary

Local Facilities					
Roadway	Segment	ADT		LOS	
Bridgehead Road	Between Shady Haven Trailer Park and Wilbur Ave.	9,500		D or Better	
Wilbur Avenue	Between SR 160 NB and SB ramps	10,600		D or Better	
State Facilities					
Roadway	Segment	AM Peak Hour		PM Peak Hour	
		V/C Ratio	LOS	V/C Ratio	LOS
SR 4 EB	Between Hillcrest Ave. and SR 160 junction	0.58	C	0.63	C
SR 4 WB	Between Hillcrest Ave. and SR 160 junction	0.53	B	0.49	B
SR 160 NB	Between SR 4 East junction and Wilbur Ave.	0.09	A	0.19	A
SR 160 SB	Between SR 4 East junction and Wilbur Ave.	0.16	A	0.14	A
SR 160 NB	Between Wilbur Ave. and Antioch Bridge	0.10	A	0.22	A
SR 160 SB	Between Wilbur Ave. and Antioch Bridge	0.19	A	0.16	A
SR 160 NB	Between Antioch Bridge and SR 12 junction	N/A	B	N/A	C
SR 160 SB	Between Antioch Bridge and SR 12 junction	N/A	C	N/A	B

Source: OG 2009a, p. 5.12-8

Notes: ¹ An annual growth factor of 1% was applied to adjust Caltrans traffic counts from 2007 to estimated 2009 levels.

N/A – Data not available

NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound.

Current Intersection Conditions — LOS

Traffic and Transportation Table 4 summarizes the existing AM and PM peak hour LOS for intersections located within the proposed project study area. As shown in **Traffic and Transportation Table 4**, under existing conditions all study area intersections operate at LOS D or better, with the exception of the Main Street/Bridgehead Road intersection, which operates at an unacceptable LOS E during the PM peak hour.

Traffic and Transportation Table 4
Existing (2009) Intersection Level of Service Summary

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)	LOS	Delay (Seconds)	LOS
Main St. and SR 160 SB Ramps	Signalized	22	C	24	C
Main St. and SR 160 NB Ramps	Signalized	16	B	32	C
Main St. and Bridgehead Rd.	Signalized	27	C	65	E
Wilbur Ave. and SR 160 SB ramps	Unsignalized	13	B	13	B
Wilbur Ave. and SR 160 NB ramps	Unsignalized	15	B	15	B
Wilbur Ave. and Bridgehead Rd.	Unsignalized	30	D	20	C

Source: OG 2009a, p. 5.12-8

Notes: Bold indicates unacceptable LOS.

NB – Northbound; SB – Southbound.

RAILWAYS

The nearest rail line is located approximately 750-feet south of the project site and crosses both Bridgehead Road and SR 160 (OG 2009a, Figure 5.12-2). This rail line is controlled by BNSF and provides commercial rail service to the area, handling 28 daily trains (OG 2009a, p. 5.12-15). Amtrak also operates 8 to 10 passenger trains on the same tracks; with the closest stop in the city of Antioch (OG 2009a, p. 5.12-15). The nearest railroad crossing at Bridgehead Road is a grade-separated crossing (OG 2009a, p. 5.12-15).

BUS TRANSPORTATION

The city of Oakley's 2002 General Plan indicates two primary types of public bus transit service in the city: school bus services and Tri-Delta Transit public bus service. School bus service operates on five routes, while public bus transit operates six routes throughout the city and beyond (OG 2009a, p. 5.12-15). The nearest bus lines to the OGS site are the following two Tri-Delta Transit lines: Rio Vista Delta Breeze Bus Route along SR 160 north of Main Street and the Tri Delta Transit Bus Route along Main Street east of SR 160 (OG 2009a, Figure 5.12-2). These bus lines are located approximately 1,500-feet west and 2,000 feet south of the project site, respectively (OG 2009a, Figure 5.12-2).

BICYCLES AND PEDESTRIANS

No designated bicycle routes exist within the immediate vicinity of the project site and adjacent project area (OG 2009a, Figure 5.12-2). Sidewalks are provided in most of the new Oakley subdivisions, but there are gaps in the pedestrian system, including along Main Street in the proposed project area (OG 2009a, p. 5.12-15).

AIRPORTS

The nearest airport to the proposed project site is Funny Farm Airport, located

approximately 7.0 miles southeast of the site (OG 2009a, p. 5.12-15). Funny Farm Airport is a private airport on 20-acres of land containing one runway (FAA 2010b). Funny Farm Airport handles approximately 50 aircraft per month (OG 2009a, p. 5.12-15). The nearest public airport to the OGS site is Rio Vista Municipal Airport, located approximately 11.5 miles northeast of the site (OG 2009a, p. 5.12-15). Rio Vista Municipal Airport contains two runways and a helipad serving general aviation activities (AirNav 2010a). For the one-year time frame ending November 5, 2008 (most recently published statistic), Rio Vista Municipal Airport handled an average of 96 aircraft per day, of which 50% was transient general aviation and 50% local general aviation (AirNav 2010a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria are based on the following:

1. California Environmental Quality Act (CEQA) Guidelines, including the CEQA Checklist found in Appendix G to the CEQA Guidelines, Section XVI. Transportation/Traffic.
2. Performance standards and thresholds established by state and local agencies

According to the Amendments of the CEQA Guidelines, effective March 18, 2010, a project may have a significant impact on the transportation system if it would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersection);
- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes and transportation, including mass transit and nonmotorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths;
- Conflict with an applicable congestion management program, including, but not limited to, level of service standards (LOS) and travel demand measures or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). CEQA compliance to this guideline is determined by the extent, if any, that the project would substantially increase hazards due to a design feature;
- Result in inadequate emergency access;
- Result in inadequate parking capacity; or

- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

PERFORMANCE OF THE CIRCULATION SYSTEM

Levels of Service – Performance Standards

As stated in **Traffic and Transportation Table 1**, the city of Oakley uses LOS D as its threshold value to define maximum roadway segment capacity. Both SR 160 and SR 4/Main Street are designated as routes of regional significance in the Contra Costa County 2009 Countywide CTP. As shown in **Table 1** the LOS D threshold is used for a number of roadway types in the Countywide CTP and is therefore applied by staff to study area roadway segments designated as routes of regional significance.

Regarding intersection LOS performance standards, as stated in **Traffic and Transportation Table 1**, the city of Oakley considers LOS D as the limit of acceptable delay for intersections. Both SR 160 and SR 4/Main Street are designated as routes of regional significance in the city of Oakley General Plan. However, as shown in **Table 1**, the Contra Costa County 2009 Countywide CTP has no specific thresholds for intersection LOS. However, the city of Oakley Long Range Roadway plan establishes LOS D at signalized intersections and LOS E for any individual movement at unsignalized intersections for a route of regional significance (refer to **Table 1**). To analyze worst-case intersection impacts, the more stringent city of Oakley General Plan LOS D performance standard is utilized for all study area intersections analyzed.

Construction Impacts

Project construction is estimated to take 33 months to complete, with approximately 303 workers as the average construction workforce over this period (OG 2009a, p. 2-32). However, during months 10 through 30 of construction (the peak period), the maximum construction workforce may reach up to 729 workers (OG 2009a, p. 2-32). Therefore, estimated daily construction trips during the peak construction period were used to determine potential impacts, as this would represent the worst-case construction traffic scenario. Based on experience with similar projects, it is estimated that some of the workforce will carpool and the average vehicle occupancy will be 1.5 persons per vehicle (OG 2009a, p. 5.12-17).

In addition to the construction workforce trips, equipment deliveries and construction-related truck traffic will contribute additional trips during project construction. Truck and heavy equipment traffic were estimated using a passenger car equivalent (PCE) factor of 1.5 passenger cars per truck (OG 2009a, p. 5.12-17).

Traffic and Transportation Table 5 lists the estimate of total construction vehicle trip for the OGS, including identifying which of those would be generated during both the AM and PM peak hour periods.

Traffic and Transportation Table 5
Project Construction Trip Generation – Peak Construction Period

	Average Daily Trips ¹	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
Construction Worker Vehicles	972	486	0	0	486
Delivery/Haul Trucks in PCE	120	8	8	8	8
<i>Total Trips</i>	<i>1,092</i>	<i>494</i>	<i>8</i>	<i>8</i>	<i>494</i>

Source: OG 2009a, p.5.12-17.

Notes: ¹ Includes trips occurring outside the AM and PM peak periods.

Roadway Segment Levels of Service

Based on the construction vehicle trip calculations presented in **Traffic and Transportation Table 5**, an analysis was conducted in the AFC to determine the impacts of these construction vehicle trips on current LOS for project area roadway segments. **Traffic and Transportation Table 6** identifies the existing traffic volumes on each study area roadway segment and compares them with LOS anticipated when average peak-hour traffic generated during the construction period is added.

As shown in **Traffic and Transportation Table 6**, LOS of study area roadway segments will not be significantly impacted with the addition of the project peak construction traffic as compared to without project conditions. As shown, construction traffic associated with the project would not temporarily degrade any study area roadway segment to an unacceptable LOS performance standard. Therefore, no adverse impacts from construction traffic to roadway segment LOS would occur.

Intersection Levels of Service

Based on the construction vehicle trip calculations presented in **Traffic and Transportation Table 5**, an analysis was conducted in the AFC to determine the impacts of these construction vehicle trips on current LOS for project area intersections. **Traffic and Transportation Table 7** compares the existing intersection LOS to those anticipated with proposed project construction vehicle traffic added to study area intersections in the vicinity of the project.

As shown, construction traffic associated with the project would temporarily result in significant delays at both the intersections of Main Street/Bridgehead Road (PM peak hour) and Wilbur Avenue/Bridgehead Road (both AM and PM peak hours). LOS at these intersections during the peak hour indicated will degrade to an unacceptable LOS. It should be noted that under existing conditions, the intersection of Main Street/Bridgehead Road operates at an unacceptable LOS E during the PM peak hour.

Traffic and Transportation Table 6
With and Without Project Roadway Segments Levels of Service - Construction

Roadway	Segment	Existing ADT	Existing LOS		Added Vehicles		ADT With Project		LOS With Project		Threshold	Exceed Threshold?
Bridgehead Road	Between Shady Haven Trailer Park and Wilbur Ave.	9,500	D or Better		1,004		10,504		Better than LOS D		D	NO
Wilbur Avenue	Between SR 160 NB and SB ramps	10,600	D or Better		302		10,902		Better than LOS D		D	NO
Roadway	Segment	AM PEAK HOUR					PM PEAK HOUR				AM and PM Peak Hour Threshold	Exceed Threshold?
		Existing LOS	Added Vehicles	Peak Hour V/C With Project	Peak Hour LOS With Project	Existing LOS	Added Vehicles	Peak Hour V/C With Project	Peak Hour LOS With Project			
SR 4 EB	Between Hillcrest Ave. and SR 160 junction	C	173	0.62	C	C	3	0.63	C	D	NO	
SR 4 WB	Between Hillcrest Ave. and SR 160 junction	B	3	0.53	B	B	173	0.53	B	D	NO	
SR 160 NB	Between SR 4 East junction and Wilbur Ave.	A	173	0.13	A	A	3	0.19	A	D	NO	
SR 160 SB	Between SR 4 East junction and Wilbur Ave.	A	3	0.17	A	A	173	0.18	A	D	NO	
SR 160 NB	Between Wilbur Ave. and Antioch Bridge	A	2	0.10	A	A	124	0.25	A	D	NO	
SR 160 SB	Between Wilbur Ave. and Antioch Bridge	A	124	0.22	A	A	2	0.16	A	D	NO	
SR 160 NB	Between Antioch Bridge and SR 12 junction	B	2	N/A	B	C	124	N/A	C	D	NO	
SR 160 SB	Between Antioch Bridge and SR 12 junction	C	124	N/A	C	B	2	N/A	B	D	NO	

Source: OG 2009a, p. 5.12-18

Notes: N/A – data unavailable

Traffic and Transportation Table 7
With and Without Project Intersection Levels of Service - Construction

Intersection	Control	AM Peak Hour				PM Peak Hour				AM and PM Peak Hour Threshold	Exceed Threshold?
		Existing		With Project		Existing		With Project			
		Delay (Seconds)	LOS	Delay (Seconds)	LOS	Delay (Seconds)	LOS	Delay (Seconds)	LOS		
Main St. and SR 160 SB Ramps	Signalized	22	C	22	C	24	C	24	C	D	NO
Main St. and SR 160 NB Ramps	Signalized	16	B	16	B	32	C	33	C	D	NO
Main St. and Bridgehead Rd.	Signalized	27	C	27	C	65	E	88	F	D	YES – PM Peak
Wilbur Ave. and SR 160 SB ramps	Unsignalized	13	B	24 (SB approach)	C	13	B	26 (SB approach)	D	D	NO
Wilbur Ave. and SR 160 NB ramps	Unsignalized	15	B	12 (NB approach)	B	15	B	15 (NB approach)	C ¹	D	NO
Wilbur Ave. and Bridgehead Rd.	Unsignalized	30	D	64	F	20	C	62	F	D	YES - AM and PM Peak

Source: OG 2009a, p. 5.12-23

Notes: ¹ The delay has been rounded up, which explains why for the same delay in seconds, the existing and with project PM Peak Hour LOS at the intersection are different.

Bold indicates unacceptable LOS.

NB – Northbound; SB – Southbound.

To reduce the significance of construction traffic to intersection LOS, staff is proposing Condition of Certification **TRANS-1**, which would require the applicant to prepare a Construction Traffic Control Plan prior to construction. The implementation of Condition of Certification **TRANS-1** would require the applicant to avoid construction related vehicle trips at both the Main Street/Bridgehead Road (PM peak hour) and Wilbur Avenue/Bridgehead Road (both AM and PM peak hours) intersections during peak construction periods to ensure no deterioration of the existing LOS performance standard at these intersections.

Linear Facilities

The OGS will be connected with the regional electrical grid by a 2.4-mile-long transmission line between the project site and the existing Contra Costa Substation (OG 2009a, p. 3-1). This transmission line will be placed within the existing 80-foot-wide Pacific Gas and Electric Company (PG&E) ROW that runs between the project site area and the substation (OG 2009a, p. 3-1). This transmission line will cross several local roadways and SR 160 (OG 2009a, Figure 3.2-1). This transmission line upgrade will upgrade an existing line with a new 230 kV line, crossing SR 160 overhead, and replacing existing steel lattice towers with new monopoles (CH2MHILL 2010v). PG&E has designated a pull-and-tensioning site in a vineyard just west of the highway crossing for transmission line stringing (CEC 2010a).

The new sanitary sewer will extend south along Bridgehead Road from a point adjacent to the project entrance road for 0.33 mile to Main Street (CH2MHILL 2010t). It will then turn eastward and run for 0.11 mile to the interconnection point with an existing Ironhouse Sanitary District (ISD) gravity main (CH2MHILL 2010t). This work will occur sometime during months 1 through 6 of the construction period, taking approximately one month to complete, and will involve a crew of 10 workers (CH2MHILL 2010t).

Construction of the sewer line will require lane closures on Bridgehead Road and Main Street (CH2MHILL 2010t). Furthermore, transmission line stringing activities have the potential to result in temporary lane and roadway closures, as well as potential disruptions to BNSF rail line operations. Traffic impacts from the construction of linear facilities would be short term in nature and are not expected to significantly impact traffic flow. Proposed Condition of Certification **TRANS-1** would ensure that the Construction Traffic Control Plan (prepared in conjunction with the city of Oakley and Caltrans) identify any temporary closure of vehicle travel lanes, disruptions to BNSF rail line use, and redirect traffic flow by cones and flagmen when necessary, as well as ensuring access to residential and/or commercial property.

Additionally, encroachment permits may be needed for roads within which new sewer line connections are constructed or are crossed by overhead transmission line stringing, as well as where transmission line construction activities would parallel existing roads and require the use of any public ROW (e.g., temporary lane closures). Condition of Certification **TRANS-4** requires that encroachment on public ROW during construction comply with Caltrans, Contra Costa County, city of Oakley, and other relevant jurisdictions limitations and requires all permits be obtained for such activities.

The implementation of Conditions of Certification **TRANS-1** and **TRANS-4** will mitigate any significant adverse temporary impact on traffic flows on the local roadway system, BNSF rail line use, and access during construction of the linear facilities to less than significant levels.

Operational Impacts

Once operational, the OGS would result in minimal vehicle trips to and from the site. A quantitative traffic analysis was not conducted in the AFC for the long-term operations phase because it would generate a low volume of trips that will not have a measurable impact on study area roadway segments and intersections (OG 2009a, p. 5.12-16). As shown in **Traffic and Transportation Table 3**, under existing conditions all study area roadway segments operate at LOS D or better. As shown in **Traffic and Transportation Table 4**, all study area intersections under existing conditions operate at LOS D or better, with the exception of the Main Street/Bridgehead Road intersection, which operates at an unacceptable LOS E during the afternoon peak hour. While this intersection currently operates at an unacceptable LOS, as project operations would result in minimal daily traffic on study area roadway segments and intersections, no degradation to existing LOS performance standards of street segment or intersections serving the project site will occur from project operations.

CONGESTION MANAGEMENT PROGRAM

California State Proposition 111, passed by voters in 1990, established a requirement that urbanized areas prepare and regularly update a Congestion Management Program (CMP). The purpose of the CMP is to monitor the performance of the countywide transportation system, develop programs to address near-term and long-term congestion, and better integrate transportation and land use planning. The Contra Costa County 2009 Countywide CTP fulfills this requirement and acts as the CMP for the project area.

As stated in **Traffic and Transportation Table 1**, the Contra Costa County 2009 Countywide CTP thresholds identify LOS D for both signalized suburban arterial routes and rural unsignalized roadways. No specific thresholds are identified in the Countywide CTP for intersection LOS in the East County planning area of the CTP. As shown in **Traffic and Transportation Table 6**, study area roadway segments will not exceed LOS D with the addition of the project peak construction traffic as compared to without project conditions. As discussed above, the OGS would result in minimal operational vehicle trips to and from the site. As project operations would result in minimal daily traffic on study area roadway segments and intersections, no degradation to existing LOS performance standards of street segment serving the project site will occur from project operations. Therefore, less than significant impacts to CMP performance standards for designated roadways would occur from construction or operational-related project traffic.

Airports

To be in compliance with 14 CFR part 77, FAA Form 7460 completion is required if the OGS would introduce (1) any construction or alteration of more than 200-feet in height above the ground level (AGL) at its site, or (2) any construction or alteration of greater

height than imaginary surface extending outward and upward at the following applicable slope (100 to 1 for horizontal distance of 20,000 feet from the nearest point of the nearest runway) (FAA 2010a).

Based on FAA 7460 requirement (1), the tallest permanent structure associated with the OGS would be the Heat Recovery Steam Generator (HRSG) stacks at 155-feet (OG 2009a, p. 5.13-29). Based on FAA 7460 requirement (2), as discussed earlier the nearest aviation facility is Funny Farm Airport located approximately 7.0 miles southeast of the site and not within the 20,000 feet threshold. Therefore, no impacts to aviation activities would occur from project permanent physical structures, and completion of FAA Form 7460 or an applicant secured FAA Determination of No Hazard to Navigable Airspace is not required.

Based on FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting, Chapter 2.0 - Part 20 (Structures to be Marked and Lighted) requirements, any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200-feet AGL or exceeds any obstruction standard contained in 14 CFR part 77 should normally be marked and/or lighted (FAA 2010c). During construction, it is possible that cranes exceeding 200-feet in height could be utilized temporarily. In the event this occurs, staff is proposing Condition of Certification **TRANS-2**, which would require all construction equipment exceeding 200-feet in height adhere to FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting requirements. The inclusion of this condition ensures that during construction less than significant impacts to navigable airspace would occur. As discussed above, as all permanent project components are under 200-feet in height and do not exceed any obstruction standard of FAA Form 7460, no permanent project facilities are subject to FAA lighting or marking requirements.

Using the longitude and latitude of the HRSG stacks (tallest structure proposed), the OGS was run through the California Military Land Use Compatibility Analysis (CMLUCA) database to determine if the site is located within 1,000 feet of a military installation, is located within military based special use airspace, or is located beneath a military designated low-level flight path (CMLUCA 2010). Based on the CMLUCA report, the OGS does not intersect with any military bases, special use airspaces, or low level flight paths (CMLUCA 2010).

Project main gas turbine/HRSG operation and wet cooling tower exhaust would result in thermal air plumes during project operation. Thermal plumes are upward clear air exhaust and have the ability to impact low flying aircraft. Given the distance of the nearest airport facilities to the site, Funny Farm Airport (7.0 miles) and Rio Vista Municipal Airport (11.5 miles), no aircraft utilizing these airports are expected to have low flying direct overflight of the project site. Furthermore, as discussed in the **Visual Resources** section, Appendix VR-2 (Visible Plume Modeling Analysis), visible water vapor plumes from the proposed OGS project gas turbine/HRSG exhausts are predicted to occur less than 20% of seasonal daylight clear hours. Therefore, staff concludes that given the distance of the project from the nearest airports, both thermal and visible plumes associated with the OGS would pose no significant hazard to aircraft.

The nearest agricultural land use to the OGS would be vineyard use to the east and

south of the site (OG 2009a p. 5.6-6). As low flying crop dusting aircraft are not typically associated with vineyard production, staff concludes the OGS would have no impact to low flying agricultural use aircraft. Furthermore, the proposed transmission line will be located within an existing utility easement and placed with the existing 69-kV transmission line on new monopole steel towers (OG 2009a p. 5.6-24). Monopole steel towers have a smaller footprint than the existing 69-kV lattice steel towers, thereby reducing the existing height of the transmission facilities (OG 2009a p. 5.6-24).

Hazards and Public Safety

Construction vehicle impacts to motorist and public safety would be minimized by proposed Condition of Certification **TRANS-1**. **TRANS-1** requires the preparation of a Construction Traffic Control Plan that includes the use of flagging and covering open trenches, minimizing hazards due to construction related vehicles entering and exiting the project site, and would divert construction-related traffic to the maximum extent feasible away from residential areas.

There is also a potential for unexpected damage to roads by vehicles and equipment within study area that could result in a roadway hazard to the public. Furthermore, the construction of the required sanitary sewer line will require subterranean construction within both Bridgehead Road and Main Street (CH2MHILL 2010t). Therefore, staff is proposing Condition of Certification **TRANS-3**, which would require that any road damaged by project construction be repaired to its original condition. This will ensure that any damage to local roadways will not be a safety hazard to motorists.

The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space. Enforcement is provided by state and local law enforcement and through ministerial state agency licensing and permitting and/or local agency permitting. As described above in **Traffic and Transportation Table 1**, CVC Sections 35550-35559 as well as both the Contra Costa County Oversize Vehicle Permit and city of Oakley Transportation Permit establish guidelines and require permits for oversize vehicle loads. To ensure consistency with these applicable ordinances, staff is proposing Condition of Certification **TRANS-4**, which would require that all oversize vehicles used on public roadways during construction comply with Caltrans, Contra Costa County, city of Oakley, and other relevant jurisdictions limitations on vehicle sizes and weights, as well as oversize vehicle routes and any other applicable limitations or other relevant jurisdictional policies.

At-grade railroad crossings can be another potential hazard to the public. As discussed earlier an active BNSF rail line is located approximately 750-feet south of the project site and crosses both Bridgehead Road and SR 160 (OG 2009a, Figure 5.12-2). However, this rail line contains a grade-separated crossing of Bridgehead Road. Therefore, construction- and operational-related vehicles accessing the project site from Bridgehead Road would have no impact to BNSF rail line operations. To ensure that rail safety is not jeopardized by transmission line stringing activities, Conditions of

Certification **TRANS-1** requires the Construction Traffic Control Plan to identify any temporary disruptions to BNSF rail line operations during transmission line stringing activities.

As discussed in the **Visual Resources**, Appendix VR-2 (Visible Plume Modeling Analysis), Visible water vapor plumes from the proposed OGS Power Plant gas turbine/HRSG exhausts are predicted to occur less than 20% of seasonal daylight clear hours. No further visual impact analysis of the predicted gas turbine/HRSG exhaust plume dimensions was warranted. Based on these findings, no ground fogging plumes would occur with the OGS that could reach adjacent roadways. Therefore, the project would have no impact on ground traffic safety with regards to visible plumes.

The implementation of Conditions of Certification **TRANS-1**, **TRANS-3**, and **TRANS-4** would ensure that the OGS results in less than significant traffic- and transportation-related hazard and safety impacts and ensure project compliance to LORS pertaining to such.

Another anticipated increase in traffic during project construction and operation would be truck trips, including delivery of hazardous materials and removal of wastes. For a discussion of the potential impacts related to the transport of hazardous materials please see the **Hazardous Materials Management** section.

Emergency Access

In the event of an emergency at the project site during construction, emergency vehicles would use the proposed driveway on Bridgehead Road to access the project site (OG 2009a, p. 5.12-25). To maintain access for emergency vehicles and allow for adequate access into and surrounding the facility during project construction, proposed Condition of Certification **TRANS-1** requires the preparation of a Construction Traffic Control Plan which includes the assurance of access and movement of emergency vehicles in and around the project site. This condition would result in less than significant impacts to emergency vehicle access during construction. For a discussion of emergency services access within the proposed facility during operation, refer to the **Worker Safety and Fire Protection** section.

Parking

During construction, workers and construction vehicles will park at the project laydown area within the project site boundaries (OG 2009a, p. 5.12-25). Based on this, no on-street parking is anticipated or required during construction (OG 2009a, p. 5.12-25). Once operational, on-site parking will be provided for all employee and maintenance vehicles (OG 2009a, p. 5.12-25). Therefore, both construction and operation of the OGS will have no impact on public parking resources serving the area.

Alternative Transportation

As discussed above, no local bus stops, pedestrian facilities, or bicycle routes are within the project site footprint. To ensure pedestrian and bicycle safety along local roadways utilized during project construction, proposed Condition of Certification **TRANS-1** requires the preparation of a Construction Traffic Control Plan which includes the

ensurance of pedestrian and bicycle safety along construction vehicle travel routes and identification of safety procedures for exiting and entering the site access gate.

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 (Title 14, California Code Regulation, section 15130).

Continued development of the city of Oakley has contributed to congestion on study area roadways that would be used by project related traffic. One project identified that could impact traffic conditions from a cumulative perspective in the vicinity of the OGS site is the River Oaks Crossing, which is proposed on property south of the project site and BNSF railroad tracks (OG 2009a, p. 5.12-25). However, at the time of preparation of this Final Staff Assessment, coordination with the City of Oakley has indicated that no construction date has been set for this project so the potential for overlapping construction schedules is unknown (CEC 2011a). Based on this, consideration of cumulative impacts of this project with the proposed OGS is not provided.

Additionally, the Marsh Landing Generating Station (MLGS) was approved by the Energy Commission on August 25, 2010 (California Energy Commission a). The MLGS will construct a new power plant in Antioch, northwest of the OGS project site, with construction starting sometime in the first quarter of 2011. Based on this start date and estimated construction duration of 27 months, it is likely that construction traffic of this project will combine with OGS related construction traffic. A review of the MLGS Final Staff Assessment (California Energy Commission b) and Presiding Member's Proposed Decision (California Energy Commission c) indicates that construction and operational traffic associated with the project was analyzed and anticipated to be concentrated along the roadway segments of SR 4 at Willow Pass Road intersection, SR 160 at Wilbur Avenue, Wilbur Avenue between Vera Avenue and Fleming Avenue, and Wilbur Avenue between Fleming Avenue and SR-160 Southbound ramp. As such, traffic associated with this project would be concentrated west of SR 160 and is not expected to add cumulatively to OGS related traffic volumes on Main Street and Bridgehead Road (as presented in **Traffic and Transportation Tables 6 and 7**), which would occur east of SR 160. Intersections of concern would be cumulative use of SR 160 northbound and southbound on/off ramps at Wilbur Avenue by both projects during construction. Peak construction traffic associated with the MLGS would generate 457 daily trips with primary access to the site being the SR 160/Wilbur Avenue ramps.

However, as approved, the MLGS requires all construction workers to arrive during off-peak traffic periods; before 7 AM and after 9 AM. By doing so, workers would then correspondingly leave the site at the end of their shifts before or after the PM peak period. The incorporation of this condition as part of the approved MLGS ensures that minimal daily construction related traffic would combine with OGS construction traffic at SR 160 northbound and southbound on/off ramps during the AM and PM peak periods.

Therefore, cumulative impacts would not occur and no change to SR 160 northbound and southbound on/off ramps LOS (as presented in **Traffic and Transportation Table 7**) would occur.

Cumulative impacts resulting from operational traffic would be unlikely, due to the relatively low numbers of vehicle trips that the CCGS would generate (OG 2009a, p. 5.12-26). Therefore, the proposed project's cumulative contribution to operational traffic impacts is considered less than significant. Furthermore, part of the Traffic Impact Fee Program (**refer to Traffic and Transportation Table 9**) is the Regional Transportation Development Impact Mitigation Fee (adopted by Resolution No. 73-05, or any future alternative regional fee adopted by the city) to finance roadway improvements to reduce the impacts cause by future development in the City. Condition of Certification **TRANS-5** would ensure that the project owner complies with the requirements of the city of Oakley Traffic Impact Fee and Regional Transportation Development Impact Mitigation Fee. Furthermore, in an April 7, 2010 Cooperation and Community Benefits Agreement between the applicant and the city of Oakley, the project applicant has agreed to contribute to the City over \$3 million for improvement projects (COO 2010c). These projects include a number of citywide roadway improvements.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 8 provides a general description of applicable statutes, regulations, and standards adopted by the federal government, the State of California, and local agencies pertaining to traffic and transportation with which the project is required to comply. Conditions of certification have been proposed to ensure project consistency with a law, ordinance, regulation, or standard where it was not already mandated by federal or state regulations.

Traffic and Transportation Table 8
Project Compliance with Adopted Traffic and Transportation Laws, Ordinances
Regulations, and Standards

Applicable Law	LORS Description and Project Compliance Assessment
Federal	
Title 14, CFR, section 77 (14 CFR 77)	<p>Includes standards for determining physical obstructions to navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alterations. Also provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace (including temporary flight restrictions).</p> <p>The proposed project would not include any permanent structures taller than 200 feet and would not be within 20,000 feet of any airport. Therefore, no impacts to aviation activities would occur from project physical structures, and completion of FAA Form 7460 or an applicant secured FAA Determination of No Hazard to Navigable Airspace is not required. In the event any construction equipment would exceed 200-feet in height, Condition of Certification TRANS-2 would ensure that FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting requirements pertaining to such are adhered to.</p>
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	<p>Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.</p> <p>Staff is proposing Condition of Certification TRANS-4, which would require that all oversize vehicles used on public roadways during construction comply with Caltrans limitations on vehicle sizes and weights.</p>
California Streets and Highway Code, division 1 & 2, chapter 3 & chapter 5.5	<p>Includes regulations for the care and protection of state and county highways and provisions for the issuance of written permits.</p> <p>Staff is proposing Condition of Certification TRANS-3, which would require that any road damaged by project construction be repaired to its original condition.</p>
California Street and Highway Code §§117, 660-711	<p>Requires permits from California Department of Transportation (Caltrans) for any roadway encroachment during oversize truck transportation and delivery. Such encroachment permits are also needed for roads that would include construction from new sewer line connections or be crossed by overhead transmission line stringing, as well as for parallel roads where transmission line construction activities would require the use of any public right-of-way (e.g., temporary lane closures).</p> <p>Staff is proposing Condition of Certification TRANS-4, which would require that any encroachment on public right of way during construction obtain all necessary Caltrans permits required for these actions.</p>
California Street and Highway Code §§660-711	<p>Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.</p> <p>Staff is proposing Condition of Certification TRANS-4, which would require that all oversize vehicles used on public roadways during construction comply with Caltrans limitations on vehicle sizes and weights.</p>
Local	
Contra Costa County 2009 Countywide Comprehensive Transportation Plan	<p>The Contra Costa County 2009 Countywide CTP, multimodal transportation service objectives indicate the following performance standards:</p> <ul style="list-style-type: none"> • <u>SR 4 and the SR 4 Bypass</u>: Delay Index should not exceed 2.5 during the AM or PM Peak Period for these facilities; HOV lane utilization should exceed 600 vehicles per lane in the peak direction at peak hour. • <u>Signalized Suburban Arterial Routes</u>: LOS D (by Contra Costa County Transportation Authority LOS methodology). • <u>All other Signalized Suburban Arterials</u>: Peak hour volume to capacity ratio

	<p>no worse than 0.85.</p> <ul style="list-style-type: none"> • <u>Rural Unsignalized Roadways</u>: LOS D (by roadway segment). • <u>Traffic Management Plan (TMP) Sites</u>: Roadway segments subject to a TMP may be analyzed using a measure other than LOS or V/C during TMP operations.
	<p>As shown in Traffic and Transportation Table 6, all study area roadway segments would operate at LOS D or greater during construction. Project operations would have no impacts to exiting LOS performance standards of study area roadway segments and intersections. Therefore, the proposed project would be consistent with this Plan.</p>
Contra Costa County Oversize Vehicle Permit	<p>Contra Costa County requires a permit before operating any extra-legal loaded vehicles within the County.</p>
	<p>Staff is proposing Condition of Certification TRANS-4, which would require that all oversize vehicles used on public roadways during construction comply with Contra Costa County limitations on vehicle sizes and weights.</p>
City of Oakley General Plan Circulation Element	<ul style="list-style-type: none"> • <u>Policy 3.1.1</u>: Strive to maintain Level of Service D as the minimum acceptable service standard for intersections during peak periods (except those facilities identified as Routes of Regional Significance). • <u>Policy 3.1.2</u>: For those facilities identified as Routes of Regional Significance, maintain the minimum acceptable service standards specified in the East County Action Plan Final 2000 Update, or future Action Plan updates as adopted.
	<p>As shown in Traffic and Transportation Table 6, all study area roadway segments identified as Routes of Regional Significance would operate at LOS D or greater during construction. However, as shown in Traffic and Transportation Table 7, construction traffic associated with the project would temporarily result in significant delays at both the intersections of Main Street/Bridgehead Road (PM peak hour) and Wilbur Avenue/Bridgehead Road (both AM and PM peak hours). LOS at these intersections during the peak hour indicated will degrade to an unacceptable LOS. Condition of Certification TRANS-1 would reduce temporary construction traffic impacts to these intersections. However, during construction the proposed project would be temporarily inconsistent with city of Oakley General Plan policy 3.1.1.</p> <p>Project operations would have no impacts to existing LOS performance standards of study area roadway segments and intersections. It should be noted that under existing conditions, the intersection of Main Street/Bridgehead Road operates at an unacceptable LOS E during the PM peak hour.</p>
City of Oakley Long Range Roadway Plan	<p>The Long Range Roadway Plan has adopted LOS D, or a volume-to-capacity (V/C) ratio of 0.90, as the threshold of acceptability for signalized intersections. Routes of Regional Significance are subject to special performance standards. The level of service established for a route of regional significance in Oakley is a peak hour LOS D at signalized intersections, and a peak hour LOS E for any individual movement at unsignalized intersections.</p>
	<p>As shown in Traffic and Transportation Table 7, construction traffic associated with the project would temporarily result in significant delays at both the intersections of Main Street/Bridgehead Road (PM peak hour) and Wilbur Avenue/Bridgehead Road (both AM and PM peak hours). LOS at these intersections during the peak hour indicated will degrade to an unacceptable LOS. Condition of Certification TRANS-1 would reduce temporary construction traffic impacts to these intersections. However, during construction the proposed project would be temporarily inconsistent with the city of Oakley Long Range Roadway Plan performance standards.</p> <p>Project operations would have no impacts to exiting LOS performance standards of study area roadway segments and intersections. It should be noted that under existing conditions, the intersection of Main Street/Bridgehead Road operates at</p>

	an unacceptable LOS E during the PM peak hour.
City of Oakley Transportation Permit	The city of Oakley's transportation permit requires approval from the Public Works Department before operating any oversized loads on city roads.
	Staff is proposing Condition of Certification TRANS-4 , which would require that all oversize vehicles used on public roadways during construction comply with City of Oakley limitations on vehicle sizes and weights.

In a letter dated April 5, 2010, the city of Oakley provided staff with comments on the proposed project and submitted a number of city recommended conditions of approval for the proposed OGS (COO 2010a). **Traffic and Transportation Table 9** summarizes traffic and transportation related city recommended conditions of approval found applicable by staff to the significance criteria identified above for determining traffic and transportation impacts of the OGS and provides a project compliance assessment.

Traffic and Transportation Table 9
Project Compliance with City of Oakley Recommended Conditions of Approval

Recommended Condition of Approval	Project Compliance Assessment
22. Repair all roadways affected by installation of underground linear facilities to at least their preconstruction condition and coordinate these efforts with city of Oakley, Contra Costa County, and Caltrans.	Condition of Certification TRANS-3 requires that any road damaged by project construction be repaired to its original condition and coordinated with the appropriate jurisdiction.
23. Schedule all actions and necessary to complete roadway repairs with city of Oakley.	Condition of Certification TRANS-3 requires that any road damaged by project construction be repaired to its original condition and coordinated with the appropriate jurisdiction.
24. The project owner shall provide appropriate evidence of compliance with Federal Aviation Administration (FAA) regulations to the Oakley Community Development Department regarding the marking and/or lighting of the project's exhaust stacks.	As all permanent project components are under 200-feet in height and do not exceed any obstruction standard of FAA Form 7460, no proposed project components are subject to FAA lighting or marking requirements. During construction, it is possible that cranes exceeding 200-feet in height could be utilized. In the event this occurs, staff is proposing Condition of Certification TRANS-2 , which would require all construction equipment exceeding 200-feet in height adhere to FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting requirements.
46. Obtain an encroachment permit from Caltrans for construction of any improvements within the State right of way.	Condition of Certification TRANS-4 requires that encroachment on public ROW during construction comply with Caltrans, Contra Costa County, city of Oakley, and other relevant jurisdictions limitations and requires all permits be obtained for such activities.
55. Submit a haul route plan to the City Engineer for review and approval prior to importing or exporting any material from the site, and pay all appropriate review and processing costs. The plan shall include the location of the borrow or fill area, the proposed haul routes, the estimated number and frequency of trips, and the proposed schedule of hauling. Based on this plan the City Engineer shall determine whether pavement condition surveys must be conducted along the proposed haul routes to determine what impacts the trucking activities may have. The project proponents shall be responsible to repair to their pre-construction condition any roads along the utilized routes.	Condition of Certification TRANS-1 requires that a Construction Traffic Control Plan be prepared in coordination with city of Oakley and include construction vehicle haul routes, location of the borrow/fill area, estimated number and frequency of construction vehicle trips, and proposed schedule of hauling. Furthermore, Condition of Certification TRANS-3 requires that any road damaged by project construction be repaired to its original condition and coordinated with the appropriate jurisdiction.
69a. Comply with the requirements of the Traffic Impact Fee (authorized by Ordinance No. 14-00, adopted by Resolution 49-03).	Condition of Certification TRANS-5 requires that the project owner pay the Traffic Impact Fee in coordination with city of Oakley.
69b. Comply with the requirements of the Regional Transportation Development Impact Mitigation Fee or any future alternative regional fee adopted by the City (authorized by Ordinance No. 14-00, adopted by Resolution No. 73-05).	Condition of Certification TRANS-5 requires that the project owner pay the Regional Transportation Development Impact Mitigation Fee or any future alternative regional fee in coordination with city of Oakley.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any traffic-related benefits associated with the OGS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Public and agency comments were provided in writing and verbally on the contents of the Preliminary Staff Assessment (PSA) during the public comment period and PSA workshop. However, no public or agency comments were received in relation to issues presented in the **Transportation and Traffic** section of the PSA.

CONCLUSIONS

Based on the list of significance thresholds identified above, staff has analyzed potential construction and operational impacts by the OGS related to the regional and local traffic and transportation system and conclude the following:

- Condition of Certification **TRANS-1** should be implemented to ensure that all construction-related traffic and construction-related activities would result in less than significant adverse impact along the routes or roadway intersections that would be used to access the OGS site regarding a substantial increase in congestion, deterioration of the existing LOS performance standard, or creation of a traffic hazard during any time in the daily traffic cycle.
- The OGS would not include any permanent structures taller than 200-feet. Therefore, no impacts to aviation activities would occur from project physical structures and no FAA required lighting is required, and completion of FAA Form 7460 or an applicant secured FAA Determination of No Hazard to Navigable Airspace is not required. Condition of Certification **TRANS-2** should be implemented to ensure that any temporary construction equipment over 200-feet in height have all lighting and marking required by the FAA to not create a hazard to air navigation.
- Condition of Certification **TRANS-3** should be implemented to ensure that any road damaged by project construction be repaired to its original condition.
- Condition of Certification **TRANS-4** should be implemented to ensure that all oversize vehicles used on public roadways and roadway encroachment during construction comply with Caltrans, Contra Costa County, city of Oakley, and other relevant jurisdictions limitations on vehicle sizes, weights, encroachment, and travel routes and obtain any permits required for these actions.
- No construction worker or vehicle parking will occur in or on public parking resources during construction of the OGS. Once operational, no offsite operational-related parking would occur and public parking areas would not be affected.
- Condition of Certification **TRANS-1** should be implemented to ensure pedestrian and bicycle safety along travel routes of construction vehicles to the project site, identification of safety procedures for exiting and entering the site access gate, and identifying any disruptions to street segments, intersections, or BNSF rail line operations during transmission line stringing activities or any other utility tie ins.

- Condition of Certification **TRANS-5** should be implemented to ensure that the project owner complies with the requirements of the city of Oakley Traffic Impact Fee (authorized by Ordinance No. 14-00, adopted by Resolution 49-03) and the Regional Transportation Development Impact Mitigation Fee or any future alternative regional fee adopted by the City (authorized by Ordinance No. 14-00, adopted by Resolution No. 73-05).

Should the Energy Commission certify the project, staff recommends that the Energy Commission adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall consult with the city of Oakley and prepare and submit to the Compliance Project Manager (CPM) for approval a Construction Traffic Control Plan and implementation program. The Construction Traffic Control Plan must be prepared in accordance with Caltrans Manual on Uniform Traffic Control Devices and the WATCH Manual and must include but not be limited to the following issues:

- Construction-related vehicles other than local Oakley or Brentwood residents shall avoid the intersections of Main Street/Bridgehead Road (4:00 PM – 6:00 PM) during peak periods of construction. The intersection of Wilbur Avenue/Bridgehead Road shall be either avoided or a flagman provided during peak periods of construction between 7:00 AM – 9:00 AM and 4:00 PM – 6:00 PM to reduce further degradation of the LOS performance standard
- Temporary closure of travel lanes or disruptions to street segments, intersections, or BNSF rail line operations during transmission line stringing activities or any other utility tie ins
- Timing of heavy equipment and building materials deliveries
- Specification of construction-related haul routes, avoiding residential neighborhoods to the maximum extent feasible, and including the location of borrow or fill areas, the estimated number and frequency of trips, and the proposed schedule of hauling
- Redirecting construction traffic with a flag person or temporary restriping if required
- Signing, lighting, and traffic control device placement if required
- Ensurance of access for emergency vehicles into the project site and through any construction-related temporary travel lane closures or disruptions
- Ensurance of pedestrian and bicycle safety from construction vehicle travel routes and any construction-related temporary travel lane closures or disruptions
- Procedures for exiting and entering the site
- Access to residential and/or commercial property located near transmission line routes or any other utility tie-ins and any construction-related temporary travel lane closures or disruptions

Verification: At least 30 days prior to site mobilization, the project owner or contractor shall provide the Construction Traffic Control Plan to the CPM for review and approval.

TRANS-2 The project owner shall ensure that all temporary construction equipment over 200-feet in height shall have lighting and marking consistent with FAA Advisory circular 70/7460-1 K, Obstruction Marking and Lighting, 34 (Markers) for temporary construction equipment so not to create a hazard to air navigation

Verification: In the event construction equipment over 200-feet in height is to be utilized, the project owner shall submit FAA Form 7460-2, Notice of Actual Construction or Alteration, to the FAA at least 10 days prior to start of construction (7460-2, Part I) and within 5 days after the construction reaches its greatest height (7460-2, Part II), showing consistency with FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting requirements for temporary construction equipment. A copy of these forms shall be provided to the CPM.

TRANS-3 Following completion of project construction, the project owner shall repair any damage to roadways affected by construction activity along with the primary roadways identified in the traffic control plan for construction traffic to the road's pre-project construction condition. Prior to the start of construction, the project owner shall photograph, videotape, or digitally record images of the roadways that will be affected by all utility line construction and heavy construction traffic. The project owner shall provide the CPM, city of Oakley, Contra Costa County, and/or Caltrans with a copy of the images for the roadway segments under its jurisdiction. Also prior to start of construction, the project owner shall notify the city, Contra Costa County, and/or Caltrans about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction-related activities associated with other projects.

Verification: Within 30 days after completion of the project, the project owner shall meet with the CPM and city of Oakley to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to original or as near-original condition as possible. Following completion of any regional road improvements, the project owner shall provide to the CPM a letter from Contra Costa County, Caltrans, or other relevant jurisdiction if work occurred within its jurisdictional public ROW stating its satisfaction with the road improvements.

TRANS-4 The project owner shall comply with Caltrans, Contra Costa County, city of Oakley, and other relevant jurisdictions limitations on vehicle sizes, weights, roadway encroachment, and travel routes and obtain any permits required for these actions.

Verification: In the Monthly Compliance Reports, the project owner shall indicate that all required permits were obtained and list the jurisdictions they were acquired from, or indicate if no permits were necessary, during that reporting period. In addition, the project owner shall retain copies of all acquired permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-5 The project owner shall coordinate with the city of Oakley and pay the applicable Traffic Impact Fee (authorized by Ordinance No. 14-00, adopted

by Resolution 49-03) and the Regional Transportation Development Impact Mitigation Fee or any future alternative regional fee adopted by the City (authorized by Ordinance No. 14-00, adopted by Resolution No. 73-05).

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the Compliance Project Manager (CPM) proof of payment of the Traffic Impact Fee (authorized by Ordinance No. 14-00, adopted by Resolution 49-03) and the Regional Transportation Development Impact Mitigation Fee or any future alternative regional fee adopted by the City (authorized by Ordinance No. 14-00, adopted by Resolution No. 73-05).

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TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelum, Ph.D.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the transmission line proposed for the Oakley Generating Station would not pose an aviation hazard according to the current FAA criteria. In addition, compliance with the requirements outlined in the proposed conditions of certification would minimize the potential for nuisance and hazardous shocks and maintain the generated fields to levels not associated with radio-frequency interference or audible noise. The proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the California Public Utilities Commission considers appropriate in light of the available health effects information. The proposed line would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to transmission line safety and nuisance if staff's recommended conditions of certification are adopted and implemented.

INTRODUCTION

The purpose of this analysis is to assess the proposed Oakley Generating Station's (OGS's) transmission line design and operational plan to determine whether the related field and non-field impacts would constitute a significant environmental hazard in the area around the route. All related health and safety laws, ordinances, regulations, and standards are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues taking into account both the physical presence of the lines and the physical interactions of their electric and magnetic fields:

- aviation safety,
- interference with radio-frequency communication,
- audible noise,
- fire hazards,
- hazardous shocks,
- nuisance shocks, and
- electric and magnetic field (EMF) exposure.

The following federal, state, and local laws and policies apply to the control of the field and nonfield 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	
City of Oakley General Plan.	Establishes plans for ensuring compatibility between noise levels and land uses.
City of Oakley Municipal Code.	Includes quantitative limits on allowable noise for various land uses.
City of Antioch General Plan	Establishes plans for ensuring compatibility between noise levels and land uses.
City of Antioch Municipal Code	Includes noise regulations associated with construction and operation of various land uses, among other noise-related regulations.
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.

Applicable LORS	Description
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
CPUC GO-131-D, "Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California"	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250–1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **Project Description** section, the proposed OGS site is in the city of Oakley, eastern Contra Costa County, at 6000 Bridgehead Road, northeast of the junction of State Route 4 (SR4) and SR 160 (**See Project Description Figures 1 and 2**). The site is at the western city limits of Oakley and adjacent to the eastern city limits of Antioch. It is located on a 21.95-acre site.

The project site is in a mostly industrial area bounded to the west by the PG&E Antioch Terminal, by a large natural gas transmission hub to the north, by DuPont property that is either industrial or vacant industrial to the east, by DuPont's titanium dioxide landfill area, and by the Burlington Northern Santa Fe railroad to the south. The majority of the project site is used as a vineyard as a portion of the DuPont property was never developed for industrial purposes.

As described by the applicant, OGS's connection to the area's electric power grid would be via a 2.4-mile-long single-circuit 230-Kilovolt (kV) line stretching from the project's on-site switchyard to the 230-kV Contra Costa Substation to the southwest. The line

would be located within the existing 80-foot-wide Pacific Gas and Electric's (PG&E's) 60-kV corridor that runs between the project site and the substation. This route is mostly zoned for industrial uses or for agriculture but also traverses near areas in the city of Antioch designated for office and residential development. The transmission lines would be separated from the nearest residences (at the Sandy Park Trailer Park) by the existing 80-foot right-of-way in which it would be located (OG 2009a pp. 3-1, 3-2, 5.6-1 through 5.6-6, 5.7-3 and 5.7-4). Since the proposed line and related switchyard would be located in the PG&E service area and connected to the PG&E power grid, their respective designs would be according to PG&E's guidelines on safety and field management.

PROJECT DESCRIPTION

The proposed project's transmission line would be a 2.4-mile-line 230-kV line replacing the existing PG&E 60-kV line running south from the project site (on the east side of Highway 160) and then due west (running north of Oakley Road). The existing 60-kV to be replaced is carried on steel lattice towers. The replacement 230-kV project line would be a single-circuit line carried on new monopole structures within the existing 80-foot right-of-way. The applicant has provided the details of the proposed line supports as related to EMF management, safety, efficiency and maintainability (CH2MHILL 2010d, OG 2009a, Figures 3.2-3A, 3.2-3B, and 3.2-3C and Appendix 3B)). The line would exit the OGS site on 20-foot-high take-off structures and then be routed on the support structures which would be up to 95 feet in height (OG 2009a pp. 3-1 and 3-2). The use of the existing 80-foot right-of-way that distances the line from area residences means that there would not be any significant residential exposures to fields from the line. Such residential exposures have been of some health concern in recent years.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry practices. These LORS and practices have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The related requirements in **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (OG 2009a, p. 3-16), these regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted

airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet (3.98 miles) from the runway, with no obstructing structures for whom the ratio of distance from runway to height is greater than 100:1. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area extending 5,000 feet.

The applicant has provided a listing of all area airports along with their respective distances from the project and related facilities. As noted by the applicant, the nearest airport to the OGS site is the Funny Farm Airport which is approximately seven miles to the southeast (OG 2009a, p. 3-16 and 5.12-15) and therefore too far away for the project's structures to potentially fall within the restricted space and thus necessitate FAA notification. Furthermore, the proposed line supports would, at a maximum height of 95 feet, be much less in height than FAA's 200-foot limit in an area with other large transmission lines; however, the applicant will file the related FAA notification as is normal industry practice (OG 2009a, p.3-16). There are no heliport located within 5,000 feet of the project lines and related facilities leading staff to conclude that the proposed lines would not pose an aviation hazard to both area helicopters and fixed-wing aircraft.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as "corona discharge," but is referred to as "spark gap electric discharge" when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts and related complaints is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed line would be built and maintained according to PG&E practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not the 230-kV line proposed. The proposed low-corona designs are used for all PG&E lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Staff recommends a specific condition of certification (**TLSN-5**) to ensure mitigation in the event of complaints from any nearby residents.

Audible Noise

The noise-reducing designs for low-intensity electric fields intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction, or maintenance

practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as proposed for OGS. 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 (OG 2009a, p.3-15). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-3** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (OG 2009a, p. 3-16) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project lines, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the rights-of-way.

The potential for nuisance shocks around the proposed lines would be minimized through standard industry grounding practices (OG 2009a, pp. 3-15 and 3-16). Staff recommends Condition of Certification **TLSN-4** to ensure such grounding for OGS.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows and exposure to them together is generally referred to as EMF exposure. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the California Public Utilities Commission (CPUC), to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation and required by staff for all permitted lines. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since most new lines in California are currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project lines according to existing PG&E field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC revisited the EMF management issue in 2006 to assess the need for policy changes to reflect the available information on possible health impacts. The findings did not point to a need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project lines, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential

significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the lines. These types of exposures are short term and well understood as not significantly related to the health concern.

Industry's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines is lower level, but long term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar PG&E lines, specific field strength-reducing measures would be incorporated into the proposed 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 strengths of the line's fields along the route would depend on the effectiveness of the field-reducing measures incorporated into their designs. These fields should be of the same intensity as PG&E lines of the same voltage and current-carrying capacity. The applicant conducted a study of the levels of the proposed line's electric and magnetic fields along the proposed route. As presented in Appendix 3B, the applicant calculated maximum field strengths for locations or line configurations potentially related to maximum human exposures. These field strengths were for locations with the line by itself and also locations of maximum interaction of fields from the line and area lines that would cross over the project line. Maximum electric field strength at the edge of the 80-foot right-of-way was calculated as 3.03 kV/m while the maximum magnetic field is 122.89 mG. These field strengths are as staff would expect for PG&E lines of the same voltage and current-carrying capacity. It is this similarity in magnitude that constitutes

compliance with presence PUC requirements for safe field management. The measurement requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to assess the validity of the applicant's assumed field strength minimization efficiency by comparing the calculated field strengths with field intensities measured when the line is operating.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. Since the proposed project transmission lines would be designed and erected according to applicable field-reducing PG&E guidelines as currently required by the CPUC for effective field management, any contribution to cumulative area exposures should be at levels expected for PG&E lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed 230-kV line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is PG&E. Since the two proposed line would be designed according to the requirements of the LORS listed in **Table 1**, and operated and maintained according to current PG&E guidelines on line safety and field strength management, staff considers the proposed design and operational plan to be in compliance with the health and safety requirements of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-2**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The City of Antioch Community Development Department Planning Division submitted a letter dated February 10, 2011 (COA 2011a) with the following comments:

Comment:

- 1) Table 1 of the Transmission Line Safety section does not list any LORS associated with the City of Antioch even though a portion of the transmission lines will be in the city limits.

Staff Response:

- 1) Staff has added two new LORS to Table 1 to acknowledge the city of Antioch General Plan and Municipal Code.

Comment:

- 2) The PSA indicates the majority of the land use designations to be industrial and agricultural. However, the transmission line corridor, as it runs through the City of Antioch, has General Plan designations of Medium Low Density Residential and Business Park. The potential impacts should take these two land uses into consideration as they were incorrectly identified in the PSA.

Staff Response:

- 2) Staff has become aware that the city of Antioch has adopted new zoning and General Plan designations in the vicinity of the transmission lines and discussion in this section has been amended to acknowledge permitted land uses in the vicinity of the transmission lines located within the city of Antioch. Staff had previously concluded that no significant impact to residents would result from the proposed transmission line changes and continues to conclude the same as staff had previously contemplated nearby residential development, which is the receptor to base our analysis on.

Comment:

- 3) The applicant shall submit a site plan showing the location of all proposed monopoles. The applicant shall provide the city of Antioch with a final site plan showing the final construction/lay down area for the transmission lines. The site plan shall show truck access to the designated area. The contractor shall obtain an encroachment permit to work within the public right-of-way.

Staff Response:

- 3) These comments appear more related to transportation issues with respect to understanding where transmission line work will be done and how that impacts roadways and the need for permits. **TRANS -1** and **TRANS-4** of the **Traffic and Transportation** section of this FSA address these issues.

CONCLUSIONS

Since staff does not expect the proposed 230-kV OGS transmission line to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current PG&E guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of PUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards, while the use of low-corona line designs, together with appropriate corona-minimizing

construction practices would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed OGS and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed lines given the 80-foot right-of-way between the line and the nearest residences. On-site worker or public exposure would be short term and at levels expected for PG&E lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be located within an existing 80-foot right-of-way, staff considers the proposed design, maintenance, construction and routing plan as complying with the applicable laws. With the conditions of certification proposed below, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed 230-kV transmission line according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and PG&E's EMF-reduction guidelines.

Verification: At least 30 days before starting construction of the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the line will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the line at the points of maximum intensity along its route. The measurements shall be made after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed not later than six months after the start of operations.

Verification: The project owner shall file copies of the post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission line is kept free of combustible material, as required under the

provisions of section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report.

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

Verification: At least 30 days before the line is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

TLSN-5 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 project-related line and associated switchyards. The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to line operation together with the corrective action taken in response to each complaint. This record shall be submitted in an Annual Report to the Compliance Project Manager on transmission line safety and nuisance-related requirements.

Verification: All reports of line-related complaints shall be summarized for the project-related lines and included during the first five years of plant operation in the Annual Compliance Report.

REFERENCES

(EPRI). Electric Power Research Institute. 1982. Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August 1998.

CH2MHILL 2010m – CH2MHILL/D. Davy (tn 57445). Applicant's Response to CEC Staff Workshop Queries #3 to 17, dated July 2, 2010. Submitted to CEC/Docket Unit on July 2, 2010.

COA 2011a – City of Antioch/M. Gentry (tn 59733). City of Antioch Comments on PSA, dated February 10, 2011. Submitted to CEC/Docket Unit on February 18, 2011.

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.

VISUAL RESOURCES

Testimony of Melissa Mourkas

SUMMARY OF CONCLUSIONS

Staff found that with mitigation, the construction and operation of the Oakley Generating Station, a natural gas-fired, combined-cycle nominal 624-megawatt plant to be constructed in Oakley, California, would not result in an adverse aesthetic impact according to the California Environmental Quality Act Guidelines. Staff has proposed appropriate Conditions of Certification to assure impacts under the California Environmental Quality Act are less than significant and compliance with applicable laws, ordinances, regulations and standards.

INTRODUCTION

Visual resources consist of the viewable natural and man-made features of the environment. In this section staff evaluates the impacts on visual resources resulting from the construction and operation of the Oakley Generating Station (OGS). Staff bases its evaluation on information contained in the California Environmental Quality Act (CEQA) Guidelines, Aesthetics, to determine if the project would:

1. Introduce a significant impact under CEQA.
2. Comply with applicable federal, state, and local laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics and preservation and protection of sensitive visual resources.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 1 includes information about relevant federal, state, and local LORS pertaining to aesthetics or the preservation and protection of sensitive visual resources.

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

Applicable LORS	Description
Federal	
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (PL 109-59; 2005). Expired 2009.	Pertains to sites located on or in vicinity of federally-managed lands. OGS site is not located on federally managed lands.
National Scenic Byway (ISTEA 1991, Title 23, section 162)	Pertains to sites located in the vicinity of National Scenic Highways. OGS is not located in the vicinity of a recognized National Scenic Byway.
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. The State of California has not formally designated as scenic any of the roads or highways within or adjacent to the project area. In the vicinity of the OGS, Route 160 in Contra Costa County has been listed as eligible as a State Scenic Highway. State Route 160 in Sacramento County, across the river from the project site, is a designated State Scenic Highway. Eligible status provides no protection unless local laws or ordinances are enacted to protect it.
Local	
Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation Element-Scenic Routes 5.9</u> Policy 5-43	Scenic Route Policies: 5-43 Scenic corridors shall be maintained with the intent of protecting attractive natural qualities adjacent to various roads throughout the County. CCC-GP Figure 5.4 identifies Route 160 near the project site as a Scenic Highway/Expressway.
Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation Element-Scenic Routes 5.9</u> Policy 5-45	Scenic views observable from scenic routes shall be conserved, enhanced and protected to the extent possible.
Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation Element-Scenic Routes 5.9</u>	Provide special protection for natural topographic features, aesthetic views, vistas, hills and prominent ridgelines at “gateway” sections of the scenic routes. Such “gateways” are located at unique transition points in topography or land use, and serve as entrances to

Policy 5-51	regions of the County. (Gateway locations are not specified in the General Plan and have not been identified by Planning Staff ¹).
Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation Element-Scenic Routes 5.9</u> Policy 5-52	Aesthetic design flexibility of development projects within a scenic corridor shall be encouraged.
Contra Costa County General Plan, adopted in 2005. <u>Open Space Element-Scenic Resources Policies and Goals 9.6</u> Goal 9-12	To preserve the scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento/San Joaquin River/Delta shoreline.
Contra Costa County General Plan, adopted in 2005. <u>Open Space Element-Scenic Resources Policies and Goals 9.6</u> Policy 9-20	New power lines shall be located parallel to existing lines in order to minimize their visual impact.
Draft Eastern Contra Costa County Trails Master Plan, July 2009	Proposed trails are located both north of the site near the shoreline and on the southern perimeter of the site along the AT&SF Railroad ROW. Approved by the Board of Supervisors and will be incorporated into the General Plan with the next revision.
East Bay Regional Parks District, Existing and Potential Parklands and Trails, Master Plan amended 11/06/2007.	Antioch/Oakley Regional Shoreline is a 7.5-acre park at foot of Antioch Bridge (SR 160) which straddles the Antioch/Oakley City Limits and offers fishing and picnicking facilities. Big Break Regional Shoreline is a linear park stretching more than two miles along the San Joaquin River east of the project site. Potential recreation trails have been identified along Big Break Shoreline in the vicinity of the project site.

¹ John Cunningham, Senior Transportation Planner, Department of Conservation and Development, Contra Costa County

Contra Costa Transportation Authority: Countywide Bicycle and Pedestrian Plan, June 14, 2010. Figure 4.	Plan includes proposed trails along Bridgehead Road and Big Break Shoreline in the project vicinity.
City of Antioch General Plan <u>5.4.2 Community Image and Design</u> Policy 5.4.2c	Maintain view corridors from public spaces to natural ridgelines and landmarks, such as Mt. Diablo and distant hills, local ridgelines, the San Joaquin River and other water bodies. Transmission lines and replacement poles would be located within the City of Antioch.
City of Oakley 2020 General Plan /Contra Costa County Title 8 (Zoning) Chapter 84-62:H-I Heavy Industrial District	The OGS site is designated for a land use of Utility Energy (UE). The project site is currently zoned SP-3. As the DuPont Bridgehead Road Specific Plan has not yet been adopted, the underlying applicable zoning from the General Plan is Heavy Industry (H-I). (City of Oakley letter dated 4-5-2010).
City of Oakley Municipal Code Title 4, Chapter 31 Water Efficient Landscape Ordinance (WELO)	Municipal Code amended by Ordinance 03-10 establishing Water Efficient Landscape Requirements. Landscape areas exceeding 2,500 square feet must meet the regulations.
River Oaks Crossing Specific Plan, August 2008	River Oaks Crossing Specific Plan permits the development of the parcel immediately south of the OGS site as commercial property featuring large-scale retail buildings mixed with smaller retail and parking areas.
Draft DuPont Bridgehead Road Specific Plan	The Draft DuPont Bridgehead Road Specific Plan excludes Utility Energy as a permitted land use and adds new designations to the General Plan for this area. The Draft plan has not been adopted.

SETTING

The proposed OGS would be built within the city limits of Oakley, in Contra Costa County. The proposed project site is located approximately 0.75 mile south of the San Joaquin River, within view from State Route 160 and the John A. Nejedly Bridge, commonly referred to as the Antioch Bridge, the principle gateway into the Bay Area from Sacramento County and the Sacramento/San Joaquin Delta region. The Diablo Range rises to the south, offering a commanding view of Mt. Diablo, which at 3,849 feet in elevation is 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 reclaimed agricultural land bounded by sloughs and earthen levees. The project site is located between these two landscapes, at a confluence of shoreline,

highway, industrial and agricultural landscapes. To the west, in unincorporated Contra Costa County and the City of Antioch, is a heavily industrialized landscape composed of numerous power plants and other industrial sites. To the east, The City of Oakley is a landscape of mixed shoreline, residential, commercial, light industrial and business district uses. It is a setting of marked contrasts.

PROJECT SITE

The OGS project site is 21.95-acres in size and is currently in agricultural use, planted with vineyards. The agricultural use dates back to at least 1965, as seen in aerial photographs over time². A small (1.6-acre) conservation area exists on site, which includes a 0.62-acre mitigation wetland. The majority of the DuPont property north of the project site has been in industrial use as a chemical plant since 1956³. Most of the former chemical plant buildings have been removed, leaving in place the pavement and footprints of buildings. Immediately east of the project site, in what would be the construction lay-down area, is a former agricultural site, which became a landfill for disposal of titanium dioxide from the DuPont site⁴. The project site is bounded on the southern perimeter by the Burlington Northern Santa Fe (BNSF) railroad tracks, established ca. 1908, and sidings built later to service the DuPont site. The southwest corner is adjacent to the PG&E Antioch Gas Terminal and Bridgehead Road forms the western boundary. The northern boundary is defined by an existing line of mature Tasmanian Blue Gum (*Eucalyptus globulus*) trees. A line of large eucalyptus trees extends from the project site into the construction lay-down area. The topography is relatively flat, with minor changes in elevation, and slopes gently from south to north, toward the San Joaquin River. The railroad tracks are elevated approximately 2 feet-4 feet above existing grade.

Visual Resources Table 2 provides the proposed project's approximate dimensions, colors, materials, and finishes for major buildings and structures.

² Environmental Data Resources, Aerial Photo Decade Package, April 16, 2009.

³ 09-AFC-04, Cultural Resources, Table 5.3-2, page 5.3-18.

⁴ 09-AFC-04 Soils, page 5.11-1

VISUAL RESOURCES Table 2
Proposed OGS Project's Dimensions, Colors, Materials and Finishes
Of Major Buildings and Structures

Element	Height	Length	Width	Diameter	Color	Materials	Finish
HRSG stacks	155	---	---	20	Gray	Metal	Flat/Untextured
HRSG Casings	86	150	29	---	Gray	Metal	Flat/Untextured
Gas Combustion Turbine	32	54	24	---	Gray	Metal	Flat/Untextured
Gas Turbine Air Inlet Filters	70	68	52	---	Gray	Metal	Flat/Untextured
Air-Cooled Condenser	124	311	221	---	Gray	Metal	Flat/Untextured
Demineralized Water Storage Tank	25	---	---	30	Gray	Metal	Flat/Untextured
Service/Fire water Storage Tank	34	---	---	51	Gray	Metal	Flat/Untextured
Control Administration Building	17	117	60	---	Gray	Metal	Flat/Untextured
Warehouse-Maintenance Building	19	100	60	---	Gray	Metal	Flat/Untextured
Water Treatment Building	23	80	60	---	Gray	Metal	Flat/Untextured
Transmission Line Pole 1	65	---	---	---	Gray	Metal	Flat/Untextured
Transmission Line Pole 2	105	---	---	---	Gray	Metal	Flat/Untextured

Source: 09-AFC-4, page 5.13-29

Transmission Line(s)

The power generated by the OGS would extend approximately 2.4 miles to PG&E's Contra Costa Substation through an existing transmission corridor. The current 60-kV, single-circuit line would be replaced by a double-circuit 60-kv/230-kV line on new poles north of Main Street and single circuit 230-kV poles from Main Street to the Contra Costa Substation (Supplemental Filing July 2010, Figure WSQ5-5).

Natural Gas Pipeline

Fuel would be delivered in a new 300-foot-long pipeline from a connection to PG&E's Line 303 natural gas transmission line, adjacent to the project site on the west. A secondary connection may be installed by the project owner to deliver fuel to the OGS

via a 410-foot long pipeline from PG&E's Line 400 natural gas transmission line, located just west of the project site.

Water Supply and Discharge

The Diablo Water District would deliver potable water for power plant cooling and process water, fire protection, and potable uses. Process and sanitary wastewater would be conveyed to the Ironhouse Sanitary District sewer system. All water and sewer pipelines would either be located below ground or would not cause any potential visual change.

Construction Staging Area

Both construction laydown and worker parking areas would be located east of the project site on a 2-acre site, described above, within the larger DuPont property boundaries. Staging areas for the construction and replacement of transmission poles would be determined by PG&E upon finalization of construction plans. Preliminary locations for transmission line laydown area and pull and tensioning sites have been identified. These would be: on the west side of Bridgehead Road, opposite the PG&E gas terminal, in a vineyard north of where the line turns west, and immediately east of Contra Costa Substation. The transmission line upgrade and the right of way would be restored within one year from beginning construction.

ASSESSMENTS OF IMPACTS AND DISCUSSION OF MITIGATION

This section includes information about the following:

1. Method and threshold for determining significance
2. Direct/indirect/induced impacts and mitigation
3. Cumulative impacts and 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 2010 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 known as “Key Observation Points” (KOPs). KOPs are selected to be representative of the most characteristic and 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) and are discussed further in this document under Operational Impacts and Mitigation. Briefly, KOPs with high sensitivity (due to environmental Checklist pertaining to “Aesthetics”, 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 applicable 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). See Visual Resources Table 1 for applicable LORS and Table 1 for the project’s consistency with applicable LORS.

Visual Resources Figure 1 shows the locations of the seven KOPs used in this analysis:

KOP 1 – View to the northeast toward the project site from the existing driveway of the Sandy Point Mobile Home Park where it exits to Bridgehead Road.

KOP 2 – View to the northeast toward the project site from the northbound lane of SR 160.

KOP 3 – View to the northwest toward the project site from SR 4/Main Street at Live Oak Avenue.

KOP 4 – View to the southwest toward the project site from Wilbur Avenue, within the DuPont property.

KOP 5 – View to the southwest toward the project site from Central Slough, within the DuPont property.

KOP 6 – View to the south from Almondridge Park toward the existing and proposed transmission corridor.

KOP 7 – View to the east from intersection of Viera Avenue and Oakley Road in Antioch, toward the existing and proposed transmission corridor.

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

Information about direct and indirect impacts and proposed mitigation is included in this section and grouped according to the questions found in the following CEQA Environmental Checklist Form.

VISUAL RESOURCES Table 3
CEQA Environmental Checklist Form—Aesthetics

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
AESTHETICS —Would the project:				
A. Have a substantial adverse effect on a scenic vista?				X
B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, historic buildings within a state scenic highway, or part of a river, stream, or estuary ?				X
C. Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
D. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?		X		

1. SCENIC VISTA

“Would the project have a substantial adverse effect on a scenic vista?”

For the purposes of this analysis, a *scenic vista* is defined as a distant view of high pictorial quality perceived through and along a corridor or opening. No scenic vistas exist in the KOP 1, KOP 2, KOP 3, KOP 4, KOP 6 and KOP 7 viewsheds. KOP 5 includes a high-quality view of Mt. Diablo in the distance but does not qualify as a scenic vista under this definition.

2. 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?”

For the purpose of this analysis, *scenic resources* include a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique/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 corridor.

SR 160 is a California State Scenic Highway from Sacramento in the north to the Sacramento/Contra Costa County line in the south. The portion of the highway from the Contra Costa County line to the intersection of SR 4 in Antioch is listed as eligible for designation as a state scenic highway⁵. The Contra Costa County General Plan Transportation and Circulation Element, Figure 5-4, identifies SR 160 as a Scenic Highway/Expressway. The identification of road corridors as either eligible or designated scenic highways is usually a strong indication of the scenic value of the corridor's viewshed and an indicator of high visual sensitivity in the assessment of potential visual impacts.

Notable scenic resources within the project's viewshed are the San Joaquin River and Mt. Diablo. The OGS project, located to the east of SR 160, would not impact the view of any scenic resources from the highway nor would it damage any scenic resources. These scenic resources are discussed in KOP1, KOP 2 and KOP 5.

3. VISUAL CHARACTER OR QUALITY

“Would the project substantially degrade the existing visual character or quality of the site and its surroundings?”

The visual aspects evaluated according to this criterion are organized into two categories: construction impacts and operational impacts.

1. Construction Impacts and Mitigation

Information about construction impacts are organized according to project site and construction laydown and parking area and linear routes.

Project Site and Construction Laydown Area

Construction of the OGS facility is projected to take 33 months from start of construction to completion. During this time, access to the project site and laydown and parking areas would be from Bridgehead Road at the western boundary of the site. The OGS main entrance would be a new access road from Bridgehead Road, along the north property line of the adjacent PG&E Antioch Gas Terminal. Large equipment, such as the turbines, step-up transformers, generators and HRSG modules, may be delivered by rail to the siding located on the project site's southern boundary.

⁵ CalTrans, http://www.dot.ca.hq/LandArch/scenic_highways/ccosta.htm.

The visual character and quality of the project site and construction laydown area would not be substantially degraded during the construction phase. The construction laydown area would be on a previously disturbed site, and while the proposed project site itself is not currently an industrial site, it would be located immediately adjacent to industrial uses. While the construction activity would be highly visible from KOPs 1 and 2, (motorists exiting Sandy Point, travelling on Bridgehead Road and on SR 160) there would be no adverse impacts from these viewpoints, as these viewers have been previously exposed to industrial activity in the area. Passengers and crew on the Amtrak trains that pass by the site on the BNSF tracks 8 times per day would have a visual exposure duration limited to a few seconds. The project location, immediately adjacent to a former industrial site and near other light industrial uses, would negate the need for mitigating the views of the construction activity, as it would not significantly degrade the existing character or quality of the site and its surroundings.

Linears

Construction of the new steel transmission poles would involve removal of the existing structures, site preparation and installation of the replacement poles. Existing transmission towers to be replaced and any new towers are proposed to be located within the existing transmission corridor. The existing lattice tower located in the wetland easement area would not be replaced. Staging areas for the construction and replacement of transmission poles would be determined by PG&E upon finalization of construction plans. Preliminary locations for transmission line laydown area and pull and tensioning sites have been identified. These would be: on the west side of Bridgehead Road, opposite the PG&E gas terminal, in a vineyard north of where the line turns west, and immediately east of Contra Costa Substation. The applicant has stated that the transmission line upgrade and the right-of-way would be restored within one year from beginning construction⁶. Areas disturbed during installation of the 230-kV transmission line including tower locations and pull and tensioning sites would be recontored and hydro-seeded with native grass mix upon completion of project construction. The revegetation plan and Transmission Line Best Management Practices proposed by the applicant are incorporated by reference into staff's proposed Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan). See also **BIO-7** and **BIO-8** for additional measures for restoration of the corridor. Based upon the above-referenced Conditions of Certification, construction of the poles and transmission lines would not significantly degrade the visual character or quality of the existing transmission corridor.

Light or Glare

During construction, the proposed project 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.

Noisy project construction would be limited by Condition of Certification **NOISE-8** to occur between 7:30 AM and 7:00 PM on weekdays and 9:00 AM and 7:00PM on weekends for up to 33 months. Some construction activities may take place 24 hours a

⁶ CEC 2010e

day, 7 days a week. According to the AFC Project Description, night lighting during construction would be aimed toward the center of the site where the construction activities are occurring and would be shielded. Lighting would not be highly visible off-site.

With the effective implementation of the applicant's proposed light trespass mitigation measure, the project's construction-related lighting impacts in the context of the existing lighting would meet the City of Oakley requirements for night time lighting. Those requirements include: minimizing backscatter, shielding to prevent light trespass and use of motion detectors to light areas only when occupied (City of Oakley letter dated April 5, 2010). With adequate screening and shielding, proposed construction lighting would remain subordinate to the surrounding area. Staff recommends Condition of Certification **VIS-3** to ensure full compliance and verification of night lighting measures during construction and operational phases.

Conclusion

Overall, staff concludes that the project's proposed construction activities as described above would not substantially degrade the existing visual character or quality of the site and its surroundings with the adoption of the Conditions of Certification noted herein.

2. Operational Impacts and Mitigation

Operation impacts are discussed by representative Key Observation Points (KOPs) followed by a summary of impacts from Linears and Water Vapor Plumes. Seven KOPs were submitted with the AFC. 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.

KOP1, View to the northeast from the Sandy Point Mobile Home Park.

KOP 1, Visual Resources Figure 2a is taken from the vantage point of residents leaving the Sandy Point Mobile Home Park (Sandy Point) where the driveway intersects with Bridgehead Road, approximately 0.2 mile from the project site. A similar view is also visible to the guests of the Comfort Suites Hotel to the south of Sandy Point. Residents of Sandy Point exiting onto Bridgehead Road currently see a collection of signs, utility poles and a backflow preventer in the foreground, Bridgehead Road, vineyards and the raised railroad bed in the middle ground and a line of existing trees in the background, forming the horizon line. Some existing industrial structures are partially visible in this view, but are largely obstructed by the raised railroad bed. An existing transmission line crosses horizontally through the view and support cables for utility poles interfere with the left side of the view.

Visual Sensitivity (Figure 2a)

The visual quality of KOP 1 is low primarily due to the interruptions of the view by the clutter of elements in the foreground. The line of mature eucalyptus trees in the background is not uniform across the horizon. Vineyards on the east side of Bridgehead Road are linear in the direction of this view and do not fill the space with vivid greenery,

as they might if planted in the opposite orientation. KOP 1 is a view from a residential area, so the viewer concern is typically expected to be high. The existence of industrial facilities in this area since 1956 has lessened the concern and staff rates it as moderate-high. While visibility from this KOP is high due to its close proximity to the project site (0.25 mile), it is limited to the residents of Sandy Point, guests and employees of the Comfort Suites Hotel and, to some degree, the motorists travelling north on Bridgehead Road. Visibility from the residences in Sandy Point is reduced by the interference of trees and the orientation of structures on site. Because of the interference of trees and orientation of the structures, the view duration, which might normally be quantified as high, due to its permanent exposure to the residents, is being considered from the standpoint of those entering and exiting Sandy Beach instead. Residents of Sandy Point come to a full stop at the end of the driveway and the duration of the view from this KOP would vary. View duration is moderate based upon the short length of time (20-60 seconds) motorists pause while exiting onto Bridgehead Road. It must be noted that, while KOP 1 is intended to demonstrate the impact on the residents of Sandy Point, the number of motorists on Bridgehead Road impacted by the project is categorized as a moderately-high number of viewers (Bridgehead Road between Sandy Point and Wilbur Avenue carries an average daily traffic volume of 9,500 motorists)⁷. The number of viewers from KOP 1 is moderate and limited to the residents of (approximately 35 homes) and visitors to Sandy Point. KOP 1 is characterized as having low visual quality, moderate-high viewer concern and moderate-high viewer exposure. KOP 1 has moderate overall visual sensitivity.

Visual Change (Figure 2b)

KOP 1 demonstrates a high degree of visual change. Visual Resources Figure 2b simulates the view from KOP 1 with the project included. The scale of the new structures are significantly larger than any existing structures and the muscular forms of the steam generators and the rectangular box of the air cooling unit are sharply differentiated from the existing view of treeline and sky. The contrast of the form is high. The strong horizontal lines of the project follow the line of the raised railroad bed and, at the same time, are highly dissimilar to both the softer lines and texture of the existing trees. The muted gray paint color on the buildings is a new introduction to the view and the difference from existing colors is moderate. The addition of the new structures reinforces the industrial nature of the area, mimicking some of the existing fixtures in terms of texture, and lessens the benign visual effects of trees and vineyards. The result is a moderate effect on texture. KOP 1 has overall high visual contrast. The raised railroad bed, which varies from 2-4 feet in height from finished grade along its trajectory, does little to mitigate the verticality and presence of the new structures. The proposed new structures dominate the landscape and effectively block the view of the treeline functioning as the horizon line. Dominance is high and blockage is moderate-high. The overall visual change is high.

KOP 1 Summary:

Staff concludes that the introduction of project structures from this KOP would substantially degrade the existing viewshed from KOP 1. From this KOP, overall visual sensitivity is moderate, overall visual change is high. Those two ratings result in an

⁷ 09-AFC-04, Traffic & Transportation Table 5.12-4, page 5.12-8.

impact of adverse and significant. Condition of Certification **VIS-2**, if implemented, will reduce the impact to less than significant by introducing landscape screening trees at the perimeter of much of the project (see Landscape Plan, Figure 9a and 9b). These measures will reduce the visual impact to less than significant at KOP 1. An agreement between the City of Oakley and the applicant (COO 2010c) has been executed, which calls for, among other things, the owner to provide street trees along the Bridgehead Road east frontage. Compliance with that agreement will provide additional screening from KOP 1.

Future Impacts

The area immediately south of the project site bounded by Bridgehead Road on the west, the BNSF railroad on the north and east and Main Street (SR 4) on the south is designated for future development in the River Oaks Crossing Specific Plan, adopted September, 2008. The River Oaks Crossing Specific Plan calls for 690,000 square feet of retail, including three major retailer stores. Building A, as shown on the specific plan Visual Resources Figure 3.14-1, is projected to be 120,000 square feet and 32 feet - 46 feet in height. The size and placement of this building may partially screen the view of the OGS from KOP 1. Development of this retail center would further alter the character of the existing landscape.

KOP 2, View from Highway 160 Northbound, between Highway 4 and Wilbur Avenue

This KOP represents the view seen by motorists traveling northbound on SR 160 from approximately one-third mile southwest of the site. The roadway is elevated and provides an unobstructed view of the project site and adjacent parcels, making it highly visible from the road. The Sandy Point Mobile Home Park and an industrial storage yard are in the foreground, existing PG&E structures are in the middle ground and the view is stitched together by the nearly continuous row of existing trees in the background, providing some visual cohesion. Power transmission lines cross horizontally across the foreground. The view is an amalgam of industrial clutter in the foreground and a strong horizon line of trees and the open water of the San Joaquin River beyond.

KOP 2 is located on the 0.75 mile segment of highway between the San Joaquin River and SR 4, and is bordered by Antioch and Oakley on the east and Antioch on the west. The land in Oakley is zoned Special Planning Area 3 (SP3-Future Specific Plan). The City has not yet adopted a specific plan for the parcel, therefore the underlying applicable zoning designation is Heavy Industry (H-1). The abutting land in Antioch is zoned Heavy Industrial (M-2) west of the highway and is composed of mostly industrial facilities. The abutting land immediately to the east of the highway within the City of Antioch is zoned Business Park and currently is used for industrial purposes. This stretch of SR 160, from the junction with SR 4 north to the Antioch bridge and into Sacramento County has been determined as eligible for State Scenic Highway designation but the Contra Costa County segment adjacent to the project site has not been adopted by the State.

Visual Sensitivity (Figure 3a)

KOP 2, Visual Resources Figure 3a, represents the existing view. This view, including the aforementioned industrial uses, is seen primarily by motorists on Route 160

traveling in the northbound direction. A similar view is seen from the southbound direction. The visual quality from this KOP is low due to the clutter in the foreground, existing transmission lines slicing across the sky and the lack of clear view to the water. The current and former industrial use of the DuPont property at-large suggests there would be low-moderate viewer concern from this KOP. The designation of this segment of SR 160 as eligible as State Scenic Highway increases the viewer concern to moderate. The raised roadway provides a high degree of visibility of the project site from this KOP. This location is approximately 0.5 mile south of the toll plaza on SR 160, and at peak times, motorists may be slowing as they approach the toll plaza. The duration of the view other than at peak times from KOP 2 is low-moderate as highway traffic may be traveling at freeway speeds, slowing after they pass this point for the Toll Plaza. According to the California Department of Transportation, an average 13,500 vehicles pass by this view each day, a high number of viewers per day⁸. Overall viewer exposure is moderate-high. Given the industrial nature of both sides of the highway at this location, the scenic aspects of this highway have been lost. Overall visual sensitivity is moderate.

Visual Change (Figure 3b)

Visual Resources Figure 3b is a visual simulation of the proposed project's structures as viewed from KOP 2. The project would introduce to the site 16 new structures with a vertical height as follows: two, 155-foot exhaust stacks; two, 86-foot heat recovery steam generators (HRSG); a 32-foot combustion turbine generator (CTG); 124-foot air-cooled condenser; 23-foot water treatment building; 34-foot raw/fire water storage tank; 25-foot storage tank; 56-foot steam turbine; 35-foot steam turbine generator pedestal; 70-foot gas turbine air inlet filters; 19-foot warehouse/maintenance building; and a 17-foot control administration building. Two transmission poles, one at 105-feet and one at 65-feet, would be located on the property west of the air-cooled condenser. Based on the simulation, most of these elements would be seen from this KOP.

In terms of form, line and texture, the air-cooled condenser at 124 feet high and 311 feet in length is top-heavy as it appears to hover over the finely textured steel structures that support it. The change in form, line and texture is high as the air cooling unit's rectangular form and the bulky HRSG units with their vertical stacks are highly differentiated from the consistent horizon line of existing eucalyptus trees. The flat gray color of the new structures is less visually intrusive than the existing white roofs of the mobile homes and adjacent storage buildings, making the color contrast of the new facility low. The contrast resulting from the introduction of the new elements on the site is high. The structures do not block a view of the open water in the background, as that is currently obstructed by the trees on site. The proposed structures replace an existing expanse of green vegetation (vineyards) and partially block the views of the existing trees, giving the view a moderate-high degree of blockage. At this KOP, the OGS dominates the view as the eye is drawn to the horizon but the clutter in the foreground reduces the dominance to moderate. The overall visual change is moderate-high.

⁸ CalTrans, 2008 Traffic Volumes, <http://trafficcounts.dot.ca.gov/2008all/r134161i.htm>

KOP 2 Summary:

Staff concludes that with staff's proposed Conditions of Certification **VIS-1** and **VIS-3**, the introduction of project structures would not substantially degrade the existing viewshed from KOP 2. Considering the moderate visual sensitivity and the moderately high visual change, the introduction of the proposed project's publicly visible structures from the elevated roadway into a previously industrialized view combined with the Conditions of Certification **VIS-1** and **VIS-3** would generate a less than significant visual effect at this KOP.

Future Impacts

The area immediately south of the project site bounded by Bridgehead Road on the west, the BNSF railroad on the north and east and Main Street (SR 4) on the south is designated for future development in the River Oaks Crossing Specific Plan, adopted September, 2008. The River Oaks Crossing Specific Plan calls for 690,000 square feet of retail, including three major retail stores and restaurants. The largest retail buildings are projected to be from 32- 46 feet in height. The placement of these buildings may partially screen the view of the OGS from KOP 2. Development of this retail center would further alter the character of the existing landscape.

KOP 3, View to the northwest SR 4/Main Street at Live Oak Avenue

Visual Resources Figure 4a depicts the view from KOP 3, looking northwest toward the project site from the intersection of Main Street/SR 4 and Live Oak Road, approximately 0.4 mile southeast of the project site. This is the view seen by motorists traveling northbound on Live Oak Avenue as it approaches the signalized intersection with Main Street/SR 4. Similar views are seen by motorists leaving the Live Oak Community Church, located at 5471 Live Oak Avenue, and the Public Storage facility, located at 1625 Main Street. The view is composed of a line of roadside plantings in the foreground, penetrated by utility and light poles. A tall stack is visible in the background. This KOP is located across Main Street from the SP-2 River Oaks Crossing Specific Plan Area and in an area zoned for commercial use.

Visual Sensitivity (Figure 4a)

The visual quality of KOP 3 is low-moderate. The view is not a long view, as it is foreshortened by the roadside plantings. The road surface itself makes up the foreground of the view. The plantings are consistent and provide a continuous band of green, forming a horizon line with a large expanse of sky overhead. The vertical penetrations by the transmission and light poles and the stack in the background coupled with the horizontal beams of the traffic signals add an industrial aspect and clutter to the view. Viewer concern is low-moderate from the motorist's perspective. Viewers are not within a scenic corridor and are traveling in an area of mixed uses such as agriculture, industrial, light industrial and commercial, and limited nearby residential. There is a high degree of variability of views for motorists traveling on Main Street/SR 4 as they pass through the area. The visibility of the view is moderate, seen primarily by motorists stopped at the traffic light on Live Oak Avenue, facing north toward the project site. The roadside plantings partially screen the project site from view. The number of viewers is moderate, possibly low-moderate: motorist trips at peak hours are 121 turning from Live Oak onto Main Street (in both directions) and 1308 traveling west on

Main Street⁹. Average Daily Volumes (ADV) are not available for this intersection. The view duration would be longest for those stopped at the traffic signals on Live Oak Avenue. Duration is moderate (20-60 seconds). Some of the views would be from the church parking lot at the corner of Live Oak Avenue and Main Street/SR 4 and may last a bit longer than 20-60 seconds. The overall degree of viewer exposure is moderate. Overall visual sensitivity for KOP 3 is low-moderate.

Visual Change (Figure 4b)

Visual Resources Figure 4b is a simulation of the project structures as viewed from KOP 3. The facility is centered in the view and is partially obscured by the existing vegetation. The new stacks are visually in line with the perceived height of the existing stack. The project's landscape plan calls for trees planted at the southern perimeter of the project site, and when mature, would reinforce the screening provided by the existing roadside plantings. This would have the effect of partially blending the new structures into the existing landscape. The neutral gray color is a moderate contrast to the existing landscape elements. The architectural lines, rectangular form and steel texture of the proposed facility contrast to a high degree with the soft plantings in the foreground but repeats the form and line of the existing stack, therefore contrast is moderately high. The proposed OGS is located 0.4 mile from KOP 3, the distance having the effect of diminishing its size from the viewer's perspective. This distance makes it co-dominant with the other structures in the view, giving it a moderate dominance rating. There is low view blockage as the existing vegetation already blocks any long-distance view and the facility is beyond the existing screening vegetation. This simulation indicates that the degree of overall visual change at KOP 3 would be moderate.

KOP 3 Summary:

Staff concludes that the introduction of project structures, with staff's proposed Conditions of Certification **VIS-1**, **VIS-2** and **VIS-3**, from this KOP would not substantially degrade the existing viewshed from KOP 3. When considering the low-moderate visual sensitivity and moderate visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

Future Impacts

As with KOP 1 and KOP 2, there are potential visual impacts from the development plans for the River Oaks Crossing commercial and retail center proposed adjacent to the OGS project site. The Draft EIR for the River Oaks Crossing Specific Plan, September 2007, includes Visual Simulation No. 2 Looking North along Live Oak Avenue, a view similar to KOP 3. This visual simulation shows future retail buildings of 32 feet to 46 feet in height, which would partially, if not completely, obscure the view of the OGS from this KOP.

⁹ River Oaks Crossing FEIR, Appendix B, Fehr & Peers, February 2008

KOP 4, View to the southwest from Wilbur Avenue, within the DuPont property.

This KOP, approximately 0.2 mile northwest of the project site, represents the view from potential future development on the DuPont property. The City of Oakley's General Plan specifies light industrial and business park uses north of Wilbur Avenue. The Bridgehead Road Specific Plan, which has not been adopted by the City of Oakley, stipulates this area for Research and Development (R&D) and /or Business Park/Light Industrial Flex, which is a change in designation from the General Plan. At present, access to the site is restricted and there are currently no viewers or users stationed at or near this KOP.

Visual Sensitivity (Figure 5a)

The existing view from KOP 4 is seen in Figure 5a. The visual quality from this KOP is low. The mature eucalyptus trees provide a degree of vividness to the middle ground but these same trees largely block the view of Mt. Diablo in the background. The foreground is littered with remnants of industrial buildings (concrete pads, loading ramps) and their infrastructure, and railroad tracks from a former internal rail system no longer in use. A single remaining shed-style building is visible close to the treeline and much of the ground is paved with a variety of surfaces. There is no cohesion to this view. Viewer concern is low as access to the site is restricted and there are currently no permanent viewers. Visibility of the project site is moderate due to the nearly continuous line of mature eucalyptus trees partially screening the site. As mentioned, access to the site is restricted and therefore the number of viewers is low. View duration is low-moderate (10-60 seconds) as most viewers are likely to be passing through in slow-moving vehicles. Overall viewer exposure is low-moderate. Visual sensitivity for this KOP is low based on existing conditions.

Visual Change (Figure 5b)

The visual change at KOP 4 as presented in the simulation in Figure 5b is considerable. This is due to the high degree of dominance of the new structures, which rise above the existing treeline. The structures and forms of the OGS are of a commanding scale, larger than anything else in this view. The only other structure in the view is the aforementioned one-story shed. The rectilinear line of the air cooling unit and the pipes and cylindrical stacks of the HRSG units run counter to the rounded crowns of the existing trees. The gray color stands out from the dark green leaves of the trees. The texture of the steel is smooth while the texture of the trees is variable. The high degree of change in form, color, texture and line presented in this simulation leads to a high degree of contrast. There is no significant view blockage but the intrusion of the structures into the sky at the horizon line formed by the trees must be considered as moderate view blockage. The overall visual change is moderate-high.

KOP 4 Summary:

Staff concludes that the introduction of project structures from this KOP would not substantially degrade the existing viewshed from KOP 4. When considering the low visual sensitivity and moderate-high visual change, the introduction of the proposed project's publicly visible structures, with staff's proposed Conditions of Certification **VIS-1**, **VIS-2** and **VIS-3**, would generate a less than significant visual effect at this KOP.

KOP 5, View to the southwest from wetlands within the DuPont property.

This KOP was selected to represent the recreationists' viewpoint as well as the view from potential future development of the DuPont site. Several regional and local planning documents propose future recreation trails passing between the shoreline of the San Joaquin River and the northernmost edge of the DuPont property. A similar view is also seen from a greater distance by boaters on the San Joaquin River. At this time, the only viewers at this KOP are maintenance crews on the DuPont site. The OGS project site is approximately 0.4 mile southwest of KOP 5. The foreground consists of wetland grasses and shrubs. In the middle ground is the watercourse known as Central Slough and in the background, a view of Mt. Diablo compromised by existing transmission poles and a cluster of industrial buildings masking the foothills. A solid treeline frames the view of Mt. Diablo, blocking the view of much of the Diablo Range.

Visual Sensitivity (Figure 6a)

This KOP, Visual Resources Figure 6a, has a moderate degree of visual quality. The natural grasses and small shrubs in the foreground coupled with the Central Slough watercourse provide a vivid, seemingly naturalized setting. Mt. Diablo rises formidably in the background and a line of existing trees neatly frames the peak. What diminishes the quality of the view is the intrusion of the existing PG&E Antioch Gas terminal building, related structures and transmission line poles. Viewer concern is low as there currently are no viewers other than the occasional DuPont employee maintaining the property. Visibility is high as the view is largely wide open. The number of viewers is low (less than 10/day) and the duration of the view is moderate 20-60 seconds (this would inherently vary). Therefore, there is moderate overall exposure to the view. The overall visual sensitivity at KOP 5 is low-moderate.

Visual Change (Figure 6b)

The effect of the project is shown in the simulation in Visual Resources Figure 6b. The air-cooled condenser unit and the two steam generators with exhaust stacks rise up above the existing treeline, creating a stark, well-defined silhouette against the sky. The forms are rectangular and heavy, very distinct from the soft landscape elements of grasses, shrubs and trees in the foreground and middle ground. The rectangular forms create a high degree of contrast to the existing view. The muted gray color is darker than the sky and accentuates the industrial nature of the buildings. The color contrast is moderate. The structures appear nearly in line with the peak of Mt. Diablo, creating an asymmetrical balance to the view. The lines created by the buildings have a high degree of contrast with the other elements in the KOP. The texture of the buildings, with its stacks, flat smooth sides and myriad of pipes is highly differentiated from the existing landscape. The overall contrast of this project is high. The air-cooled condenser unit and the two steam generators with their stacks are co-dominant in the landscape with Mt. Diablo. However, they fully dominate the middle ground of the view, therefore their visual dominance is high. The line of existing trees blocks most of the view of the Diablo Range east of Mt. Diablo and therefore the view blockage is moderate. The overall visual change is moderate-high.

KOP 5 Summary:

Staff concludes that with the proposed Conditions of Certification **VIS-1**, **VIS-2** and **VIS-3**, the introduction of project structures from this KOP would not substantially degrade the existing viewshed from KOP 3. When considering the low-moderate overall visual sensitivity and moderate-high visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

KOP 6- View to the south from Almondridge Park, City of Antioch, of transmission corridor

The OGS project includes the replacement of existing single line transmission steel-lattice towers with monopole towers that would carry one line to the PG&E Contra Costa Substation (CCS) in Antioch from Main Street in Oakley. KOP 6, seen in Figure 7a, is located within Almondridge Park in Antioch, along the existing transmission corridor to CCS. The viewpoint is nearly 1 mile southwest of the OGS project site and 0.2 mile north of the actual transmission corridor. As seen in this KOP, the transmission corridor to CCS is oriented horizontally across the view. The transmission towers sited in the center of the view intersect with the transmission corridor. This view was selected to show the replacement transmission line's intersection with the existing north-south transmission line from the nearest public park.

Visual Sensitivity (Figure 7a)

The visual quality of the existing view toward the transmission towers, seen in Figure 7a, is moderate. The landscape of the park, with its trees and curving, open lawn areas, is vivid and cohesive. The otherwise high visual quality is affected by the intrusion of the two existing lines of transmission towers and lines. As this view is from within a public park located within a residential subdivision, it is assumed that viewer concern is naturally high. The pre-existence of the transmission towers moderates the viewer concern somewhat to a value of moderate-high. This is an unobstructed view, as the towers and lines are placed in an open landscape setting, with little visual distraction to mask their existence. There is a high degree of visibility. A public park of this size, approximately 12 acres, within a subdivision where approximately 25 residences have a direct view into the park, would have a moderate-high number of viewers on a daily basis (101-200). Views would be extended rather than fleeting, as park users would tend to spend more than a few minutes while recreating in the park. And while ancillary to the KOP's limited view, the view from the adjacent residences is also extended. Therefore, view duration is high. Taken together, the overall viewer exposure is high. For this KOP, overall visual sensitivity is moderate-high.

Visual Change (Figure 7b)

Figure 7b represents a simulation of the view as it would appear during the project's operational period. Comparison of the existing view with the simulation including the replacement towers indicates that there would be a noticeable but small degree of visual change with the alterations to the transmission corridor. Tubular steel poles would replace steel-lattice towers. From Main Street in Oakley to the Contra Costa Sub Station, the poles in the corridor will be for single lines, not double lines as shown in the simulation in Figure 7. Also, to facilitate the crossing of the new east-west, single-circuit

230-kV line with the existing north-south, 230-kV line, additional tubular steel poles would be required. These poles would parallel the existing 230-kV line for a short distance to the south, allowing the new conductors to safely pass beneath the larger conductors. The replacement poles would appear closer together and taller than the two steel-lattice towers they would replace. The monopole form has a reduced footprint and mass from the existing towers. The lines of the new poles are less cluttered and industrial-looking and have a more residential-friendly form. Color contrast is low as both existing and proposed are finished in gray metal. The texture changes from a highly industrialized structure with a lattice of structural elements to a smooth, single pole with horizontal cross-arms conveying the transmission lines. Overall contrast in the view with the project completed would not change and therefore is considered low. The taller, more numerous poles would not become more dominant in the view than they are in the existing view, and the replacement of lattice towers with tubular steel poles results in slightly less view blockage due to the reduced mass of the poles. The overall visual change in this view within the existing transmission corridor is low.

KOP 6 Summary:

Staff concludes that the introduction of project structures from this KOP would not substantially degrade the existing viewshed from KOP 6. When considering the moderate-high visual sensitivity and low visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

KOP 7- View to the east from intersection of Viera Avenue and Oakley Avenue, Antioch, toward the existing transmission corridor.

KOP-7 View from Viera Avenue at Oakley Road

Figure 8a represents the existing view along the project's transmission corridor from the edge of a residential subdivision. The 80' wide linear corridor passes between houses and features a curvilinear recreation path with scattered trees and plantings in the vicinity of this KOP. The homes' backyards are adjacent to the corridor and all appear to be fenced. This is an existing corridor of steel lattice towers and a single circuit of transmission lines.

Visual Sensitivity (Figure 8a)

From the standpoint of KOP 7, the visual quality is moderate due to the variety and maturity of the plantings and trees and their largely evergreen species. It is a pleasing view and the entrance to the recreation path beckons the viewer to enter. The existence of the steel lattice towers diminish the view quality from what might otherwise be moderate-high. Because the corridor is located within a residential neighborhood, the viewer concern is expected to be high. The visibility from this KOP is high. Visibility from the individual residences is hard to gauge although it is likely the existing mature plantings and trees provide some screening of the steel lattice towers. Considering that the spacing between towers in the immediate area ranges from 857 to 885 feet, the impact on the visibility of the corridor is mostly upon the recreation path users and the residences immediately abutting the towers themselves. The number of viewers is assumed to be moderate because this viewpoint is at the western edge of a residential

subdivision rather than in a centralized location where there might be more viewers. The duration of the view is shorter for the motorists passing this intersection, longer for the recreation path users and longest for the residents immediately abutting the corridor. The view duration is moderate-high. Considering the high visibility, moderate number of viewers and moderate-high duration of the view, the overall viewer exposure is moderate-high. Combined with the moderate visual quality and high viewer concern, the overall visual sensitivity for KOP 7 is moderate-high.

Visual Change (Figure 8b)

Figure 8b is a simulation of the view from KOP 7 after installation of the replacement single circuit transmission poles. As depicted in Figure 8b, the pole (shown as a double-circuit) may be as high as 125 feet, although the AFC specifies the height at 95 feet (AFC pg. 3-2). The spacing between poles is specified as a typical span of 880 feet in AFC Figure 3.2-3A, however the poles would be placed in the same locations as the existing towers (AFC pg. 5.2-43). Figure 1 shows the replacement poles in the same locations as the existing poles in the vicinity of KOP 7. The transmission lines themselves would be at least 32 feet clear above ground, per the specifications of AFC Figure 3.2-3A. As seen in the simulation, Figure 8b, the lines appear to be much higher above ground than the minimum of 32 feet. Construction would require approximately 400 square feet of temporary vegetation clearance at each pole location and the impact area would be replanted (AFC pg. 5.2-44- Biological Resources).

The replacement poles are of a similar color to the existing towers; color change is low. Tubular steel poles are generally more consistent in terms of form with other features found in residential neighborhoods than lattice steel towers. The degree of intrusion would be slightly less with the project; the effect of form is low. The poles are less distracting than the lattice tower form and the structure has a smoother texture given the simplicity of the design and materials. The line and texture changes are low. The poles are noticeable and unmistakable in the view but the solidity of the evergreen vegetation below helps to offset the weight of the poles in this view. The overall contrast from existing to proposed is low. An existing palm tree to the left of the simulated pole is of a similar height from this perspective and helps to mitigate the visual dominance of the pole. The new poles are equally dominant in the view from KOP 7 as the existing towers and therefore the dominance is low. The smaller footprint and width of the structures actually reduce view blockage, therefore view blockage is low. The reduction in occupied space of the new poles would mostly be experienced by the recreational users on the path. Taking into consideration the low contrast, moderate dominance and low blockage, the overall visual change is low at KOP 7 and considered positive.

KOP 7 Summary:

Staff concludes that the introduction of project structure from this KOP would not substantially degrade the existing viewshed (residential perspective) from KOP 7. When considering the moderate-high visual sensitivity and low visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

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**, By providing a neutral color scheme for the introduced structures, the contrast with the existing landscape is reduced to less than significant. Perimeter landscape screening would impede visibility upon implementation of Condition of Certification **VIS-2**, achieving a less than significant impact on sensitive viewing areas. Lighting mitigation proposed in Condition of Certification **VIS-3** would reduce visual effects of construction and operational lighting to less than significant. Existing visual quality at KOP 7 would actually improve with the replacement of the lattice towers. With these measures, the impacts from the 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.

VISUAL RESOURCES Table 4
Overall Visual Change

KOP No.	VISUAL SENSITIVITY (Existing Condition)						
	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity
			Visibility	No. of Viewers	Duration of View	Overall Viewer Exposure	
1	Low	Moderate-High	High	Moderate	Moderate	Moderate-High	Moderate
2	Low	Moderate	High	High	Low-Moderate	Moderate-High	Moderate
3	Low-Moderate	Low-Moderate	Moderate	Moderate	Moderate	Moderate	Low-Moderate
4	Low	Low	Moderate	Low	Low-Moderate	Low-Moderate	Low
5	Moderate	Low	High	Low	Moderate	Moderate	Low-Moderate
6	Moderate	Moderate-High	High	Moderate-High	High	High	Moderate-High
7	Moderate	High	High	Moderate	Moderate-High	Moderate-High	Moderate-High

KOP No.	VISUAL CHANGE (Proposed Condition)							
	Project Effect							Overall Visual Change
	Contrast					Dominance	View Blockage	
	Form	Line	Color	Texture	Overall Contrast			
1	High	High	Moderate	Moderate	Moderate-High	High	Moderate-High	High
2	High	High	Moderate	High	High	Moderate	Moderate-High	Moderate-High
3	High	High	Moderate	Moderate-High	Moderate-High	Moderate	Low	Moderate
4	High	High	High	High	High	High	Moderate	Moderate-High
5	High	High	Moderate	High	High	High	Moderate	Moderate-High
6	Low	Low	Low	Low	Low	Low	Low	Low
7	Low	Low	Low	Low	Low	Low	Low	Low

Linears

Power Lines

The generated power would be transmitted approximately 2.4 miles to PG&E's Contra Costa Substation via an existing transmission corridor, which currently accommodates a 60-kV, single circuit line. The application originally called for double-circuit lines and poles to accommodate both the existing 60-kV and 230-kV proposed circuits. As submitted by the applicant in the Supplemental Filing Response, July 2010, the existing 60-kV line would be replaced south of Main Street by a single-circuit line that would accommodate the project's new 230-kV line. The circuits north of Main and connecting to the OGS would be double-circuit poles accommodating both the existing 60-kV and proposed 230-kV lines (Figure WSQ5-5). The new circuits would require replacement of the existing steel-lattice towers with tubular steel poles. All the new off-site structures would be located in existing transmission corridors. Therefore, the visual impacts of the new transmission poles would be minimal. KOPs 6 and 7 provide visual information for the transmission lines and include a substantial discussion of the visual impacts. The existing lattice tower located in the Conservation Easement Area adjacent to Bridgehead Road would not be replaced (CH2MHILL, Wetland E Management Plan, Figure 2, June 2010).

Pipelines

Fuel would be delivered via a new 300-foot-long pipeline that would connect into PG&E's Line 303 natural gas transmission line immediately west of the project site. The project owner may include a secondary connection to deliver fuel to the OGS via a 410-foot-long pipeline from PG&E's Line 400 natural gas transmission line, which is located just west of the project site. The pipelines would be located underground, therefore there would be no visual impact.

Potable water would be provided by the Diablo Water District for power plant cooling and process water, fire protection and potable uses. Process and sanitary wastewater would be conveyed to the Ironhouse Sanitary District sewer system. All pipelines would be underground or would not otherwise constitute any potential visual impact.

Publicly Visible Water Vapor Plumes

The proposed OGS would be air-cooled. Therefore the wet-cooling towers that are typically responsible for the largest and most visible plumes from power plant projects would not be a part of this project. Visible plumes from the project's HRSG exhaust stacks may occur, though at much lower magnitudes and frequencies than from wet-cooling systems. Small visible plumes may form during periods of low temperature and high humidity, most likely on cold nights. There is no cooling tower associated with this project and therefore no cooling tower plumes.

Staff conducted a modeling analysis to predict the frequency of visible vapor plumes from the project's proposed gas turbine/HRSGs, using the CSVP model (refer to VISUAL RESOURCES Appendix VR-2 for staff's complete modeling analysis.) Staff's modeling predicted visible vapor plumes for less than seven percent of seasonal daylight clear hours. Because staff's predicted visible plume frequency falls well below the staff threshold of 20% of seasonal daylight clear hour; those visible plumes would, by staff's definition, be less than significant. The project's auxiliary boiler is both too small and would operate too infrequently (no more than 403 hours/year) to create visible plumes of concern.

Nighttime plumes are anticipated, although their frequency was not modeled either by the applicant or staff. With sufficient up-lighting, visible nighttime plumes might, if frequent enough, potentially represent an adverse impact. However, such up-lighting from the project itself is prohibited under staff-recommended Condition of Certification, **VIS-3**. Therefore any adverse impacts from the visible nighttime plumes are not anticipated, assuming implementation of Condition **VIS-3**.

4. 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 unshielded and lights not directed onsite they could introduce significant light or glare to the vicinity.

During regular operation, lighting is proposed to be limited to areas required for operational safety and security. As stated in the AFC (09-AFC-04, 5.13-33), there would be additional lighting associated with the project stacks and open areas on site. Illumination needed only on demand would be provided with switches or motion detectors. Illumination would be directed only toward those areas where it is needed and non-glare fixtures would be specified. Lighting would not be highly visible off-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 City requirements for night time lighting. The City of Oakley letter dated April 5, 2010 refers to minimizing backscatter, shielding to prevent light trespass and motion detectors to light areas only when occupied. With adequate screening and shielding, proposed new lighting would remain subordinate to the surrounding area. Staff recommends Condition of Certification **VIS-3** to ensure full compliance and verification of night lighting measures.

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 OGS would be built within the City of Oakley, on the DuPont industrial property and on the site of existing vineyards within that property. 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 larger viewshed, which extends along the San Joaquin River shoreline on the Antioch side of SR 160. The project is to be located within an area zoned for Heavy Industrial or Utility Energy. The project structures would be highly visible in the viewshed, especially from the raised roadway of SR 160 but would not significantly alter the character of the existing landscape, with the exception of the displacement of 21.95 acres of agricultural use (existing vineyards). While most of the former DuPont chemical plant has been dismantled and removed, the property at large has historically been developed as industrial since 1956. The landscape screening proposed and the landscape mitigation required in Condition of Certification **VIS-2** would mitigate only the impacts in the immediate vicinity and would not mitigate the impacts of the project in the larger viewshed, such as the views from the elevated SR 160. The City of Oakley states that, as of October 26, 2010, there are no current buildings permits issued in the immediate vicinity of the proposed project. The cumulative impacts on views attributable to the completion of this project would not appreciably alter the existing industrial landscape character and the project contribution to the cumulative industrial character of the viewshed is considered low-moderate, making it less than significant.

Industrial development along the south shore of the San Joaquin River in the project vicinity on the Antioch side of SR 160 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 the Antioch Bridge and Highway 160. This industrialized riverfront is also seen from Mt. Diablo and highly visible at night. However, Mt. Diablo State Park closes to visitors at night and therefore, viewer exposure from the summit viewing area would be minimal or non-existent. As a result, the impression received by visitors entering Contra Costa County 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. Staff recommends that exterior lighting at the OGS facility be shielded from public view areas to the extent feasible to mitigate 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

California *Government Code*, Section 65300, requires each city and county in California to adopt a general plan for the physical development of the county or city and any land outside its boundaries that bears relation to its planning. On the basis of these general plans, cities and counties establish policies and strategies necessary to carry out elements of the plan.

Both Contra Costa County and the City of Oakley have adopted a general plan, Contra Costa County in 2005 and the City of Oakley in 2002, amended in 2010. Visual Resources Table 5, which follows, includes a description of these policies and strategies—laws, ordinances, regulations, and standards of Federal, State and local jurisdictions—as they pertain to the OGS as well as staff's proposed Condition of Certification **VIS-1**, **VIS-2** and **VIS-3** to help ensure the OGS's conformance with them.

VISUAL RESOURCES Table 5

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
Federal			
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (PL 109-59; 2005). Expired 2009.	Pertains to sites located on or in vicinity of Federally-managed lands.	Yes	OGS is not located on or in the vicinity of Federally-managed lands.
National Scenic Byway (ISTEA 1991, Title 23, Sec. 162)	Pertains to sites located in the vicinity of a National Scenic Byway	Yes	OGS is not located in the vicinity of a National Scenic Byway.
State			
California Streets and Highways Code, Sections 260 through 263 – Scenic Highways	Pertains to sites located in the vicinity of a designated State Scenic Highway.	Yes	OGS is not located in the vicinity of a State Scenic Highway. SR 160 is listed as “eligible”.
Local			
Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation</u> <u>Element-Scenic Routes 5.9</u> Policy 5-43	Scenic Route Policies: 5-43 Scenic corridors shall be maintained with the intent of protecting attractive natural qualities adjacent to various roads throughout the County.	Yes	CC GP Figure 5.4 identifies Highway 160 near the project site as a Scenic Highway/Expressway. OGS is to be located on an agricultural field adjacent to industrial development-no natural qualities exist to be protected.
Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation</u> <u>Element-Scenic Routes 5.9</u> Policy 5-45	Scenic views observable from scenic routes shall be conserved, enhanced and protected to the extent possible.	Yes	The OGS location does not block scenic views from the scenic route (SR 160).

<p>Contra Costa County General Plan, adopted in 2005.</p> <p><u>Transportation and Circulation</u></p> <p><u>Element-Scenic Routes 5.9</u></p> <p>Policy 5-51</p>	<p>Provide special protection for natural topographic features, aesthetic views, vistas, hills and prominent ridgelines at “gateway” sections of the scenic routes. Such “gateways” are located at unique transition points in topography or land use, and serve as entrances to regions of the County. . (Gateway locations are not specified in the GP and have not been identified by Planning Staff).</p>	<p>Yes</p>	<p>The OGS location is not located at an identified gateway. Gateways have not been identified by CCC planning staff.</p>
<p>Contra Costa County General Plan, adopted in 2005.</p> <p><u>Transportation and Circulation</u></p> <p><u>Element-Scenic Routes 5.9</u></p> <p>Policy 5-52</p>	<p>Aesthetic design flexibility of development projects within a scenic corridor shall be encouraged.</p>	<p>Yes</p>	<p>The proposed OGS is not located within a scenic corridor.</p>
<p>Contra Costa County General Plan, adopted in 2005. <u>Open Space Element-Scenic Resources Policies and Goals 9.6</u></p> <p>Goal 9-12</p>	<p>To preserve the scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento/San Joaquin River/Delta shoreline.</p>	<p>Yes</p>	<p>The OGS meets the overall goal as it does not have a direct impact on the visibility of these scenic resources (see KOP 2 analysis).</p>
<p>Contra Costa County General Plan, adopted in 2005. Open Space Element-Scenic Resources Policies and Goals 9.6</p>	<p>New power lines shall be located parallel to existing lines in order to minimize their visual impact.</p>	<p>Yes</p>	<p>Replacement and new transmission poles are to be located within existing transmission corridors. OGS transmission lines are located within the</p>

Policy 9-20			Oakley and Antioch City limits.
Draft Eastern Contra Costa County Trails Master Plan, July 2009	Proposed trails are located both north of the site near the shoreline and on the southern perimeter of the site along the AT&SF Railroad ROW. Approved by the BOS and will be incorporated in to the General Plan with the next revision.	Yes	No policy considerations associated with the Trails Master Plan.
East Bay Regional Parks District, Existing and Potential Parklands and Trails, Master Plan amended 11/06/2007.	Antioch/Oakley Regional Shoreline is a 7.5-acre park at foot of Antioch Bridge (SR 160) which straddles the Antioch/Oakley City Limits and offers fishing and picnicking facilities. Big Break Regional Shoreline is a linear park stretching more than two miles along the San Joaquin River east of the project site. Potential recreation trails have been identified along Big Break Shoreline in the vicinity of the project site.	Yes	The Regional Shoreline parks are outside the project boundaries. The Master Plan has no policy considerations for visual resources.
Contra Costa Transportation Authority: Countywide Bicycle and Pedestrian Plan, June 14, 2010. Section 4, Goals & Objectives; Map, Figure 4.	Plan includes proposed trails along Bridgehead Road and Big Break Shoreline in the project vicinity.	Yes	The plan contains no policy considerations regarding visual resources.

City of Antioch General Plan <u>5.4.2 Community Image and Design</u> Policy 5.4.2c	Maintain view corridors from public spaces to natural ridgelines and landmarks, such as Mt. Diablo and distant hills, local ridgelines, the San Joaquin River and other water bodies. Transmission lines and replacement poles would be located within the City of Antioch.	Yes	Views to the San Joaquin River and Mt. Diablo from SR 160 or other public spaces in Antioch (KOPs 6 & 7) are not impacted by the project.
City of Oakley 2020 General Plan /Contra Costa County Title 8 (Zoning) Chapter 84-62:H-I Heavy Industrial District	The OGS site is designated for a land use of Utility Energy. The project site is currently zoned SP-3. As the DuPont Bridgehead Road Specific Plan has not yet been adopted, the underlying applicable zoning is Heavy Industry (H-I)(City of Oakley letter dated 4-5-2010).	Yes	Heavy Industry is aesthetically compatible with power plant development. The DuPont Bridgehead Road Specific Plan has not been adopted.
City of Oakley Municipal Code Title 4, Chapter 31 Water Efficient Landscape Ordinance (WELO)	Municipal Code amended by Ordinance 03-10 establishing Water Efficient Landscape Requirements. Landscape areas exceeding 2500 sf must meet the regulations.	Yes as conditioned	The OGS landscape plan is conditioned in VIS-2 to meet the City WELO requirements.
Draft EIR, River Oaks Crossing Specific Plan River Oaks Crossing Specific Plan, September 2008	River Oaks Crossing SP permits the development of the parcel immediately south of the OGS site as commercial property featuring large scale retail buildings mixed with	Yes	OGS is compatible with aesthetic guidelines of the Specific Plan. ROC development will likely reduce the visual impact of the OGS as viewed from the south and south

	smaller retail and parking areas.		east (see KOP 3 analysis).
Draft DuPont Bridgehead Road Specific Plan	The Draft DuPont Bridgehead Road Specific Plan excludes Utility Energy as a permitted land use and adds new designations to the General Plan for this area.	Yes	The Specific Plan has not been adopted and therefore is not applicable to the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

A public site visit and informational hearing were held on November 2, 2009. No public comments pertaining to visual resources have been received or docketed.

The City of Oakley has commented on the project in two separate letters as follows:

April 5, 2010: Letter from Rebecca Willis, Community Development Director outlining recommended conditions of approval (COO 2010a).

June 23, 2010: Letter from Rebecca Willis, Zoning Administrator with comments indicating agreement with the landscape plan and outlining recommended conditions of approval (COO 2010b).

The staff-recommended Conditions of Certification address the majority of the City's comments on Visual Aesthetics/Design as follows:

1. Lighting and Photometric Plan with measures to minimize backscatter to nighttime sky and shield light trespass (See City of Oakley April 5, 2010 letter – Recommended Condition No. 9) (**VIS-3**);
2. Landscape and Irrigation Plan conforming to the City of Oakley's Water Efficient Landscape Ordinance (See City of Oakley April 5, 2010 letter – Recommended Condition No. 12.) (**VIS-2**);
3. Use of California native drought-tolerant plants (See City of Oakley April 5, 2010 letter – Recommended Condition No. 13) (**VIS-2**);
4. Screening Trees Plan (See City of Oakley April 5, 2010 letter – Recommended Condition No. 14) (**VIS-2**);
5. On-site landscape inspection upon completion (See City of Oakley April 5, 2010 letter – Recommended Condition No. 15) (**VIS-2**).

Additionally, the City of Oakley has entered into an agreement with Radback Energy to provide landscape screening trees within the City right-of-way on the east side of Bridgehead Road in the area adjacent to the project site (APNs 051-052-030 and 051-

052-049). This agreement is not included as part of a Condition of Compliance as it is private agreement between the City and the applicant and the Energy Commission has no ability to enforce the agreement, however, it is noted in this FSA to acknowledge that the agreement exists and provides additional measures to address potential visual issues.

The City of Antioch has commented on the project in a letter dated February 10, 2011, signed by Mindy Gentry, Acting Senior Planner (COA 2011a) . Staff has responded to the comments by revising the discussion of KOP2 to include Antioch zoning information and in Construction Impacts and Mitigation: *Linears* portion of this section, referring to Conditions of Certification BIO-6, 7 & 8 for information on restoring the transmission corridor post-construction.

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 paintable features in a color scheme which will blend into the horizon of the river, hills and sky. The project owner shall submit for CPM review and approval, a specific surface treatment plan that will satisfy these requirements. 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.

The treatment plan shall include:

- a. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes.
- b. A list of each major project structure, 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 2 of the Staff Assessment).
- d. A specific schedule for completion of the treatment.

- e. A procedure to ensure proper treatment maintenance for the life of the project.

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 City of Oakley 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.

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 placed around the facility boundaries, in conformance with the Conceptual Landscape Plan, Figure 9a and 9b. 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 the City of Oakley and the local water purveyor for review and comment a Landscape Documentation Package whose proper implementation will satisfy these requirements. The plan shall include:

- a. A detailed Landscape Design Plan, at a reasonable scale (1"=40' maximum). 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. The Landscape Design Plan shall include a Planting Plan with Plant List (prepared by a qualified professional arborist or landscape architect 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; specifications for groundcover, top-dressing of planting areas and weed abatement measures.

Existing trees and species shall be noted on the Landscape Plan. The Landscape Design Plan shall specify all materials to be used for interior roads, walks, parking areas and hardscape materials (i.e. gravel) to be placed in areas that are not paved or planted.

- b. An Irrigation Plan in compliance with the City of Oakley's Water Efficient Landscape Ordinance, Ordinance No. 03-10, Title 4, Chapter 31. The plan shall include the following: complete Irrigation Design Plan, specifying system components and locations, and shall include the Water Efficient Landscape Worksheet.
- c. Maintenance procedures, and a plan for routine annual or semi-annual debris removal for the life of the project.
- d. A procedure for monitoring 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 the City of Oakley 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 the City of Oakley a revised plan for review and approval by the CPM. Planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the CPM and the City of Oakley within seven days after completing installation of the landscape plan, that the site is ready for inspection. A report to CPM, equivalent to the City of Oakley's Certificate of Completion Package in Title 4, Chapter 31, shall be submitted in conjunction with the 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

Operational Phase:

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 City of Oakley 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 requirement.

- 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.
- 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.

Construction Phase:

The project owner shall ensure that lighting for construction of the power plant is used in a manner that minimizes potential night lighting impacts, as follows:

- a. To the extent feasible given safety and security concerns and operational needs, all lighting shall be of minimum necessary brightness consistent with worker safety and security.
- b. All fixed position lighting shall be shielded/hooded, and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and direct light trespass (direct light extending outside the boundaries of the power plant site or the site of construction of ancillary facilities, including any security related boundaries).
- c. No nighttime lighting or construction activities shall occur in the transmission corridor adjacent to residential properties or in public spaces, such as Almondridge Park in the City of Antioch.
- d. Wherever feasible and safe and not needed for security, lighting shall be kept off when not in use.

Verification: Within seven days after the first use of construction lighting, the project owner shall notify the CPM that the lighting is ready for inspection. If the CPM requires modifications to the lighting, within 15 days of receiving that notification the project owner shall implement the necessary modifications and notify the CPM that the modifications have been completed.

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 City of Oakley 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.

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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, 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 would 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. 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*.

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Appendix VR-2: Visible Plume Modeling Analysis

William Walters, P.E.

INTRODUCTION

The following provides the assessment of the dry-cooled Oakley Generating Station Power Plant Project (OGS) gas turbine heat recovery steam generator (HRSG) exhaust stacks' visible plumes. Staff completed a visible plume frequency modeling analysis for the applicant's proposed unabated gas turbine/HRSG design.

PROJECT DESCRIPTION

The applicant has proposed two 213 MW GE 7FA combustion turbines and two non-fired HRSGs. The proposed gas turbine design includes no duct burners. The applicant has not proposed to use any methods to abate visible plumes from the HRSG exhaust.

Additionally, a small auxiliary boiler (50.6 MMBtu/hr) is proposed for this project. However, due to the small size and limited operation (403 hours/year) of the auxiliary boiler, it would have a plume frequency potential below staff's initial significance criteria and should have plume sizes that would not be considered visually significant.

VISIBLE PLUME MODELING METHODS

PLUME FREQUENCY AND DIMENSION MODELING

The Combustion Stack Visible Plume (CSVP) model was used to estimate plume frequency for the HRSG exhaust. This model provides a conservative estimate of plume frequency. This model utilizes hourly HRSG exhaust parameters and hourly ambient condition data to determine the plume frequency. This model is based on the algorithms of the Industrial Source Complex model (Version 2), that determine conditions at the plume centerline, but this model does not incorporate building downwash.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20 percent of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. The methodology used to determine high visual contrast hours is provided below:

The Energy Commission has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data set¹⁰ used in the analysis categorizes sky cover in 10%

¹⁰ This analysis uses a five-year Fairfield AERMET meteorological data set (2003-2007) and a five-year meteorological data set from the Contra Costa Power Plant PG&E met tower (2001-2002, 2004-2006) where hours with missing data were excluded. Two different meteorological data sets were used due to the uncertainty whether the local PG&E data contained a full set of weather and visible range exclusionary data, which could have caused the PG&E data to overstate the potential plume frequency during no rain/no fog hours and clear hours.

increments. Staff has included in the “Clear” category a) all hours with sky cover equal to or less than 10% plus b) half of the hours with total sky cover 20-90%. The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-90% the opacity of sky cover is relatively low (equal to or less than 50%), so this sky cover does not always substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover criteria can be considered high visual contrast hours and are included in the “clear” sky definition.

If it is determined that the seasonal daylight clear hour plume frequency is greater than 20 percent then plume dimensions are calculated, and a significance analysis of the plumes is included in the Visual Resources section of the Preliminary Staff Assessment.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the Applicant’s Supplemental Filing for Air Quality and Public Health (CH2MHILL 2010d), which contained the latest exhaust parameters for the project, and performed an independent psychrometric analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for the HRSG stacks under two separate gas turbine operating cases.

HRSG PARAMETERS

Based on the stack exhaust parameters anticipated by the Applicant, the frequency of visual plumes can be estimated. The operating data for these stacks are provided in **Visible Plume Table 1**.

Visible Plume Table 1
HRSG Exhaust Parameters ^a

Parameter	HRSG Exhaust Parameters		
Stack Height	155.5 feet (47.4 meters)		
Stack Diameter	18.4 feet (5.6 meters)		
Ambient Conditions	Moisture Content (% by weight)	Exhaust Flow Rate (klbs/hr)	Exhaust Temp (°F)
Full Load			
34°F	5.15	4,162	192
59°F	5.50	4,116	191
104°F	6.11	4,073	213
Medium Load			
34°F	5.26	3,638	185
59°F	5.49	3,316	180
104°F	5.49	3,156	196

Source: CH2MHILL 2010d. Appendix C, Table 5.1A-3a

Note: a. Values were extrapolated or interpolated between hourly ambient condition data points as necessary.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff modeled the HRSG plumes using the CSVP model with a five-year meteorological data set from Fairfield that was already in staff's possession and a five-year meteorological data set collected from Contra Costa Power Plant PG&E met tower and processed by the applicant (OG 2009a). **Visible Plume Table 2** provides the CSVP model visible plume frequency results for the full and medium load operating cases for each of the two meteorological data sets.

Visible Plume Table 2
Staff Predicted Hours with HRSG Steam Plumes
Fairfield 2003-2007 Meteorological Data,
Contra Costa Power Plant 2001-2002, 2004-2006 Meteorological Data

Case	Available (hr)	Full Load With No Duct Firing		Medium Load with No Duct Firing	
		Plume (hr)	Percent	Plume (hr)	Percent
Fairfield Data					
All Hours	39,623	4,255	10.74%	5,492	13.86%
Daylight Hours	20,196	857	4.24%	1,105	5.47%
Daylight No Rain No Fog	18,256	262	1.44%	371	2.03%
Seasonal Daylight No Rain No Fog*	7,102	250	3.52%	353	4.97%
Seasonal Daylight Clear**	4,207	156	3.71%	209	4.97%
Contra Costa Power Plant PG&E Met Tower Data					
All Hours	43,424	2,599	5.99%	3,792	8.73%
Daylight Hours	22,013	569	2.58%	885	4.02%
Daylight No Rain No Fog	21,784	564	2.59%	869	3.99%
Seasonal Daylight No Rain No Fog*	9,631	561	5.82%	865	8.98%
Seasonal Daylight Clear**	5,809	263	4.53%	367	6.32%

*Seasonal conditions occur anytime from November through April.

**Available hours based on seasonal daylight clear hours.

A visible plume frequency of 20% of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. Both full and medium load operations for the proposed HRSGs are predicted to produce infrequent visible gas turbine/HRSG plumes, well below 20% of seasonal daylight clear hours.

CONCLUSIONS

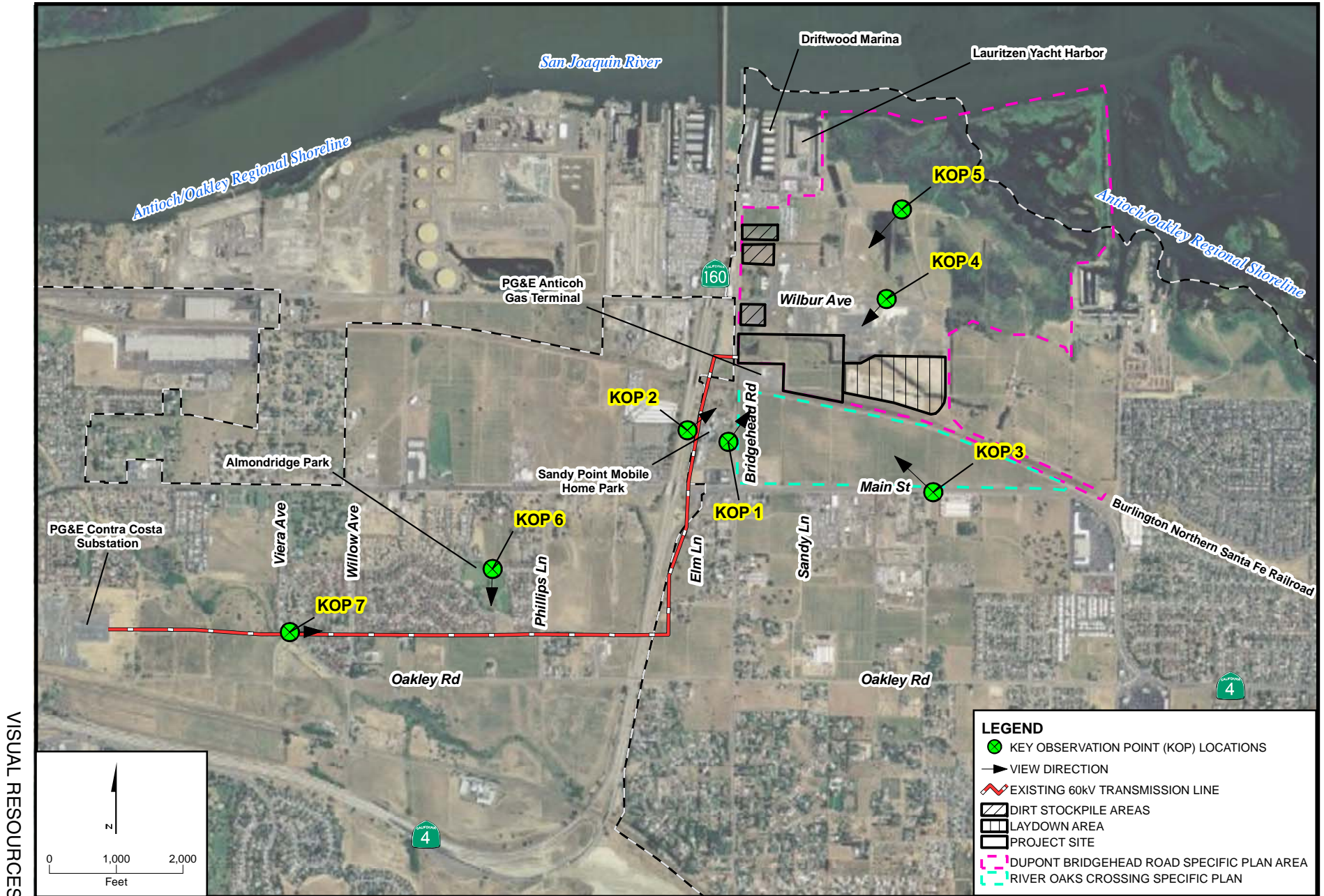
Visible water vapor plumes from the proposed OGS gas turbine/HRSG exhausts are predicted to occur less than 20 percent of seasonal daylight clear hours. Therefore, no further visual impact analysis of the predicted gas turbine/HRSG exhaust plume dimensions has been completed.

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VISUAL RESOURCES - FIGURE 1
Oakley Generating Station - Key Observation Point Locations



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 2 a & b
Oakley Generating Station - KOP 1 - Key Observation Point Locations

KOP 1- Existing View



2a. View to the northeast toward the project site from the driveway that exits from the Sandy Point Mobile Home Park (KOP 1). PG&E's Antioch Gas Terminal is visible in the left portion of the view, beyond the BNSF tracks that extend across the view.

KOP 1- Simulated Condition



2b. View from KOP-1 with simulated project and landscaping five years after installation.

VISUAL RESOURCES - FIGURE 3 a & b
Oakley Generating Station - KOP 2- Key Observation Point Locations

KOP 2- Existing View



3a. View to the northeast toward the project site from the northbound lane of SR 160 (KOP 2). The project site is visible in the center of the view beyond the mobile home park, industrial storage area, and PG&E Antioch Gas Terminal.

KOP 2- Simulated Condition



3b. View from KOP-2 with simulated project and landscaping five years after installation.

VISUAL RESOURCES - FIGURE 4 a & b
Oakley Generating Station - KOP 3- Key Observation Point Locations

KOP 3- Existing View



4a. View to the northwest from SR 4/Main Street at Live Oak Avenue (KOP-3). Live Oak Community Christian Church is located across Live Oak Avenue from this location.

KOP 3- Simulated Condition



4b. View from KOP-3 with simulated project and landscaping five years after installation.

VISUAL RESOURCES - FIGURE 5 a & b
Oakley Generating Station - KOP 4- Key Observation Point Locations

KOP 4- Existing View



5a. View to the southwest from Wilbur Avenue, within the DuPont property (KOP-4). The project site is beyond the row of mature eucalyptus trees that extends across the view. The peak of Mount Diablo is visible in the distance.

KOP 4- Simulated Condition



5b. View from KOP-4 with simulated project and landscaping five years after installation.

VISUAL RESOURCES - FIGURE 6 a & b
Oakley Generating Station - KOP 5- Key Observation Point Locations

KOP 5- Existing View



6a. View to the southwest from wetlands within the DuPont property (KOP-5). Mount Diablo is visible in the right side of the view, beyond structures on the DuPont property.

KOP 5- Simulated Condition



6b. View from KOP-5 with simulated project and landscaping five years after installation.

VISUAL RESOURCES - FIGURE 7 a & b
Oakley Generating Station - KOP 6- Key Observation Point Locations

KOP 6- Existing View



7a. View to the south from Almondridge Park, in Antioch (KOP-6). The transmission corridor that includes towers to be replaced extends across this view, from east to west.

KOP 7- Simulated Condition



7b. View from KOP-6 with transmission corridor replacement simulated.

VISUAL RESOURCES - FIGURE 8 a & b
Oakley Generating Station - KOP 7- Key Observation Point Locations

KOP 7- Existing View



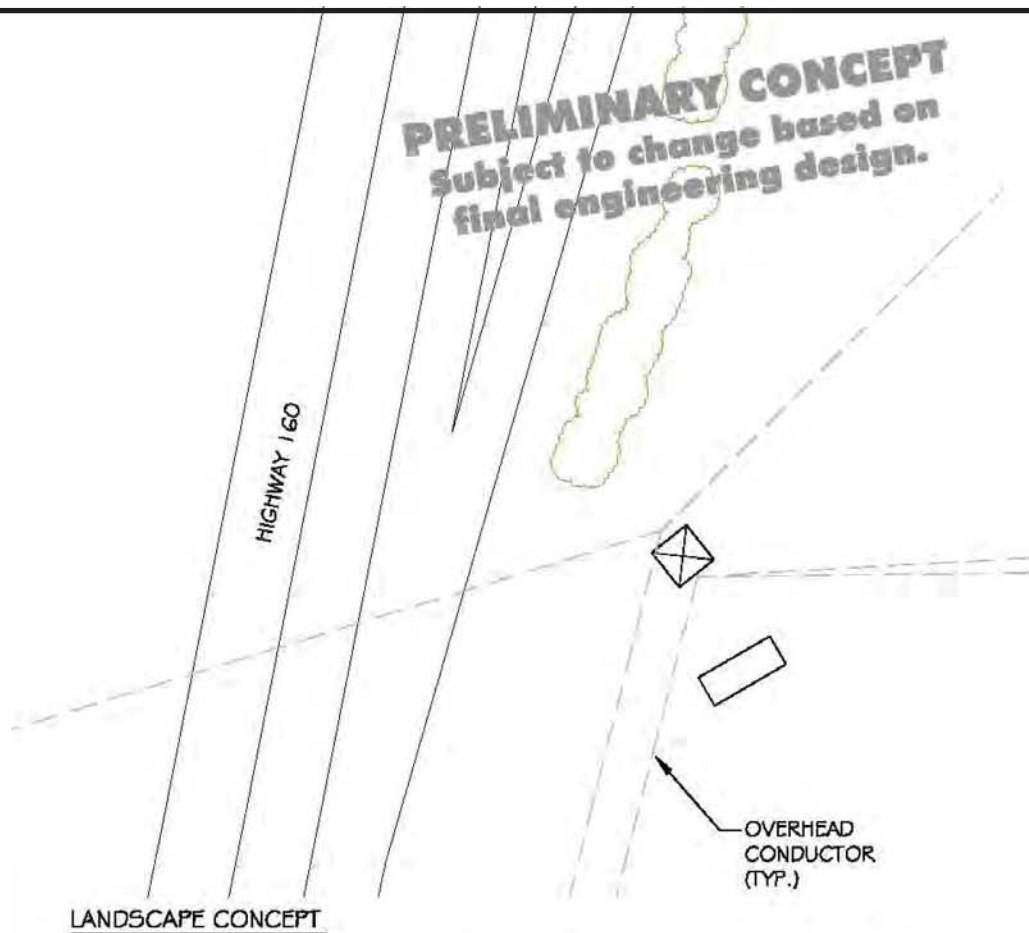
8a. View to the east from intersection of Viera Avenue and Oakley Road, in Antioch (KOP-7). This segment of the transmission corridor includes a pedestrian path, the entrance to which is visible in the center of this view.

KOP 7- Simulated Condition



8b. View from KOP-7 with transmission corridor replacement simulated.

VISUAL RESOURCES - FIGURE 9a
Oakley Generating Station - Conceptual Landscape Plan

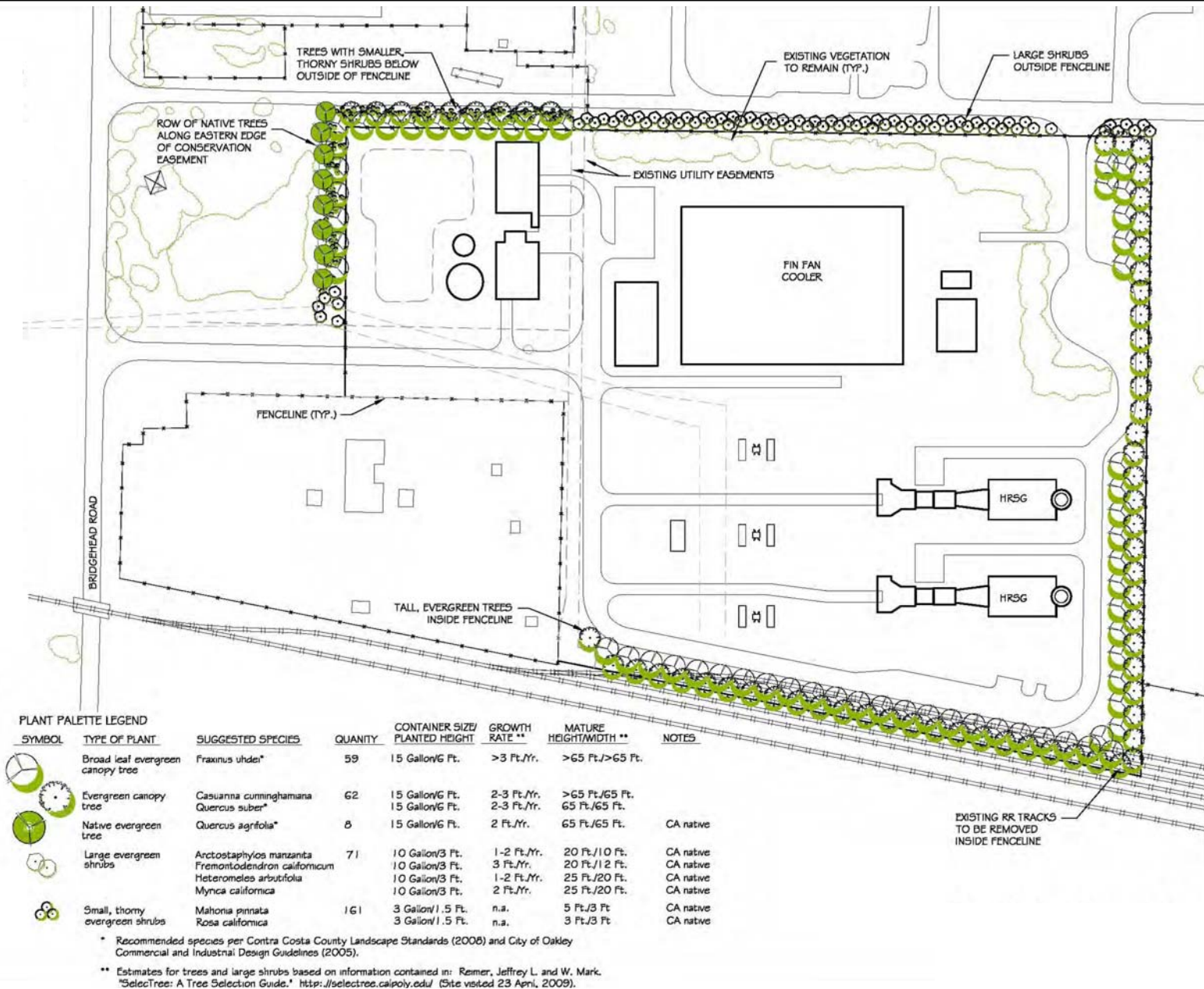


The landscape plan calls for installing rows of tall, evergreen trees inside the eastern and southern edges of the facility's perimeter fence and tall, evergreen trees with small, thorny shrubs below along portions of the outside of the northern and western edges of the fence in order to partially screen views from the roadways and surrounding area. Outside the northern fenceline where existing eucalyptus trees provide screening, large shrubs will be installed to screen views of the fence.

NOTES:

1. Final landscape layout will be determined in conjunction with final engineering design and survey data.
2. Smaller trees and shrubs shall be planted below overhead conductors to allow for clearance. All planting shall be consistent with technical operation requirements for landscaping in proximity to electric transmission facilities.
3. Tree canopies shall not extend over underground pipelines.
4. Owner will provide regular irrigation for a minimum two-year period while landscaping becomes established.
5. Owner will retain a licensed landscape contractor to provide periodic maintenance including removal and replacement of dead plant material and periodic evaluation of site landscaping to determine additional landscaping maintenance needs.

VISUAL RESOURCES - FIGURE 9b
Oakley Generating Station - Conceptual Landscape Plan



WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough, REA

SUMMARY OF CONCLUSIONS

Management of the nonhazardous and hazardous waste generated during construction and operation of the Oakley Generating Station (OGS) 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 (AFC) and staff's proposed conditions of certification are implemented.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with existing wastes onsite and wastes generated from the proposed construction and operation of the OGS. The technical scope of this analysis encompasses solid wastes existing onsite and those to be generated during facility construction and operation. Management and discharge of wastewater is addressed in the **SOIL AND WATER RESOURCES** section of this document. Additional information related to waste management may also be covered in the **WORKER SAFETY** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

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

- Any existing wastes on-site are adequately characterized and remediated in accordance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The management of project wastes would be in compliance with all applicable LORS.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental 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 OGS with respect to management of waste.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
<p>Title 42, United States Code (U.S.C.), §§6901, et seq.</p> <p>Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al).</p>	<p>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.</p>
<p>Title 42, U.S.C., §§ 9601, et seq.</p> <p>Comprehensive Environmental Response, Compensation and Liability Act</p>	<p>The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment, among other things.</p>
<p>Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes.</p>	<p>These regulations were established by United States Environmental Protection Agency (USEPA) to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes.</p> <p>USEPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of USEPA.</p>
<p>Title 49, CFR, Parts 172 and 173.</p> <p>Hazardous Materials Regulations</p>	<p>U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20.</p>

Applicable Law	Description
State	
<p>California Health and Safety Code (HSC), Chapter 6.5, §25100, et seq.</p> <p>Hazardous Waste Control Act of 1972, as amended.</p>	<p>This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements.</p> <p>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.</p>
<p>Title 22, California Code of Regulations (CCR), Division 4.5.</p> <p>Environmental Health Standards for the Management of Hazardous Waste</p>	<p>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.</p> <p>The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.</p>
<p>California Health and Safety Code,, Chapter 6.11 §§25404 – 25404.9</p> <p>Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)</p>	<p>The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs.</p> <p>The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). Contra Costa County Department of Environmental Health is the area CUPA.</p>
<p>Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §15100, et seq.</p> <p>Unified Hazardous Waste and Hazardous Materials Management Regulatory Program</p>	<p>While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses.</p> <ul style="list-style-type: none"> Article 9 – Unified Program Standardized Forms and Formats (§§ 15400-15410). Article 10 – Business Reporting to CUPAs (§§15600 – 15620).

Applicable Law	Description
<p>Public Resources Code, Division 30, §40000, et seq.</p> <p>California Integrated Waste Management Act of 1989.</p>	<p>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.</p>
<p>Title 14, CCR, Division 7, §17200, et seq.</p> <p>California Integrated Waste Management Board</p>	<p>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.</p>
<p>California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq.</p> <p>Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).</p>	<p>This law was enacted to expand the State's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4 year cycle, with a summary progress report due to DTSC every 4th year.</p>
<p>Title 22, CCR, §67100.1 et seq.</p> <p>Hazardous Waste Source Reduction and Management Review.</p>	<p>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.</p>
Local	
<p>Contra Costa County Health Services Hazardous Materials Programs</p>	<p>Certified Unified Program Agency (CUPA) Program This program consolidates, coordinates and makes consistent the administrative requirements, permitting, inspection activities, enforcement activities and fees for hazardous waste and hazardous materials programs in each jurisdiction.</p>
<p>Contra Costa County Health Services Hazardous Materials Incident Notification Policy</p>	<p>Provides oversight for spills and releases of hazardous materials.</p>

Applicable Law	Description
Contra Costa County Integrated Waste Management Plan.	Provides guidance for local management of solid waste and household hazardous waste (incorporates the county's source Reduction and Recycling Elements, which detail means of reducing commercial and industrial sources of solid waste). Waste will be recycled in a manner consistent with applicable LORS.
Oakley Municipal Code, Title 4 Public Health, Safety & Welfare Regulations, Chapter 20 – Solid Waste Collection & Regulations	Any construction, demolition and renovation project within the City which has a total cost of \$100,000 or more shall be subject to this section. Upon applying for a building permit, the applicant shall describe, on forms provided by the City, how the applicant will divert fifty percent (50%) or more of all C&D debris from the waste stream.
City of Antioch Municipal Code Article II, Title 6, Chapter 3,	Any construction, demolition and renovation project within the City which has a total cost of \$75,000 or more shall be subject to this section. Projects which exceed this cost shall submit a Waste Management Plan in accordance with this article.

SETTING

Existing Site Conditions

The proposed OGS project site is a 21.95-acre site that was part of a 210-acre parcel owned by E.I. du Pont de Nemours and Company (DuPont). The proposed OGS facility will be located at 6000 Bridgehead Road in the city of Oakley, California in Contra Costa County. The project site is south of the San Joaquin Delta area, approximately 55 miles east of San Francisco and approximately 60 miles southwest of Sacramento, east of State Route (SR) 160 and north of the Burlington Northern Santa Fe (BNSF) railroad tracks and a Pacific Gas Electric (PG&E) substation (OG 2009a, Land Use 5.6-9).

DuPont operated a chemical manufacturing facility at 6000 Bridgehead Road, Oakley, California. Operations at the Plant began in 1956. The plant produced fuel-additive anti-knock compounds and chlorofluorocarbons in 1956, and titanium dioxide (TiO₂) production was added in 1963. All three production lines have been eliminated. The DuPont property is undergoing investigation and remediation activity under the Resource Conservation and Recovery Act (RCRA).

The project owner provided a Phase I and Phase II Environmental Site Assessment (ESA), dated October 2004, for the Western Development Area, which includes the project site. A vineyard has occupied most of the WDA for over 80 years (OG 2009a, Land Use 5.6-9). DuPont used the northeast corner of the site for an aboveground fuel tank. Also the northwest portion of the WDA was adjacent to a DuPont hazardous waste storage area (CH2MHILL 2010f).

A Phase I ESA of the proposed project site was prepared on October 19, 2004, by the DuPont Corporate Remediation Group in accordance with the American Society for Testing and Materials (ASTM) Standard Practice E 1527-97 (OG 2009a, Appendix 5.14). A Phase II ESA of the proposed project site was completed due to three Areas of

Potential Concern (AOPC): an electrical substation built in 1955, a former gasoline aboveground storage tank, and the proximity to the former DuPont manufacturing facility. The Phase II ESA concluded that no further investigation was required prior to redevelopment.

The Department of Toxic Substances Control (DTSC) is responsible for the remediation oversight of the contaminated areas of the DuPont property. In 2006, the DTSC issued a decision of Corrective Action Completion without controls for three parcels of the DuPont property, including the Western Development Area, and indicated that the parcels are suitable for unrestricted land use development (CH2MHILL 2010f). The DTSC released the WDA from further regulatory oversight on May 1, 2006 (DTSC ENVIROSTOR 80001610, www.envirostor.dtsc.ca.gov).

The project owner also submitted a March 2010, Phase I ESA, in accordance with ASTM Standard Practice E 1527-05 prepared by Tetra Tech. A Due Diligence Summary Report dated January 15, 2010, was prepared by ARCADIS and submitted by the project owner to the Energy Commission.

The project owner provided a Phase I ESA for the 2.4-mile transmission line corridor for the OGS project. The Phase I ESA identified that there is a considerable amount of unrestricted and unauthorized disposal of waste along the transmission route, including, but not limited to, plastic, glass, metal, shingles, lumber, a water heater, etc (CH2MHILL 2010e). Due to the amount and variety of unauthorized solid waste along the transmission line route, staff has included Condition of Certification **WASTE-1**. Condition of Certification **WASTE-1** will require the applicant to collect and dispose of solid waste, and sample and analyze potentially contaminated soil along the transmission line route to insure that waste is properly classified as hazardous or nonhazardous prior to construction. Condition of Certification **WASTE-2** would require that prior to initiating any earthwork on the project site; the project owner shall prepare and submit to the Energy Commission Compliance Project Manager for approval, a Soils Management Plan to assure the proper handling, storage and disposal of contaminated soils. Condition of Certification **WASTE-3** would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation during site characterization, soil grading or soil excavation to determine appropriate actions to be taken in the event contaminated soil is encountered.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

- A. For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the 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 (AFC). 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 (EP) 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 EP then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the EP may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

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

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

- B. Regarding 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

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

management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management. Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions and Potential for Contamination

The Phase I ESAs and the Due Diligence Summary Report conducted for the proposed OGS site did identify recognized environmental conditions (REC) associated with the proposed project site and linear facility corridors (CH2MHILL 2010e, CH2MHILL 2010f, OG 2009a). A REC is defined by the ASTM as “the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property..” In 2006, Department of Toxic Substances Control (DTSC) issued a decision of Corrective Action Completion without controls for three parcels of the DuPont property, including the Western Development Area, and indicated that the parcels are suitable for unrestricted land use development (CH2MHILL 2010f). There is a considerable amount of unrestricted and unauthorized solid waste that has been disposed of along the 2.4-mile transmission line route; although no specific hazardous substances have been identified. However, the project owner will be required to develop a plan for cleanup of the unauthorized solid waste that has been disposed of along the transmission line route.

Given the presence of waste materials along the transmission line route, as evidenced in the Phase I ESA dated April 8, 2010, potentially contaminated soil may be encountered during site characterization, excavation, or grading, as evidenced by discoloration, odor, detection by handheld instruments, or other signs. To address this concern, Staff has included Conditions of Certification **WASTE-1, WASTE-2, WASTE-3,** and **WASTE-4**, that would require the applicant to develop a Soil Management Plan, hire an environmental professional to inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and demonstrate how the site would be managed in order to protect human health and the environment. These conditions, which are consistent with proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2** in the Worker Safety section, would ensure that potential contamination is appropriately identified, disposed of and managed so that worker health and safety is protected and potential environmental impacts are not exacerbated.

Construction Impacts and Mitigation

Site preparation and construction of the proposed power plant and associated facilities would generate both nonhazardous and hazardous wastes in solid and liquid forms (OG 2009a, Section 5.14.1.2.1). To facilitate proper management of project construction wastes, staff proposes Condition of Certification **WASTE-5** requiring the project owner to develop and implement a Construction Waste Management Plan. This condition

would require the applicant to identify the expected waste types and volumes, and the methods to be used to dispose of them during construction of the facility.

Non-hazardous Wastes

Non-hazardous solid wastes generated during construction would include approximately 202 tons of scrap wood, concrete, steel/metal, paper, glass, and plastic waste (OG 2009a, Section 5.14.1.2.1). The City of Oakley operates the Construction and Demolition (C&D) Waste Diversion Program. Any construction, demolition and renovation project within the City which has a total cost of \$100,000 or more shall be subject to Oakley Municipal Code Title 4, Chapter 20, and Section 4.20.324. The applicant will divert 50% or more of all C&D debris from the waste stream. All non-recyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, §17200 et seq. Adoption of Condition of Certification **WASTE-6** would ensure that the OGS project owner complies with the City's C&D Ordinance.

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

Hazardous Wastes

The proposed OGS would generate less than one ton of hazardous wastes during construction (OG 2009a, Table 5.14-1). Construction waste would include empty hazardous material containers, solvents, waste paint, oil absorbents, used oil, oily rags, batteries, and cleaning wastes. The amount of waste generated would be minor if handled in the manner identified in the AFC (OG 2009a, Section 5.14.1.2.1).

DTSC issues permanent California identification numbers to generators, transporters and disposal facilities for the purposes of tracking hazardous waste (Title 22 California Code of Regulations, Section 66262.12) and ensuring proper disposal. 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-7**. Although the hazardous waste generator number is determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site. Wastes would be accumulated onsite for less than 90 days and then properly manifested, transported and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in OG 2009a Section 5.14.1.2. and concluded that all wastes would be disposed of in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-8** to notify the Energy Commission's Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

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

Operation Impacts and Mitigation

The proposed OGS would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 5.14-2 of the project AFC gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed. Before operations can begin, the project owner would be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-9**. The purpose of the Operation Waste Management Plan is to avoid the potential effects on human health and the environment from handling and disposing of hazardous wastes procedures. The Plan must include appropriate procedures to ensure proper labeling, storage, packaging, recordkeeping, and disposal of all hazardous wastes. Staff believes that compliance with proposed Condition of Certification **WASTE-9** would further reduce potential impacts to local landfills from project wastes.

Non-hazardous Solid Wastes

The proposed OGS would generate 39 tons of non-hazardous waste per year during project operation. Wastes would include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media), as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass) (OG 2009a, page 5.14-7). All non-hazardous wastes would be recycled to the extent possible, and non-recyclable wastes would be regularly transported offsite to a local solid waste disposal facility (OG 2009a, section 5.14.2.3.1).

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation, and are discussed in the **SOIL AND WATER RESOURCES** section of this document.

Hazardous Wastes

The proposed OGS would generate three tons of hazardous wastes per year during routine project operation. Wastes would include used hydraulic fluids, oils, greases, oily filters and rags, spent SCR catalyst, cleaning solutions and solvents, and batteries (OG 2009a, page 5.14-7). In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous wastes. Proper hazardous material handling and good housekeeping practices will help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes

Condition of Certification **WASTE-10**, requiring the project owner/operator to report, clean-up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of the FSA.

The amounts of hazardous wastes generated during the operation of OGS would be minor, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on-site, transported offsite by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-8** to notify the CPM whenever the owner becomes aware of any such action.

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-7**, would be retained and used for hazardous waste generated during facility operation.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

The construction associated with OGS will produce a variety of mixed nonhazardous wastes, such as wood, metal, plastics, etc. Waste will be recycled where practical and non-recyclable waste will be deposited in a Class III landfill. Using a conservative assumption that most of the 202 tons of non-hazardous construction waste would be wood, which has a value of only 400 pounds per cubic yard², during construction of the proposed project, approximately 1,010 cubic yards of solid waste will be generated and recycled or disposed in a Class III landfill (OG 2009a, Section 5.14.2.3.1.). The non-hazardous solid wastes generated yearly at OGS would also be recycled if possible, or disposed in a Class III landfill.

Table 5.14-3 of the project AFC identifies four non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes generated by the OGS. These Class III landfills are all located in Contra Costa County. The remaining capacity for the four landfills combined is over 63 million cubic yards. The total 6,250 cubic yards (1,252 tons) of nonhazardous waste generated from project construction and operation, 1,010 and 5,250 (30 years) cubic yards, respectively, will consume less than 1% of the available landfill capacity (OG 2009a,

²The cubic yards value was calculated using California Integrated Waste Management Board's construction/demolition and inert debris tools and resources, which assumes construction debris wood waste weighs 400 pounds per cubic yard.
<http://www.calrecycle.ca.gov/swfacilities/CDI/Tools/Calculations.htm>

5.14-11). Staff believes that disposal of the solid wastes generated by the OGS can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Operation and maintenance of the plant and associated facilities will generate a variety of wastes, including hazardous wastes. To control air emissions, the project's turbine units would use selective catalytic reduction and oxidation catalyst equipment and chemicals, which generate both solid and hazardous waste. The hazardous waste generated during this phase of the project will consist of electrical equipment, used oils, universal wastes, solvents, and empty hazardous waste materials. (OG 2009a, Section 5.14.1.2). Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices.

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

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled will be transported offsite to a permitted treatment, storage, or disposal facility. The 270 tons of hazardous waste generated from project construction and operation will contribute less than 1% of the available landfill capacity (OG 2009a, page 5.14-11). Staff believes that disposal of the solid wastes generated by the OGS can occur without significantly impacting the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

OGS would generate non-hazardous solid waste that would add to the total waste generated in Contra Costa County and in California. However, there is adequate recycling and landfill capacity in California to recycle and dispose of the wastes generated by OGS. It is estimated that OGS would generate approximately 1,010 cubic yards of solid waste during construction (including approximately one ton of hazardous waste) and about thirty-five tons a year from operations (including eight tons of solid hazardous waste). OGS's contribution would likely represent less than 1% of the county's total waste generation (CH2MHILL 2010aa). Therefore, the cumulative impact of the proposed OGS project and other likely projects on solid waste recycling and disposal capacity would not be significant.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed OGS would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle

and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the OGS would be required to obtain a hazardous waste generator identification number from U.S. EPA. The OGS would also be required to properly store, package and label all hazardous waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

In the **SOCIOECONOMICS** section of this staff assessment, staff presents census information that shows that there are minority populations within one mile and six miles of the project. Since staff has added conditions of certification that would reduce the risk associated with hazardous waste to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the power plant on minority populations. Therefore, there are no environmental justice issues for Waste Management.

RESPONSE TO AGENCY COMMENTS

The City of Oakley provided recommended Conditions of Approval for the Energy Commission's consideration for the OGS project in a letter dated April 5, 2010. The City of Oakley's Conditions of Approval Site Plan/Architecture and Grading Plan sections included items related to Waste Management (COO 2010a).

Approval Site Plan/Architecture

10. Trash enclosures shall match Oakley Disposal and City standards and shall provide adequate space to accommodate both trash and recycling, as determined by the Community Development Director. Trash enclosures shall be constructed with a roof to match the building materials and have metal gates.

11. Storage shall be contained inside the buildings. Pallets, boxes, cardboard, etc. shall not be stored outside, except within trash enclosures.

Grading Plan

59. The burying of any construction debris is prohibited on construction sites.

Staff recommends that the project owner plan for and have appropriate areas for storage and loading recycle materials. It is expected that the applicant will include in their Construction Waste Management Plan, as required by Condition of Certification **WASTE-5**, provisions that are consistent with the City of Oakley requirements for solid waste, hazardous waste, recycled waste and construction debris.

The Department of Toxic Substance sent a letter, data January 20, 2011 stating that the agency had no comments on the Oakley PSA – Part A (DTSC 2011a).

The City of Antioch provided comments for the Energy Commission's consideration for the OGS project in a letter dated February 10, 2011. The City of Antioch requested that where the transmission line construction and operation occurs within city limits, the

applicant be required to comply with their requirement for preparation of a Waste Management Plan if project costs exceed \$75,000. They also requested that the Energy Commission staff modify Condition of Certification **WASTE-1** to require ongoing clean up of illegally disposed trash and debris within the transmission line footprint (COA 2011a).

Staff has revised Condition of Certification **WASTE-6** to require the applicant to comply with the city of Antioch's C & D Debris Program requirements specified in Antioch Municipal Code Article II, Title 6, Chapter 3. Staff also added reference to this LORS in Table 1.

Staff has revised Condition of Certification **WASTE-5** and **WASTE-9** to require the applicant to remove existing trash during construction and implement a regular schedule for trash cleanup where they have the legal right on the transmission line and project site.

CONCLUSIONS

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

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

However, to help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **8**. These conditions would require the project owner to do all of the following:

- Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1, 2, 3, and 4**).
- Comply with local waste recycling and diversion requirements (**WASTE-6**).
- Obtain a hazardous waste generator identification number (**WASTE-7**).
- Prepare Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-5 and 9**).

- Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-8**).
 - 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-10**).
2. Existing conditions at the OGS project site include areas where prior site uses may have resulted in releases of hazardous substances or soil contamination. To address these concerns, staff will require that Conditions of Certification **WASTE-1**, **WASTE-2**, **WASTE-3** and **WASTE-5** be completed prior to construction.
 3. Regarding impacts of project wastes on existing waste disposal facilities, the existing available capacity of the four Class II landfills that may be used to manage nonhazardous project wastes exceeds 63million cubic yards (OG 2009a, page 5.14-9).The total amount of nonhazardous wastes generated from construction and operation of OGS would be minimal compared to the remaining landfill capacity Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of OGS have a combined remaining capacity in excess of 10 million cubic yards. The total amount of hazardous wastes generated by the OGS project would contribute less than 1% of the remaining permitted capacity. Therefore, impacts from disposal of OGS generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

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

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall dispose of existing waste along the transmission line route within parcels where PG&E has the legal right to remove waste (including aboveground tanks, empty drums, and other equipment and materials) prior to initiation of construction of the transmission line for the Oakley Generating Station (OGS). PG&E will ensure proper handling of waste from areas disturbed during the construction of the transmission line.

Verification: At least 60 days prior to the start of site mobilization to construct the transmission line, the project owner shall provide to the CPM a list of the types and amount of existing waste to be disposed of from the Oakley Generating Station (OGS) transmission route.

WASTE-2 Prior to initiating any earthwork on the project site, the project owner shall prepare and submit to the CPM for approval, a Soils Management Plan (SMP). The SMP should include but is not limited to the following:

- Land use history, including description and locations of known contamination;
- An earthwork schedule;
- The project owner shall describe methods which will be used to properly handle and/or dispose of soil which may be classified as hazardous or contain contaminants at levels of potential concern, including the identification of legal discharge areas;
- The SMP shall discuss, as necessary, the reuse of soil on site in accordance with applicable criteria to protect construction workers or future workers on site;
- A SMP summary report, which includes all analytical data and other findings, must be submitted once the earthwork has been completed.

Verification: At least 60 days prior to any earthwork, including those earthwork activities associated with the site mobilization, ground disturbance, or grading as defined in the general conditions of certification the project owner shall submit the Soils Management Plan to the CPM for approval.

WASTE-3 The project owner shall provide the resume of an experienced and qualified Professional Engineer or Professional Geologist, who shall be available for consultation during site characterization (if needed), excavation and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

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

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

WASTE-4 If potentially contaminated soil is identified during site characterization, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Professional Engineer or Professional Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of DTSC, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Professional Engineer or Professional

Geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the DTSC for guidance and possible oversight.

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

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

- A description of all construction waste streams, including projections of frequency, amounts generated and hazard classifications; and
- A brief description waste management laws, ordinances and regulations.
 - Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
 - Removal of existing waste, where the project owner has the legal right, within the transmission line and project area; and
- A detailed description of the worker training program which will be provided to assure that appropriate waste management procedures are used in the handling, storage and disposal of operation wastes.

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

WASTE-6 The project owner shall provide a Construction and Demolition Debris Recycling (C&D debris) plan demonstrating how they will divert at least 50% of all soil, rock and gravel, and at least 50% of all construction and demolition debris to the city of Oakley per Oakley Municipal Code 4, Chapter 20, Section 4.20.324. The project owner shall ensure compliance with all of city of Oakley's diversion program requirements and shall provide proof of compliance documentation to the city and the CPM, consistent with the City's normal reporting requirements. Project mobilization and construction shall not proceed until the City issues an approval document, consistent with the city's normal building permit approval process, and the CPM provides written concurrence.

The project owner shall also provide a Waste Management Plan for the transmission line demolition and construction consistent the city of Antioch Municipal Code Article II, Title 6, Chapter 3. The project owner shall ensure compliance with all of city of Antioch's waste program requirements and shall provide proof of compliance documentation to the city and the CPM, consistent with the City's normal reporting requirements. Transmission line mobilization and construction within the limits of the city of Antioch shall not proceed until the City issues an approval document, consistent with the city's normal building permit approval process, and the CPM provides written concurrence.

Verification: Prior to the start of any construction activities, the project owner shall submit to the city Oakley, California documentation consistent with the requirements of the city's C & D Debris Program, along with the normally required deposit and administrative fees. At least 60 days prior to the start of any construction activities, the project owner shall submit the proposed C & D Debris Plan, along with any comments received from the city of Oakley, to the CPM for review and approval. Project mobilization and construction shall not proceed until the city of Oakley issues an approval document, consistent with the city's normal building permit approval, and the CPM provides written concurrence. Not later than 60 days after completion of project construction, the project owner shall submit documentation of compliance with the diversion program requirements to the CPM and city. The required documentation shall include a Recycling and Reuse Summary Report (as set forth by the county program), along with all necessary receipts and records of measurement from entities receiving project wastes.

Prior to the start of any transmission line construction activities within the city of Antioch limits, the project owner shall submit to the city of Antioch, documentation consistent with the requirements of the city's C & D Debris Program, along with the normally required deposit and administrative fees. At least 60 days prior to the start of any transmission line construction activities, the project owner shall submit the proposed Waste Management Plan, along with any comments received from the city of Antioch, to the CPM for review and approval. Project mobilization and construction shall not proceed until the city of Antioch issues an approval document, consistent with the city's normal building permit approval, and the CPM provides written concurrence. Not later than 60 days after completion of project construction, the project owner shall submit documentation of compliance with the diversion program requirements to the CPM and city. The required documentation shall include a Waste Management Plan completed in accordance with the city's requirements.

WASTE-7 The project owner or construction contractor shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (USEPA) prior to generating any hazardous waste during project construction .The project owner shall obtain a hazardous waste generator identification number prior to generating any hazardous waste during operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation and

notification and receipt of the number to the CPM in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM is only needed once unless there is a change in ownership, operation, waste generation, or waste characteristics that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to the CPM in the next scheduled compliance report.

WASTE-8 Upon notification of any impending waste management-related enforcement action related to project site activities by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts for the project, and describe the owner's response to the impending action or if a violation has been found, how the violation will be corrected.

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

WASTE-9 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Schedule for regular removal of waste, where the project owner has the right, within the transmission line and project area;
- A detailed description of the worker training program which will be provided to assure that appropriate waste management procedures are used in the handling, storage and disposal of operation wastes.
- Information and summary records of conversations with the local Certified Unified Program Agency and the 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;

- A detailed description of how facility wastes will be managed, and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed upon closure of the facility.

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

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

WASTE-10 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are reported, cleaned-up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

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

REFERENCES

CEC 2010e -- California Energy Commission/M. Mourkas (tn 58268). Report of Conversation - Soil Stockpiles & Transmission Poles, dated August 25, 2010. Submitted to CEC/Docket Unit on September 1, 2010.

CH2MHILL 2010e – CH2MHILL/D. Davy (tn 56163). Applicant's Phase 1 Environmental Site Assessment, Transmission Line Corridor, dated April 7, 2010. Submitted to CEC/Docket Unit on April 7, 2010.

CH2MHILL 2010f – CH2MHILL/D. Davy (tn 56480). PG & E's Due Diligence Summary Report, dated April 29, 2010. Submitted to CEC/Docket Unit on April 29, 2010.

CH2MHILL 2010aa -- CH2MHILL/D. Davy (tn 58984). Email from CH2M Regarding Question about Applicant's Solid Waste during Operation, dated November 9, 2010. Submitted to CEC/Docket Unit on November 9, 2010.

COA 2011a – City of Antioch/M. Gentry (tn 59733). City of Antioch Comments on PSA, dated February 10, 2011. Submitted to CEC/Docket Unit on February 18, 2011.

COO 2010a – City of Oakley/R. Willis (tn 56232). City of Oakley Comments, dated April 5, 2010. Submitted to CEC/Docket Unit on April 14, 2010.

DTSC 2011a – Department of Toxic Substances Control/ A. Fone (tn 59532). DTSC Comments on Oakley PSA Part A, dated January 20, 2011. Submitted to CEC/Docket Unit on January 26, 2011.

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.

OG 2009b – Oakley Generating Station (tn 52934). Applicant's Data Adequacy Supplement, dated August 24, 2009. Submitted to CEC/Docket Unit on August 24, 2009.

WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh, P.E. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Oakley Generating Station (OGS) project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1** and **-2** and fulfils the requirements of 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 Staff Assessment (SA) is to assess the worker safety and fire protection measures proposed by the OGS 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 California 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)	
2007 Edition of California Fire Code and all applicable NFPA standards (24 CCR	National Fire Protection Association (NFPA) standards are incorporated into the California Fire Code. The fire code contains general provisions for fire safety, including road and building access, water supplies, fire protection and life safety systems, fire-resistive construction, storage of combustible materials, exits

Part 9)	and emergency escapes, and fire alarm systems. Enforced by the East Contra Costa Fire Protection District.
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SETTING

The project site is on land that is zoned Heavy Industrial. It is on a 21.95-acre site that was previously part of a larger 210-acre site owned by E.I. duPont de Nemours and Company (DuPont). The site elevation is approximately 32 feet above mean sea level. The site is bounded to the west by the Pacific Gas and Electric Company's (PG&E) Antioch Terminal, a large natural gas transmission hub; to the north by DuPont property that is industrial and vacant industrial; to the east by DuPont's titanium dioxide landfill area; and to the south by the Burlington Northern Santa Fe railroad. Immediately south of the railroad is a large parcel currently in agriculture. A 74.6-acre commercial development, the Rivers Oaks Crossing, has been proposed for this parcel (OG2009a, Section 5.9.1). Surrounding land uses include the former DuPont Oakley manufacturing site and marinas along the San Joaquin River to the north, power plants owned by Pacific Gas and Electric Company (PG&E) and Mirant to the west; vineyards and mixed commercial, industrial, and residential uses to the south, and vineyards and residential uses to the east (OG2009a, Section 1.0).

The proposed facility would be located in the northwest area of the City of Oakley 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 East Contra Costa Fire Protection District (ECCFPD). The closest station to the OGS site would be Station #93, located at 212 Second Street, Oakley, approximately 3 miles southeast 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 5 minutes. The next nearest station that would respond through an automatic aid agreement would be the Contra Costa County Fire Protection District (CCCFPD) Station #81, located about 3.5 miles away at 315 West Tenth Street in Antioch, with a total response time of about 7 minutes. Another nearby station that would respond would be CCCFPD station #88, located about 5.1 miles away, with a total response time of 7 minutes (ECCFPD 2010 and OG 2009a, Section 5.10.16.2).

In the event of a hazardous materials incident, the ECCFPD 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 OGS with a response time of typically 30 minutes or up to one hour (ECCFPD 2010 and OG 2009a, Section 5.10.16.2).

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 OGS 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 OGS 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

OGS encompasses 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 combined-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 (OG 2009a, Section 5.16.2.3.1):

- 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 Program
- 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 OGS, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the ECCFPD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at OGS, 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 OGS, 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 (OG 2009a, Section 5.16.2.3). Prior to operation of OGS, all detailed programs and plans would be provided to the CPM and ECCFPD 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 (OG 2009a, Section 5.16.2.3.2):

- 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 (OG 2009a, Section 5.16.2.3). 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 ECCFPD 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 OGS 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 (OG 2009a, Section 5.16.2.3).

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% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% 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%) between 1980 and 1993.

- Construction injuries account for 15% 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 OGS 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 a representative of the ECCFPD 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 ECCFPD (OG 2009a, Sections 5.10.1.6.2 and 5.16.2.3, and ECCFPD 2010).

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 (OG 2009a, Section 5.16.2.3.1).

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 National Fire Protection Association (NFPA) standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements (OG 2009a, Section 5.16.3 and Table 5.16-5). Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The underground firewater loop would supply the hydrants and fixed suppression systems installed for the OGS structures. The primary firewater source would be a connection to the Diablo Water District potable water distribution system. The secondary source of fire protection water would be an onsite fire/service water storage tank, sized in accordance with NFPA guidelines to provide two hours of protection for the onsite worst-case single fire. Electric motor-driven and a diesel engine-driven fire pumps would be provided to pump water from the onsite storage tank (OG 2009a, Section 2.1.12).

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 (OG 2009a, Section 2.4.3.1).

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 (OG 2009a, Sections 2.1.12 and 2.4.3.1). These

systems are standard requirements by the NFPA, and the California Fire Code (CFC) and staff has determined that they will ensure adequate fire protection.

The primary access point to the site would be via an entrance from Bridgehead Avenue, which provides access to the OGS site from the western boundary. A secondary access point for fire and emergency services would be provided via an access road from Wilbur Avenue that is located approximately 900 feet north of the main entrance and which provides access to the OGS site through the DuPont property from the north-eastern boundary (OG 2009a, Figure 2.1-1).

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 ECCFPD 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 OGS combined with existing industrial facilities and expected new facilities (Willow Pass Generating Station in Pittsburg and Marsh Landing Generating Station, north of Antioch) to determine impacts on the fire and emergency service capabilities of the ECCFPD.

When discussing the project and potential impacts on fire services with the ECCFPD, Acting Fire Chief Hugh Henderson stated that the fire district is adequately staffed and equipped to respond to incidents at the OGS and he does not anticipate that the proposed facility would impact the department. 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments relating to worker safety or fire protection were received.

CONCLUSIONS

Staff concludes that if the applicant for the proposed OGS project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Condition of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant would not present a significant incremental or cumulative impact on the local fire department.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the East Contra Costa 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 construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the

CPM of any comments received from the East Contra Costa Fire Protection District 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 East Contra Costa 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 to the CPM of any comments received from the East Contra Costa Fire Protection District on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;
- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- assure that all the plans identified in Conditions of Certification **WORKER SAFETY-1** and **-2** are implemented.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- summary report of safety management actions and safety-related incidents that occurred during the month;
- report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification **WORKER SAFETY-3**, and for implementing all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during demolition, construction, and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During demolition, construction, and commissioning, the following persons shall be trained in its use and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

REFERENCES

California Fire Code 2007. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

ECCFPD 2010 – East Contra Costa Fire Protection District. Record of conversation with Acting Fire Chief Hugh Henderson, September 9, 2010.

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.

USOSHA (United States Occupational Safety and Health Administration). 1993. Process Safety Management / Process Safety Management Guidelines For Compliance. U.S. Department of Labor, Washington, DC.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

The California Energy Commission 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 Oakley Generating Station (OGS). 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 (OG 2009a, AFC Appendix 2B through 2H). 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	2010 (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 City of Oakley 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

OGS would be built on an approximately 22-acre site located in the City of Oakley in Contra Costa County. For more information on the site and its related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC, Appendix 2 (OG 2009a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and 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 program 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 OG 2009a, Appendix 2, 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. To ensure compliance, staff proposes those conditions of certification as listed in the **Geology and Paleontology** section of this document.

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.

OGS will be designed and constructed to the 2010 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 2010 CBSC takes effect, the 2010 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. 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.

PROJECT QUALITY PROCEDURES

The applicant 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 (OG 2009a, AFC § 2.4, Appendix 2B through 2H). 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 OGS is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.1 of the 2010 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 103.3 of the 2010 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 may 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 the City of Oakley, 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 for protection of 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. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

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 OGS 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 2010 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); 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 2010 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 2010 CBSC is in effect, the 2010 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.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM 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 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.

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 consistent with the fees listed in the 2010 CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

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

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

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. 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 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 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.
- 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 2010 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 2010 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 2010 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 weld 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 .pdf 6.0 or newer version) 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. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils, geotechnical, or foundation investigations reports required by the 2010 CBC.

Verification: At least 15 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 2010 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 lists. 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 2010 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 2010 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 2010 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);
- NACE R.P. 0169-83;
- NACE R.P. 0187-87;
- 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);
- Contra Costa County codes; and
- The City of Oakley 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) 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 diagram for the 13.8 kV, 4.16 kV and 480 V systems;
2. system grounding drawings;
3. lightning protection system; and
4. hazard area classification plan.

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

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009.
Submitted to the CEC/Docket Unit on June 30, 2009.

GEOLOGY AND PALEONTOLOGY

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

SUMMARY OF CONCLUSIONS

The proposed Oakley Generating Station (OGS), formerly the Contra Costa Generating Station, site is located in an active geologic area of the Great Valley physiographic province along the boundary between the northern Coast Ranges and the Great Valley physiographic provinces. The project will be within the northwestern portion of the Oakley city limit in Contra Costa County, California, adjacent to the eastern city limit of Antioch, California. Because of its geologic setting, the site could be subject to intense levels of earthquake-related ground shaking and associated liquefaction. While the potential for earthquake ground rupture is low, at least 43 major faults (or combined fault segments) are located within 50 miles of the site. 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 impacts to the project from strong ground shaking, liquefaction, lateral spreading, and dynamic compaction can be effectively mitigated, however, through structural designs as required by the 2010 California Building Code (CBC). The design-level geotechnical investigation required for the project by the CBC and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** require standard engineering design recommendations for mitigation of strong ground shaking, liquefaction, expansive clay soils, and excessive settlement due to compressible soils.

There are no known viable geologic or mineralogical resources at the proposed OGS site or along the project linears. 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 OGS project 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 OGS project as well as the OGS 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 (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the application for certification (AFC) (OG 2009a). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

<u>Applicable Law</u>	<u>Description</u>
<u>Federal</u>	The proposed OGS 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 (2010)	The CBC (2010) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The project site is not located within a designated Alquist-Priolo Fault Zone.
The Seismic Hazards Mapping Act, PRC section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	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.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP), 1995	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
<u>Local</u>	
California Building Code (2010)	These codes address the excavation, grading, and earthwork construction, not limited to construction relating to earthquake safety and seismic activity hazards.

<u>Applicable Law</u>	<u>Description</u>
Contra Costa County General Plan (2005) Section 9.7 Item 9-31 to 9-35	The section requires a general plan for long term development. Under this protection, paleontological resources shall be protected and preserved.
City of Oakley General Plan 2020 (2002) Section 6.4	Section states "There have been few archeological or paleontological finds in the City of Oakley. However, given the rich history of Plan Area, City will continue to require site evaluation prior to development of undeveloped areas, as well as required procedures if artifacts are unearthed during construction."

SETTING

The proposed OGS project would be constructed on a 21.95-acre site at 6000 Bridgehead Road, Oakley, California near the junction of State Routes (SR) 4 and 160. The project is bounded to the west by the PG&E Antioch Terminal, a large natural gas transmission hub, to the north by DuPont property that is either industrial or vacant industrial, to the east by DuPont's titanium dioxide landfill area, and to the south by the Burlington Northern Santa Fe (BNSF) railroad. The OGS project will consist of a 624 megawatt (MW) nominal generating capacity natural-gas-fired combined-cycle electric generating facility. The plant will consist of two General Electric Frame 7FA combustion turbine generators, a single condensing steam turbine generator, heat recovery generators, an air-cooled condenser, an emission reduction system, and associated support equipments and buildings. An on-site 230 kilovolt (kV) switchyard will also be constructed as part of the project. In addition, the project will include an approximate 2.4-mile-long, single-circuit 230-kV transmission line that will connect the on-site switchyard to Pacific Gas and Electric Company (PG&E) Contra Costa Station to the southwest. This transmission line will utilize the existing 80-foot-wide PG&E easement for transmission, but will replace the existing 60-kV lattice towers with new 230-kV poles along this route, where offsite ground disturbance will occur along the transmission route. Natural gas to the generating station will be supplied via a new direct connection from the adjacent PG&E Antioch natural gas terminal. Other project utility improvements would include new pipelines to the existing on-site potable water line and a new 0.44-mile force main in Bridgehead Road and Main Street to connect to the sanitary sewer pipeline.

REGIONAL SETTING

The OGS site is located in Contra Costa County, California, along the boundary between the Coast Ranges and the Great Valley (Central Valley) physiographic provinces (OG 2009a). The Great Valley is approximately 400 miles long and 60 miles wide, bounded on the north by low-lying hills; on the northeast by the volcanic plateau of the Cascade Range; on the west by the Coast Ranges; on the east by the Sierra Nevada; and on the south by the Coast Ranges and the Tehachapi Mountains. The northern third of the valley is known as the Sacramento Valley, while the southern two-thirds are known as the San Joaquin Valley. 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 OGS site lies in the flat land between the floodplain of San Joaquin River to the north and Los Medanos Hills, piedmont of the Diablo Range, to the southwest. The Diablo Range extends south of the San Joaquin-Sacramento Delta in the western side of the San Joaquin Valley and comprises a series of large en echelon anticlines composed of Franciscan Complex rocks and intervening synclines containing younger rocks. Los Medanos Hills is located approximately 1.7 miles southwest of the project site. San Joaquin River flows westerly approximately 0.6 miles north of the site (OGS 2009).

PROJECT SITE DESCRIPTION

The OGS site is located in Section 22, Township 2 North, Range 2 East of Mount Diablo Meridian at approximately 38.01 degrees north latitude by 121.75 degrees west longitude. The power plant site is located within a designated industrial area for energy projects in the City of Oakley, within the city limits (City of Oakley 2002). A portion of the project offsite transmission line will run through the city limits of the City of Antioch. The project site elevation generally varies from 58 to 65 feet above mean sea level (msl), and the site gradually slopes to the east at a grade of approximately 0.25% (OG 2009a).

The surficial geology of the site has been described as containing Quaternary age beach and dune sand deposits of northeastern Contra Costa County (USGS 2006b). 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 site is immediately underlain by loose to medium dense silty sand of varying thickness from 13 to 21 feet. An approximately 4 to 12-foot-thick silty clay to clay soil layer is present beneath the silty sand layer. The site silty clay or clay soils are moist to wet, stiff to very stiff and contains low to high plasticity fines (OG 2009a). The thickness of the silty clay or clay layer increases towards the northwest corner of the site. These clay soils are followed by dense to very dense sand to the maximum depth of exploration (100 feet below existing grade).

The depth to the ground water varied between 14 and 15 feet below the ground surface at the time of exploration (OG 2009a).

Several active and potentially active faults related to regional strike-slip faulting and compressional tectonics are present within 50 miles of the OGS site. EQFAULT™ Version 3.00 was used to model these potential seismic sources (Blake 2006). The various faults 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 (CDMG) Fault Activity Map of California (CDMG 1994) and United States Geological Survey Fault Maps (USGS 2009b). The sense of movement and fault class were derived from the California Department of Conservation Fault Parameters (CDC 2002b).

Geology and Paleontology Table 2
Active Faults Relative to the Proposed OGS 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 Strike¹</u>	<u>Fault Class</u>
GREAT VALLEY 5	4.3	6.5	0.398	Reverse	B
GREENVILLE (GN)	9.9	6.7	0.218	Right lateral – Strike slip	B
MOUNT DIABLO (MTD)	10.9	6.7	0.245	Reverse	B
CONCORD/GV (CON)	15.2	6.3	0.129	Right lateral – Strike slip	B
CONCORD/GV (CON+GVS)	15.2	6.6	0.153	Right lateral – Strike slip	B
CONCORD/GV (CON+GVS+GVN)	15.2	6.7	0.164	Right lateral – Strike slip	B
CONCORD/GV (FLOATING)	15.2	6.2	0.126	Right lateral – Strike slip	B
CONCORD/GV (GVS+GVN)	18.0	6.5	0.128	Right lateral – Strike slip	B
CONCORD/GV (GVS)	18.0	6.2	0.113	Right lateral – Strike slip	B
CALAVERAS (CS+CC+CN)	19.5	6.9	0.153	Right lateral – Strike slip	B
CALAVERAS (CC+CN)	19.5	6.2	0.106	Right lateral – Strike slip	B
CALAVERAS (FLOATING)	19.5	6.2	0.104	Right lateral – Strike slip	B
CALAVERAS (CN)	19.5	6.8	0.141	Right lateral – Strike slip	B
GREAT VALLEY 4	21.3	6.6	0.146	Reverse	B
GREAT VALLEY 7	22.6	6.7	0.147	Reverse	B
GREENVILLE (GS+GN)	22.9	6.9	0.136	Right lateral – Strike slip	B
GREENVILLE (FLOATING)	22.9	6.2	0.092	Right lateral – Strike slip	B
GREENVILLE (GS)	22.9	6.6	0.114	Right lateral – Strike slip	B
CONCORD/GV (GVN)	27.7	6.0	0.073	Right lateral – Strike slip	B
HAYWARD (FLOATING)	28.0	6.9	0.114	Right lateral – Strike slip	A
HAYWARD (HS+HN+RC)	28.0	7.3	0.138	Right lateral – Strike slip	A
<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 Strike¹</u>	<u>Fault Class</u>
HAYWARD (HS)	28.0	6.7	0.101	Right lateral – Strike slip	A
HAYWARD (HS+HN)	28.0	6.9	0.115	Right lateral – Strike slip	A
HAYWARD (HN+RC)	28.3	7.1	0.127	Right lateral – Strike slip	A
HAYWARD (HN)	28.3	6.5	0.091	Right lateral – Strike slip	A
WEST NAPA	29.1	6.5	0.090	Right lateral – Strike slip	B
HAYWARD (RC)	37.7	7.0	0.096	Right lateral – Strike slip	A
HUNTING CREEK - BERRYESSA	39.1	7.1	0.098	Right lateral – Strike slip	B
CALAVERAS (CC)	39.1	6.2	0.062	Right lateral – Strike slip	B
CALAVERAS (CS+CC FLOATING)	39.1	6.2	0.061	Right lateral – Strike slip	B
CALAVERAS (CS+CC)	39.1	6.4	0.066	Right lateral – Strike slip	B
SAN ANDREAS (SAP)	46.1	7.2	0.089	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP+SAN)	46.1	7.8	0.122	Right lateral – Strike slip	A
SAN ANDREAS (SAP+SAN+SAO)	46.1	7.8	0.127	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP+SAN+SAO)	46.1	7.9	0.132	Right lateral – Strike slip	A
SAN ANDREAS (SAS+SAP)	46.1	7.4	0.102	Right lateral – Strike slip	A
SAN ANDREAS (SAP+SAN)	46.1	7.7	0.116	Right lateral – Strike slip	A
SAN ANDREAS (FLOATING)	46.1	6.9	0.078	Right lateral – Strike slip	A
GREAT VALLEY 3	47.3	6.9	0.093	Reverse	B
SAN ANDREAS (SAN+SAO)	47.6	7.7	0.116	Right lateral – Strike slip	A
SAN ANDREAS (SAN)	47.6	7.5	0.101	Right lateral – Strike slip	A
MONTE VISTA - SHANNON	48.1	6.7	0.082	Reverse	B
GREAT VALLEY 8	49.6	6.6	0.076	Reverse	B

¹ All faults strike northwest unless otherwise indicated.

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 (2010) 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 OGS 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, potentially liquefiable soils 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 (2010). The requirements of the proposed Conditions of Certification **GEN-1**, **GEN-**

5, and **CIVIL-1** in the **Facility Design** section will also aid in mitigating these potential 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 (OG 2009a). The geologic units at the site are widespread throughout the eastern San Francisco bay and, as such, are not unique in terms of recreational, commercial, or scientific value. Finally, staff reviewed existing documentation that outlines aggregate, oil, geothermal, and natural gas production in the area (CDOGGR 2009). The information provided and the documentation reviewed indicates that the project should not impact, directly or indirectly, available geologic resources.

No paleontological resources or fossiliferous sediments were observed on the OGS site during the field survey of the plant site and reconnaissance-level paleontological field survey of the transmission line corridor (OG 2009a). Since the proposed OGS site construction would include significant amounts of grading, excavation, possible pile driving, and utility trenching, staff considers the probability that paleontological resources would be encountered during such activities to be high anytime excavation activities fully penetrate the disturbed surficial site soils or near surface Holocene alluvium deposits and encounter older Quaternary alluvium deposits. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, 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 (paleontologic resource specialist; PRS).

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

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

GEOLOGIC HAZARDS

The AFC (OG 2009a) provides documentation of potential geologic hazards at the proposed plant site. Review of the AFC, coupled with staff's independent research, indicates that the possibility of geologic hazards impacting the plant site, during its practical design life, is low. Geologic hazards, such as strong ground shaking, liquefaction during an earthquake, and settlement due to dynamic compaction must be addressed in the project geotechnical report per CBC (2010) requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the OGS plant site. Geological information was available from the California Geological Survey (CGS), 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/year and are capable of producing an earthquake of magnitude 6.5 to 7.0. Sixteen Type A faults and 27 Type B faults have been identified within 50 miles of the proposed OGS 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 OGS power plant site or to cross the transmission route, setbacks from occupied structures will not be required.

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (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 OGS power plant site. The nearest major active fault is the Segment 5 of Great Valley Fault located approximately 4.3 miles northeast of the plant site (**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 segment 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 from the site is the northern segment of Green Valley fault and that is mapped 9.9 miles southwest of the site. The Green Valley fault has been identified as a Type B fault with right-lateral northwest dipping structure and as having a slip rate of approximately 5.0 mm/year. The Mount Diablo Thrust fault is mapped approximately 10.9 miles southwest of the site. The Mount Diablo Thrust has been identified as a Type B fault with reverse and 38-degree-northwest dipping structure and as having a slip rate of approximately 2.0 mm/year. The closest Type A fault from the site, the Hayward Fault, is mapped being 28 miles southwest of the site and as having a slip rate of as much as 9.0 mm/year (CDC 2002b). The Hayward Fault, and most of other faults listed on **Geology and Paleontology Table 2** within 50 miles of the OGS 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 Sand Andreas Fault is mapped about 46 miles southwest of OGS site. The Antioch Fault was initially mapped as a northwest-striking creep active fault approximately 2 miles southwest of OGS site. However, a recent study has concluded that there is no evidence that an active surface fault structure exists in Antioch (CDC 1992b). Therefore, the Antioch fault is no longer considered as a quaternary active fault in Alquist-Priolo Special Studies Zone mapping. A recent report of 20-year long creep measurement study concludes that the average rate of movement in the Antioch Fault is virtually zero (SSA, 2003).

Based on the geotechnical investigation performed for this project (OG 2009a), the site soil class is assumed to be Site Class D to Site Class F where liquefiable soils are present. The estimated peak horizontal ground acceleration for the power plant is 0.62 times the acceleration of gravity (0.62g) for a bedrock acceleration based on 2% probability of exceedence in 50 years under 2010 CBC criteria (USGS 2009a).

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. The OGS site is predominantly underlain by fine to coarse sand of various density. Potentially liquefiable layers of submerged sand layers that exhibit relatively low blow counts are present between 7 feet above and below mean sea level (OG 2009a). The Contra Costa County General Plan (2005) identifies the project area and most of the 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 (2010) and proposed Conditions of Certification **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. Since the OGS site is underlain by liquefiable sand layers of considerable thickness, the potential for lateral spreading during seismic events at the project site and along transmission route will be low to moderate. However, the lateral spreading will be limited by the relatively flat site slopes. The project-specific geotechnical report required by the CBC (2010) and proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** 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 sand soils of dune sand origin, dynamic compaction of these materials during an earthquake is possible. The project-specific geotechnical report required by the CBC (2010) and proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section 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. The geologic environment and geotechnical investigation of the OGS site suggests minimal hydrocollapse potential at the site.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to surcharge loads, such as mass filling or large 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 regional subsidence problems exist in the OGS project area (OG 2009a). However, future changes in ground water pumping or development of hydrocarbon reserves in the Sacramento Valley could theoretically impact the site. If mass filling or large structure foundations will be incorporated at the site, recommendations for mitigating the effects of subsidence due to surcharge loading must be provided in the project-specific geotechnical report as required by the CBC (2010) and proposed **Facility Design Conditions of Certification GEN-1, GEN-5, and CIVIL-1**. When necessary, mitigation for mass filling is normally accomplished by pre-loading or waiting for primary consolidation to take place, and mitigation of heavily loaded foundations is typically accomplished by incorporating deep foundations to support significant 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, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. The site is underlain by non-plastic to low plasticity silty sand with non-expansive characteristics to 13 feet or more below the existing grade. Low to high plasticity clay soils underlie the below-surface sand soils. However, based on the site topography, minimal site grading is expected at the site and it is unlikely that the plant structures will be immediately underlain by expansive clay soils. Further, the United States Department of Agriculture (USDA 2009) has identified the surficial materials at the plant site as generally non-plastic sand soils that possess negligible shrink-swell potential. Therefore, the potential impact of expansive soils on the proposed MLGS site is negligible.

Landslides

The OGS site and planned linear alignments are in flat land areas with minimal or negligible slopes. The flat lying nature and the absence of topographically high ground within or immediately upgradient from the site suggest it is not susceptible to landslide activity.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the OGS site and most of the offsite transmission line as lying in Zone X, or areas determined to be outside the 0.2% annual chance flood plain (FEMA 2009). A small portion of the transmission route near Viera Avenue, Antioch, California will lie within Zone AE, or special flood hazard areas with base flood elevation determined, approximately 25 to 30 feet above mean sea level (FEMA 2009). The potential impact of flooding on the proposed OGS project site and most of offsite improvements is negligible. If transmission towers are planned in the above mentioned small area subject to flood hazard, the elevation of the tower footing need to be established based on the base flood elevation.

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. The proposed OGS site is located over 25 miles upriver from San Francisco Bay and over 45 miles from the Pacific Ocean coast line. Further, OGS site is approximately 0.6 miles from the southern bank of San Joaquin River. Therefore, the potential impact to the OGS site due to tsunamis is negligible. No large inland surface water bodies which could produce seiches are located near the proposed plant site.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Based on mapping information developed by the CDC, the site and other off-site project features lie in Mineral Resource Zone (MRZ)-3, which is defined by the CDC as an area containing mineral deposits the significance of which cannot be evaluated from available data. In addition, the project site and the offsite transmission route 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 2002a; 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 2006a; USGS 2006b; USGS 2000; USGS 1997a; USGS 1994; USGS 1993; USGS 1982; USDA 2008; UCMP 2009a; UCMP 2009b; City of Oakley 2002; Contra Costa County 2005). Areas with potentially significant mineralogical resources are located approximately 1.5 miles west and 2 miles southwest 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). The southern MRZ-2 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 OGS 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). 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 OGS site (CDC 1999).

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.

The OGS 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 1.4 miles southeast and 2.3 miles northeast of the site, respectively. The Rio Vista gas field with large exposure area is located approximately 5.4 miles north to northwest of the project site. The Brentwood oil field of Contra Costa County is located approximately 3.0 miles south of the site. Geothermal fields are present just north of the site along the bed of the San Joaquin River (CDC 2002a; CDC 1999; CDOGGR 2009). A natural gas exploration well advanced approximately 3,000 feet northeast of the project site was dry and abandoned (CDOGGR 2009). At least 5 thermal springs or wells are also present in Contra Costa County (CDOGGR 2009).

Since the site and project linears are generally mapped as lying in MRZ-3; previous exploration at the project site did not reveal the presence of any significant amount of potential PCC aggregate deposits (OG 2009a); 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 Section 5.8 of the AFC. In addition, staff has 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 3 paleontological localities have been documented within 3 miles of the OGS site in a northwesterly to southwesterly direction towards Mount Diablo. The closest locality was found in Quaternary alluvium deposits just south of San Joaquin River, approximately 1.6 mile northwest of the OGS site. This locality has at least 6 vertebrate specimens. A second locality has been documented in Quaternary alluvium deposits approximately 2.2 miles southwest of the site, and the last

locality was encountered in Tertiary age deposits approximately 2.6 miles southwest of OGS site (UCMP 2009a; UCMP 2009b). Quaternary alluvium deposits are also present at the proposed plant site and along the project linears; however, recent paleontological monitoring of the same geologic units have failed to yield scientifically significant fossil remains (OG 2009a). In addition, the upper 3 to 4 feet of existing materials has been previously disturbed during agricultural operations. As a result, the potential to encounter paleontological resources during construction of the OGS project is low, and, any potential impacts to such resources can be effectively mitigated through the Conditions of Certification **PAL-1** through **PAL-7**.

Construction Impacts and Mitigation

The design-level geotechnical investigation required for the project by the CBC (2010) and proposed **Facility Design** Condition of Certification **GEN-1** provide standard engineering design recommendations for mitigation of strong ground shaking, potentially liquefiable soils, and excessive settlement due to dynamic compaction, as appropriate (see proposed Conditions of Certification in the **Facility Design** section of this Preliminary Staff Assessment).

Based on site-specific exploration (OG 2009a), no viable geologic or mineralogic resources are known to be present at the plant site and are not expected to be present along the proposed linears. The previously disturbed soils due to agricultural activities have a negligible paleontological sensitivity, and recent paleontological monitoring of the underlying geologic units have failed to yield scientifically significant fossil remains (OG 2009a). Therefore, staff considers the probability of encountering significant paleontological resources to be low.

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 OGS 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, possible liquefaction, and foundation settlement due to dynamic compaction can be effectively mitigated through facility design (see proposed Conditions of Certification **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 OGS 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.

Although not encountered during site-specific exploration (OG 2009a), viable geologic resources are present in the vicinity of the project site; however, the viable geologic units are widespread alluvial deposits that occur in the San Joaquin-Sacramento Delta region and are therefore not unique in terms of recreational, commercial, or scientific value. As a result, the proposed OGS project should have negligible cumulative effect on these resources.

Paleontological resources have been documented in the general area of the project. Because the value of paleontological resources is associated with their discovery within a specific geologic host unit, the surficial disturbed sediments and Holocene younger alluvial deposits hold little promise for production of scientifically significant fossil remains. 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 OGS 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. Proposed paleontological conditions of certification follow in **PAL-1** through **PAL-7**. It is staff's opinion that the likelihood of encountering paleontologic resources during plant and project linear construction is low. Staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination

of sufficient, representative, deep excavations that will allow a full understanding of site stratigraphy.

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 2 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.

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 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted, 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 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted then, 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

Oakley Generating Station (09-AFC-4)

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

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

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

Biological Trainer: _____ Signature: _____ Date: ____/____/____

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POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Oakley Generating Station (OGS), if constructed and operated as proposed, would generate 624 megawatts (MW) (net output at California Independent System Operator (ISO) conditions¹) of electricity at an overall project fuel efficiency of 56 percent lower heating value (LHV). While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would create 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 OGS power plant, will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that OGS'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 will likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures or alternatives 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

The applicant proposes to build and operate OGS, a 624 MW (net output) combined cycle power plant, employing the General Electric's (GE) rapid response combined cycle technology, to serve California's energy needs and provide operating flexibility (that is, the ability to start up, shut down, turn down, and provide load following and

¹ 59 degrees Fahrenheit and 60 percent relative humidity

spinning reserve, when needed) (OG 2009a, AFC § 1.1). The project's combined cycle equipment will consist of two GE Frame 7FA combustion gas turbine generators (combustion turbines) with an evaporative inlet air cooling system, two triple-pressure heat recovery steam generators (HRSGs), and one triple-pressure, reheat, condensing steam turbine generator arranged in a two-on-one combined cycle train (OG 2009a, AFC §§ 1.1, 2.1, 2.4.2). The gas turbines and HRSGs will be equipped with dry low-NO_x combustors and selective catalytic reduction, respectively, to control air emissions (OG 2009a, AFC §§ 2.1.2, 2.1.4.1, 2.1.4.2, 2.1.4.3).

Natural gas will be delivered to OGS via a new 6- to 10-inch-diameter, 300-foot-long gas line that will be connected to Pacific Gas and Electric Company (PG&E) Line 303 (OG 2009a, AFC § 4.0; GB 2011a). A secondary line, a new 6- to 10-inch-diameter, 410-foot-long gas pipeline from PG&E Line 400 may be constructed to provide additional natural gas in order to meet the project's need.

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, OGS will burn natural gas at a nominal rate of approximately 3,569 million British thermal units (MMBtu) per hour, LHV, during base load operation (OG 2009a, AFC § 2.1.6) This is a substantial rate of energy consumption that could potentially impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 56 percent LHV (OG 2009a, AFC, Figure 2.1-4

and Appendix 2A). This efficiency level compares very favorably with the average fuel efficiency of a typical base load combined cycle power plant.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas to operate the project (OG 2009a, AFC §§ 1.1, 2.1, 2.4.5.1, 2.4.7.1). Natural gas will be delivered to OGS via a new 6- to 10-inch-diameter, 300-foot-long gas line that will be connected to Pacific Gas and Electric Company (PG&E) Line 303 (OG 2009a, AFC § 4.0; GB 2011a). A secondary line, a new 6- to 10-inch-diameter, 410-foot-long gas pipeline from PG&E Line 400 may be constructed to provide additional natural gas in order to meet the project's need. The AFC states that PG&E has confirmed its system's adequate capacity to supply the project (OG 2009a, AFC § 2.5.3). The PG&E system is capable of delivering the gas that OGS will 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 will be supplied to the project by PG&E via new pipeline connections. There appears to be little likelihood that OGS will require additional capacity since regional supplies are currently plentiful.

COMPLIANCE WITH ENERGY STANDARDS

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

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

OGS could create significant adverse impacts on energy resources if alternatives reduced 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

OGS will be a combined cycle power plant. Electricity will be generated by two gas turbines and a reheat steam turbine operating on heat energy recovered from the gas turbines' exhaust (OG 2009a, AFC §§ 2.1.3, 2.1.4). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or a steam turbine operating alone. This configuration is well suited to the large, steady loads met by a base load plant that generates energy efficiently over long periods of time.

The applicant proposes to install evaporative inlet air coolers, triple-pressure HRSGs, a reheat steam turbine unit, and a power cycle cooling system (OG 2009a, AFC §§ 2.0, 2.1.3, 2.1.4). Staff believes these features to be meaningful efficiency enhancements to OGS. The two-train combustion turbine/HRSG configuration is also highly efficient during unit turndown since one gas turbine can be shut down, leaving the other fully

loaded. This allows the efficient operation of one gas turbine instead of the operation of two gas turbines operating at a less efficient 50 percent of load.

The OGS's design will incorporate GE's rapid start technology, which will allow the combustion turbine to reach base load more quickly. This technology combines the fast start capability of the simple cycle gas turbine technology and the efficiency of the combined cycle technology. This technology is designed to start quickly, and while in startup phase, to operate at an efficiency rating comparable to a typical simple cycle plant. Within minutes, the steam turbine generator would begin producing power. The plant would then operate at a typical combined cycle efficiency rating.

Equipment Selection

The F-class of advanced gas turbines to be installed in OGS represents one of the most modern and efficient machines available. The applicant will install two GE Frame 7FA combustion gas turbine generators in a two-on-one combined cycle power train nominally rated at 530 MW and 57.9 percent maximum full load efficiency LHV under the ISO conditions (GTW 2009). OGS will also employ GE's rapid start technology that effectively reduces time required for startup and shutdown of the turbine generators, with similar thermal efficiency.

One possible alternative turbine is the Siemens SCC6-5000F, nominally rated in a two-on-one train combined cycle configuration at 598 MW and 57.3 percent efficiency LHV at ISO conditions (GTW, 2009).

Another alternative is the Alstom Power KA24, nominally rated in a two-on-two configuration at 560 MW with an efficiency rating of 57.3 percent LHV at ISO conditions (GTW 2009).

Any differences among the GE 7FA, SCC6-5000F, and Alstom KA24 in actual operating efficiency will 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

OGS's objectives include the generation of base load electricity and ancillary services at all hours of the day to serve energy needs of the project (OG 2009a, AFC §§ 1.3, 2.1, 2.4.2).

Alternative Generating Technologies

Alternative generating technologies for OGS are considered in the AFC (OG 2009a, AFC § 6.6). For purposes of this analysis, combined cycle without solar thermal technology, other fossil fuels, nuclear, biomass, hydroelectric, 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 (whether coupled with solar technology or not) 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.

Modern gas turbines represent the most fuel-efficient electric generating technology available today. Currently available large combustion turbine models can be grouped into three categories: conventional, advanced, and next generation. Advanced combustion turbines have advantages for OGS. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run times in commercial operations.

One possible alternative to an advanced F-class gas turbine is the next generation G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which uses partial steam cooling to allow slightly higher temperatures, yielding slightly greater efficiency. In actual operation, one would expect to see the difference in efficiency diminish, since larger-capacity G-class turbines run at less than optimum (full) output more frequently than smaller-capacity F-class turbines. (Gas turbine efficiency drops rapidly at less than full load.). Given the minor efficiency improvement promised by the G-class turbine, and since this machine would have to operate at less than optimum base load efficiency in order to meet the project load capacity requirements, staff believes the applicant's decision to purchase F-class machines is reasonable.

Another possible alternative to the F-class advanced gas turbine is an H-class next generation machine with a claimed fuel efficiency of 60 percent LHV at ISO conditions. This high efficiency is achieved through a higher pressure ratio and firing temperature, made possible by cooling the initial turbine stages with steam instead of air. The first Frame 7H machine has only recently completed commissioning at the Inland Empire Energy Center in Riverside County, California. Given the lack of commercial experience with this machine and the project load requirements, staff agrees with the applicant's decision to use F-class machines.

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 will have no significant adverse energy impacts.

Alternative Heat Rejection System

The applicant proposes to employ a dry cooling system (an air-cooled condenser) as the means for rejecting power cycle heat from the steam turbine. An alternative heat rejection system would utilize a wet cooling system (a cooling tower).

The local climate in the project area is characterized by relatively high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs slightly more efficiently than the evaporative cooling tower. In high temperatures and low relative humidity, typical of the project area, the evaporative cooling tower performs slightly more efficiently than the air-cooled condenser. However, due to unavailability of water and because a cooling tower consumes much more water than an air-cooled condenser, the applicant has chosen to use dry cooling. This is acceptable to staff, given that only a slight efficiency improvement would be provided by the wet cooling alternative.

Staff concludes that the selected project configuration (rapid response combined cycle) and generating equipment (F-class gas turbines and associated cooling systems) represent the most efficient feasible combination for satisfying the project's objectives. The two-train combustion turbine/HRSG configuration also allows for high efficiency during unit turndown since one combustion turbine can be shut down, leaving one fully loaded, efficiently operating combustion turbine instead of having two combustion turbines operate at a less efficient 50 percent of load. This offers an efficiency advantage over the larger machines during unit turndown. There are no alternatives that would significantly reduce energy consumption while satisfying the project's objectives of producing base load electricity and ancillary services.

Staff, therefore, believes that OGS will not create a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

The only nearby power plants that could potentially impact cumulative energy consumption, when aggregated with this project, are the nearby Gateway Generating Station and the proposed Marsh Landing Generating Station. As discussed above, PG&E has confirmed its system's adequate capacity to supply the OGS project (OG 2009a, AFC § 2.5.3). The PG&E's natural gas supply system has enough capacity to supply all projects. Staff knows of no other projects that could produce cumulative energy impacts.

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 OGS. 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 OGS should allow it to compete favorably, run at high capacity, and replace less efficient power generating plants.

The project would therefore not 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 fast start F-class gas turbine generator available, OGS will benefit electric consumers of California.

CONCLUSIONS AND RECOMMENDATIONS

OGS, if constructed and operated as proposed, would generate 624 megawatts (MW) (net output at ISO conditions) of electricity at an overall project fuel efficiency of 56 percent lower heating value (LHV). While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would create no significant adverse impacts on 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.

REFERENCES

GTW 2009 — Gas Turbine World 2008 performance specs, 26th Edition, pp. 29-36.

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.

GB 2011a – Galati Blek, LLP/M. Mills (tn 59571). CCGS, LLC's Initial Comments on the PSA, dated January 28, 2011. Submitted to CEC/Docket Unit on January 28, 2011.

Power 1994 — "Operating and Maintaining IPP/Cogen Facilities" Power, September 1994, p. 14.

POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The applicant predicts an equivalent availability factor¹ of 92-98 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Oakley Generating Station (OGS) will be built and will operate in a manner consistent with industry norms for reliable operation.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project by determining 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 92-98 percent for the OGS project (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 (ISO), which purchase, dispatch, and sell electricity throughout the state. How the ISO and other control area operators ensure system

¹ Equivalent availability factor is the percentage of time a unit is available for dispatch, and reflects the probability of forced (unexpected) outages.

reliability is an evolving process; new protocols are being developed and put in place to ensure 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 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 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). 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.

The 624 megawatt (MW) (net output) OGS project with operating flexibility (that is, the ability to start up, shut down, turn down, and provide peaking power, when needed) would allow the system operator to adapt the plant’s output to changing conditions in the energy and ancillary services markets.

The project is expected to achieve an equivalent availability factor in the range of 92-98 percent (OG 2009a, AFC § 2.1.2). The project’s annual capacity factor is expected to be in the range of 60-80 percent (OG 2009a, AFC § 2.3).

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 will conclude that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This will be 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. 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 the OGS project will be as reliable as other power plants on the electric system and will not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will 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 quality assurance/quality control (QA/QC) program (OG 2009a, AFC § 2.5.6) that is typical of the power industry. Equipment will be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA/QC programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program will 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 service 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 (OG 2009a, AFC § 2.5.2, Table 2.5-1). Because the project consists of two combustion turbine generators, operating in parallel as independent equipment trains, it is inherently reliable. A single equipment failure cannot disable more than one train, which allows 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. Staff believes that this project's proposed equipment redundancy will be sufficient for its reliable operation.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant will base the project's maintenance program on those recommendations (OG 2009a, AFC §§ 2.3, 2.4, 2.5). 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 will 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

Natural gas would be delivered to the OGS project via a new 300-foot-long gas line that would be connected to Pacific Gas and Electric Company (PG&E) Line 303 (OG 2009a, AFC § 4.0; GB 2011a). A secondary line, a new 410-foot-long gas pipeline from PG&E Line 400 may be constructed to provide additional natural gas in order to meet the project's need. The AFC states that PG&E has confirmed its system's adequate capacity to supply the project. 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 concludes that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The OGS project will use water from Diablo Water District (DWD), via a new water line connection to an existing 24-inch water line, for power plant cooling, process water, fire protection and potable water. A will-serve letter from DWD is provided in AFC Appendix 2I (OG 2009a). Therefore, staff believes the source of water supply represents a reliable source 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 a seismically active area (OG 2009a, AFC § 5.4, Appendix 2); see the **GEOLOGY AND PALEONTOLOGY** section of this document. The project will be designed and constructed to the latest appropriate LORS (OG 2009a, AFC Appendix 2). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it will be built to the latest seismic design LORS, this project will 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 is largely flat, with elevations ranging from approximately 10 to 30 feet above sea level. The site is not within a 100-year flood plain or a 500-year flood plain (OG 2009a, AFC § 5.15.1.3, Figure 5.15-3). A drainage, erosion and sediment control plan will be implemented and site drainage will be designed to maintain the natural drainage pattern. 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 statistic for the years 2005 through 2009 (NERC 2010):

For combined cycle units (all MW sizes):

Availability Factor = 89.54 percent

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 92-98 percent (OG 2009a, AFC § 2.4.2) 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 will consist of two 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 will 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, when needed). The fact that the project consists of two 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 92-98 percent, 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. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.

GB 2011a – Galati Blek, LLP/M. Mills (tn 59571). CCGS, LLC's Initial Comments on the PSA, dated January 28, 2011. Submitted to CEC/Docket Unit on January 28, 2011.

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed interconnection facilities including the Oakley Generating Station (OGS) 230 kV switchyard, single 230 kV overhead generator tie-line, 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 interconnection of the OGS will cause new transmission line overloads under normal and contingency conditions. Mitigation includes installation of Special Protection System (SPS), rerate transmission line, and reconductoring the overloaded transmission lines. The applicant is partially responsible for the transmission system upgrades.
- The reconductoring of the following lines should be considered a reasonably foreseeable consequence of the interconnection of the OGS and a general environmental analysis should be included in Staff's final assessment:
 - 18.3 mile-long Contra Costa PP – Delta Pumps 230 kV transmission line reconductoring
 - 8 mile-long Kelso – Tesla 230 kV line transmission line reconductoring
 - 21 mile-long Las Positas - Newark 230 kV transmission line reconductoring.

These three lines are downstream of the proposed interconnection of the OGS and their reconductoring is considered an indirect project impact that is a reasonable foreseeable result of the project. A general environmental analysis of the Contra Costa PP to Delta Pumps line and the Las Positas to Newark line is included as **Appendix A** to this section, to meet California Environmental Quality Act (CEQA) requirements. A similar level of analysis was conducted for the Kelso to Tesla line in Appendix A to the **Transmission System Engineering** section of the Mariposa Energy Project (MEP) Supplemental Staff Assessment.

- The interconnection of the OGS will require replacement of the circuit breaker at Pittsburg PP Switching Station. Other existing breakers are adequate to withstand the post project incremental fault currents described in the Short Circuit Study.

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 Independent System Operator (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 project 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 OGS 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 OGS is a natural gas-fired combined-cycle power generating facility that would be located in Oakley, Contra Costa County, California. The OGS would consist of two combustion turbine-generators (CTG) and a steam turbine generator (STG). The maximum output of the OGS would be 672 megawatts (MW). With the generator auxiliary load of 21 MW, net output of the OGS would be 651 MW. The OGS would be interconnected to the PG&E Contra Costa Substation. The proposed commercial operation date of the OGS is late 2013.

The combustion turbine generator is rated at 247 MVA with a power factor of 0.90. The STG is rated at 253 MVA with a power factor of 0.90. Each CTG would be connected through a 9,000-ampere generator circuit breaker and a 9,000-ampere disconnect switch, through a short 9,000-ampere isolated phase bus duct to the low sides of its dedicated 159/212/265 MVA generator step-up (18/230 kV) transformer. The STG would be connected through a short 9,000-ampere isolated phase bus duct to the low side of its dedicated 159/212/265 MVA generator step-up (18/230 kV) transformer. The auxiliary power would be provided by the CTG units through their dedicated 1,200-ampere isolated phase bus ducts and their dedicated back-fed step-down (18/4.16 kV) transformers. The high sides of the CTG transformers and the high side of the STG transformer would each be connected through their dedicated 1,200-ampere SF6 breakers and 1,200-ampere disconnect switches to the common generator tie bus. A single 230 kV overhead generator tie-line would connect the OGS through a 2,000-ampere disconnect switch to the PG&E Contra Costa Substation.

The 2.4-mile long single circuit generation tie-line would be built with 1272 kcmil ACSR bundled conductors and would be supported by both single-circuit steel pole structures and double-circuit steel pole structures. The generator tie-line would be built using the existing Contra Costa – DuPont 60 kV line right-of-way. The existing Contra Costa – DuPont 60 kV line will be removed and demolished. South of Main Street of the OGS generator tie-line would be supported by single-circuit steel poles. Generator tie-lines on North of Main Street would be supported by double-circuit steel poles. The double-circuit steel poles would support the OGS generator tie-line and the existing 60 kV line

which taps the Contra Costa – Balfour 60 kV line at the intersection of Bridgehead Road and Main Street. The existing Contra Costa Substation would need to be extended in order to accommodate the OGS. Power would be distributed to the grid via existing transmission lines from the Contra Costa Substation (OG 2009a Section 3.2, Figure 2.1-5, CH2MHILL 2010m, CH2MHILL 2010ad Figures 2-1).

These proposed facilities are acceptable to staff and 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 both of the Transition Cluster Group 1 Phase I Interconnection Study and the Phase II Interconnection Study. The interconnection of the OGS will be based on the Phase II Interconnection Study.

SCOPE OF TRANSITION CLUSTER PHASE I AND PHASE II INTERCONNECTION STUDIES

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 OGS project. The California ISO used a net output of 4,707 MW in its Phase I Interconnection Study. As of December 2009 only six projects (1,159 MW) of the original twelve projects in the Group 1 cluster remain in the interconnection queue.

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 Study did not provide an accurate forecast of impacts on the transmission grid. Therefore, staff has relied on the Phase II Interconnection Study Report that was completed and received on November 5, 2010 and the revision 2.0 of the Appendix A, Phase II Interconnection Study Report received on December 17, 2010, to determine the impact on grid reliability and identify transmission upgrades for reliable interconnection.

The Phase II Group Study modeled the OGS project with a net output of 651 MW. The base case was developed from PG&E's 2009 base case series. It has a 1-in-10 year adverse weather load level for the Greater Bay Area. The 2013 summer peak load and 2013 summer off-peak load base cases included all pre-Transition Cluster generation projects and the associated Network Upgrades and Special Protection System, as well as the planned California ISO approved transmission upgrade projects that are scheduled to be in service by 2013. The power flow studies were conducted with and without the proposed Greater Bay Area Transition Cluster Group Phase II projects connected to the PG&E grid at each project's proposed interconnection point. The detailed study assumptions were described in the study. The Power Flow study assessed the Greater Bay Area Transition Cluster Group Phase II projects' impact on thermal loading of the transmission lines and equipment. Short circuit studies were conducted to determine if the Greater Bay Area Transition Cluster Group Phase II projects would overstress existing substation facilities. Transient Stability Evaluation studies were conducted using the 2013 summer peak load full loop base case to determine whether the Greater Bay Area Transition Cluster Group Phase II projects would create instability in the system following certain selected outages (CH2MHILL 2010b Section 3, CH2MHILL 2010y, CH2MHILL 2010ad).

PHASE II STUDY RESULTS FOR TRANSITION CLUSTER PROJECTS

Power Flow Study Results and Mitigation Measures

The Phase II Group Study identified pre-project overload criteria violations under 2013 Summer Peak and Off-Peak study conditions. Pre-project overloads are caused by either existing system conditions or by projects with higher positions in the PG&E's generator interconnection queue. The study concluded that the addition of the Greater Bay Area Transition Cluster Group Phase II projects would cause normal overloads and emergency overloads. Section 7.1 of the Transition Cluster Phase II Interconnection Study listed details of the Power Flow study results and proposed mitigation measures (CH2MHILL 2010y Section 7.1, CH2MHILL 2010ad Section 4).

Under Normal Overloads (N-0) Condition:

The Power Flow study indicated that the Greater Bay Area Transition Cluster Group would cause the following transmission line overloads under normal operation condition using the 2013 summer peak and 2013 off-peak study cases.

- Contra Costa PP – Delta Pumps 230 kV line (Contra Costa – Windmaster section)
- Contra Costa PP – Delta Pumps 230 kV line (Windmaster – Delta Pumps section)
- Kelso – Tesla 230 kV line (Kelso – USWP Ralph section)
- Kelso – Tesla 230 kV line (USWP Ralph – Tesla section)
- Las Positas - Newark 230 kV line

Under Category B (N-1) Conditions:

The Power Flow study indicated that the Greater Bay Area Transition Cluster Group would cause six N-1 overloads using 2013 peak and 2013 off-peak study cases.

- Birds Landing – Contra Costa 230 kV line
- Contra Costa PP – Contra Costa Sub 230 kV line
- Lone Tree – Cayetano 230 kV line (Lone Tree – USWP JW Ranch section)
- Lone Tree – Cayetano 230 kV line (USWP JW Ranch – Cayetano section)
- Kelso – Tesla 230 kV line (Kelso – USWP Ralph section)
- Kelso – Tesla 230 kV line (USWP Ralph – Tesla section)

Under Category B (N-2) Conditions:

The Power Flow study indicated that the Greater Bay Area Transition Cluster Group would cause six N-2 overloads using 2013 peak load and 2013 off-peak study cases.

- Kelso – Tesla 230 kV line (Kelso – USWP Ralph section)
- Kelso – Tesla 230 kV line (USWP Ralph – Tesla section)
- Lone Tree – Cayetano 230 kV line (Lone Tree – USWP JW Ranch section)
- Lone Tree – Cayetano 230 kV line (USWP JW Ranch – Cayetano section)

- Lambie – Birds Landing 230 kV line
- Vaca Dixon – Lambie 230 kV line

Mitigation:

Mitigation to the above transmission line overloads have been identified under two categories: **Reliability Network Upgrades** and **Delivery Network Upgrades**. Reliability upgrades are required in order to meet system reliability standards for the interconnection of the projects in the studied cluster. Delivery network upgrades are required only when an interconnecting generator requests full delivery interconnection service, often required in order to receive capacity payments or meet contractual requirements. OGS is a full delivery generator and thus delivery network upgrades identified for the generating cluster could be downstream impacts of the OGS.

Reliability Network Upgrades, transmission line rerate and installation of SPS are the recommended mitigation measures.

- Line rerate: Lone Tree – Cayetano 230 kV line would need to be rerated from 2 feet/second wind speed to 4 feet/second wind speed. This is a reasonable mitigation alternative that only requires wind speed monitoring and no additional downstream transmission facilities. There are two sections to the Lone Tree – Cayetano 230 kV line: the Lone Tree – USWP JW Ranch section and the USWP JW Ranch – Cayetano section. The Lone Tree – USWP JW Ranch section of the line is loaded at 86% before the addition of the Transition Cluster Group Phase II projects under N-1 conditions. The post project line loading is 105%, an increase line loading of 19%. The USWP JW Ranch – Cayetano section of the line is loaded at 86% before the addition of the Transition Cluster Group Phase II projects under N-1 conditions. The post project line loading is 104%, an increase line loading of 18%. The line rerate cost allocation for the OGS is approximately 63.5% which means that the OGS is the primary responsible party for this line rerate.
- Installation of SPS to drop OGS generation to mitigate following transmission line overloads. SPS would not require major downstream transmission facility upgrades.
 1. Contra Costa PP – Contra Costa Sub 230 kV line. The line is loaded at 101% before the addition of the Transition Cluster Group Phase II projects under N-1 conditions. The post project line loading is 171%, an increase line loading of 70%. The SPS cost allocation for the OGS is approximately 89.3% which means that the OGS is a primary responsible party.
 2. Birds Landing – Contra Costa 230 kV line. The line is loaded at 92% before the addition of the Transition Cluster Group Phase II projects under N-1 conditions. The post project line loading is 129%, an increase line loading of 37%. The SPS cost allocation for the OGS is approximately 89.3% which means that the OGS is the primary responsible party.
 3. Vaca – Lambie 230 kV line. The line is loaded at 81% before the addition of the Transition Cluster Group Phase II projects under N-2 conditions. The post project line loading is 137%, an increase line loading of 56%. The SPS cost allocation for

the OGS is approximately 89.3% which means that the OGS is the primary responsible party.

4. Lambie – Birds Landing 230 kV line. The line is loaded at 63% before the addition of the Transition Cluster Group Phase II projects under N-2 conditions. The post project line loading is 119%, an increase line loading of 56%. The SPS cost allocation for the OGS is approximately 89.3% which means that the OGS is the primary responsible party.

Under the Delivery Network Upgrades, the Phase II Study recommends reconductoring overloaded transmission lines to allow for the full delivery of generation. The reconductoring of existing transmission lines owned by PG&E would be licensed by the California Public Utilities Commission (CPUC). Through the CPUC licensing process environmental impacts would be identified and, where necessary, mitigated. Reconductoring would be a reasonably foreseeable consequence of the OGS and a general environmental analysis of the reconductoring should be included in Staff's final assessment of the OGS.

- Contra Costa PP – Delta Pumps 230 kV line

Reconductor the 18.3 mile-long Contra Costa PP – Delta Pumps 230 kV line (Contra Costa – Windmaster: 16.5 miles and Windmaster – Delta Pumps: 1.8 miles) with a higher capacity conductor. This line is loaded at 71% before the addition of the Transition Cluster Group Phase II projects under normal operation conditions. With the addition of the generators in the cluster, the line loading is 122%, an increase line loading of 51%. The cost allocation for the OGS is approximately 79.6% which means that the OGS is the primary responsible party for this line reconductoring and that even if all the other projects in the cluster were never built; reconductoring would likely be required for the OGS.

- Kelso – Tesla 230 kV line

Reconductor the 8 mile-long Kelso – Tesla 230 kV line (Kelso – USWP Ralph: 3.3 miles and USWP Ralph – Tesla: 4.7 miles) with a higher capacity conductor. The Kelso – USWP Ralph section of the line is loaded at 36% before the addition of the Transition Cluster Group Phase II projects under normal operation conditions. With the addition of the generators in the cluster, the line loading is 105%, an increase line loading of 69%. The USWP Ralph – Tesla section of the line is loaded at 38% before the addition of the Transition Cluster Group Phase II projects under normal operation conditions. With the addition of the generators in the cluster, the line loading is 107%, an increase line loading of 69%. The cost allocation for the OGS is approximately 34.9% which means that the OGS is partly responsible for this line reconductoring.

- Las Positas - Newark 230 kV line

Reconductor the 21 mile-long Las Positas - Newark 230 kV line with a higher capacity conductor. This line is loaded at 85% before the addition of the Transition Cluster Group Phase II projects under normal operation conditions. With the addition of the generators in the cluster, the line loading is 113%, an increase line loading of 31%. The cost allocation for the OGS is approximately 79.7% which means that the OGS is the primary responsible party for this line reconductoring and that even if all

the other projects in the cluster were never built; reconductoring would likely be required for the OGS.

Short Circuit Study Results, Mitigation Measures and Substation Evaluation

Short Circuit studies were performed to determine the degree to which the addition of the Greater Bay Area Transition Cluster Group Phase II projects increase fault duties at PG&E's substations, adjacent utility substations, and the other 70 kV, 115 kV, 230 kV and 500 kV busses within the study area. The fault duties were calculated with and without the Greater Bay Area Transition Cluster Group Phase II projects to identify any equipment overstress conditions. Buses electrically adjacent to Transition Cluster projects and their short circuit duties are listed in Appendix E. The short circuit duties related just the OGS are listed in Attachment 4. The short circuit initial study identified that the OGS contributes more than the threshold value of 100 Amps to the circuit breaker 672 in the Pittsburg PP 230 kV Switching Station. A replacement of circuit breaker 672 with a higher rating circuit breaker would be required (CH2MHILL 2010ad Section, CH2MHILL 2010y Attachment 4).

Transient Stability Study Results and Mitigation Measures

Transient stability studies were conducted using the 2013 summer peak full loop base cases to ensure that the transmission system remained in operating equilibrium, as well as operating in a coordinated fashion, through abnormal operating conditions after the Phase II Transition Cluster projects became operational. Disturbance simulations were performed for a study period of 10 seconds to determine whether the Transition Cluster projects would create any system instability during line and generator outages. The Transient Stability study result indicated that the OGS would not cause adverse impacts on the stable operation of the transmission system following the selected Category "B" and Category "C" outages (CH2MHILL 2010ad Section 7).

Reactive Power Deficiency Analysis Results

Reactive power deficiency analysis was performed to determine the system performance according to the NERC/WECC planning criteria. The reactive power deficiency analysis indicated that the addition of the Transition Cluster projects including the OGS would not contribute to any reactive power margin violations at PG&E buses following selected Category "B" and Category "C" contingencies (CH2MHILL 2010ad Section 6)

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 OGS 230 kV switchyard, a single 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.

Staff proposed conditions of certification **TSE-1** through **TSE-7** would help ensure that construction and operation of the transmission facilities for the proposed OGS would comply with applicable LORS.

The Phase II Interconnection Study indicates that the project interconnection would comply with all NERC/WECC planning standards and California ISO reliability criteria as long as the identified Reliability Network Upgrades are implemented.

RESPONSES TO PUBLIC AND AGENCY COMMENTS

Staff received comments from the California Department of Water Resource – State Water Project (CDWR) concerning the reconductoring of the existing PG&E Contra Costa PP – Delta Pumps 230 kV line. CDWR is concerned that the reconductoring could impact the operation of their Banks Pumping Plant. The CDWR proposed a Condition of Certification that would provide uninterrupted electric service for the CDWR pumping plant during reconductoring (CDWR 2011b).

The reconductoring of existing transmission lines owned by PG&E would be licensed by the California Public Utilities Commission (CPUC), any licensing conditions or mitigation measures placed on reconductoring would be done by the CPUC. The CDWR proposed Condition of Certification and Verification of Condition could be included in the CPUC's licensing process.

CONCLUSIONS AND RECOMMENDATIONS

The proposed interconnection facilities including the OGS 230 kV switchyard, single 230 kV overhead generator tie-line, 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 interconnection of the OGS will cause new transmission line overloads under normal and contingency conditions. Mitigation includes installation of SPS, rerate transmission line, and reconductoring the overloaded transmission lines. The applicant is partially responsible for the transmission system upgrades.
- The reconductoring of the following lines should be considered a reasonably foreseeable consequence of the interconnection of the OGS and a general environmental analysis should be included in Staff's final assessment:
 - 18.3 mile-long Contra Costa PP – Delta Pumps 230 kV transmission line reconductoring
 - 8 mile-long Kelso – Tesla 230 kV line transmission line reconductoring

- 21 mile-long Las Positas - Newark 230 kV transmission line reconductoring.

These three lines are downstream of the proposed interconnection of the OGS and their reconductoring is considered an indirect project impact that is a reasonable foreseeable result of the project. A general environmental analysis of the Contra Costa PP to Delta Pumps line and the Las Positas to Newark line is included as **Appendix A** to this section, to meet CEQA. A similar level of analysis was conducted for the Kelso to Tesla line in Appendix A to the **Transmission System Engineering** section of the MEP Supplemental Staff Assessment.

- The interconnection of the OGS will require replacement of the circuit breaker at Pittsburg PP Switching Station. Other existing breakers are adequate to withstand the post project incremental fault currents described in the Short Circuit Study.
- The reconductoring of the following lines should be considered a reasonably foreseeable consequence of the interconnection of the OGS and a general environmental analysis should be included in Staff's final assessment:
 - 18. 3 mile-long Contra Costa PP – Delta Pumps 230 kV transmission line reconductoring
 - 8 mile-long Kelso – Tesla 230 kV line transmission line reconductoring
 - 21 mile-long Las Positas - Newark 230 kV transmission line reconductoring.
- The interconnection of the project will require replacement of the circuit breaker at Pittsburg PP Switching Station. Other existing breakers are adequate to withstand the post project incremental fault currents described in the Short Circuit Study.

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 of the transmission facilities, 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 of the transmission facilities, 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 of the transmission facilities, 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) A copy of the executed LGIA signed by the California ISO and the project owner and approved by the Federal Energy Regulatory Commission.

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 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) A copy of the executed LGIA signed by the California ISO and the project owner and approved by the Federal Energy Regulatory Commission.

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 Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

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".
- c) A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge

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- CDWR 2011b – California Department of Water Resources/M. Vang (tn 59734). CDWR Comments on PSA, dated February 14, 2011. Submitted to CEC/Docket Unit on February 18, 2011.
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- CH2MHILL 2010ad -- CH2MHILL/D. Davy (tn 59319). Appendix A - Revision 2 – Transition Cluster Phase II Interconnection Study Report, dated December 20, 2010. Submitted to CEC/Docket Unit on December 20, 2010.
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- OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.
- WECC (Western Electricity Coordinating Council). 2002. NERC/WECC Planning Standards, August 2002.

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.

ALTERNATIVES

Testimony of Suzanne Phinney, D.Env.

SUMMARY OF CONCLUSIONS

The purpose of an alternatives analysis under CEQA is to analyze a reasonable range of feasible alternatives which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. In the analysis of the Oakley Generating Station (OGS), staff has determined that all environmental impacts can be mitigated to less than significant. Staff has considered a full range of alternatives to the OGS to respond to issues raised by parties during the siting process.

Five alternative project sites were examined. Several alternative generation technologies were also evaluated. While some of the alternative sites could achieve project objectives, they do not have any environmental advantages over the proposed site or would have disadvantages (e.g. longer gas and transmission interconnections, greater visual presence, closer to receptors). The alternative technologies would either not be feasible in the project area or would not generate the power equivalent of the proposed project. The alternative linear routes are feasible but present no clear advantage. Staff does not recommend an alternative over the project as proposed.

Staff also believes that the “no project” alternative is not superior to the proposed project. The “no project” scenario could lead to increased operation of existing plants (and reliance on older, more polluting technology) or development of new plants on 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 OGS.

Staff does not recommend an alternative site, generation technology, or configuration over the project proposed by Contra Costa Generating Station, LLC.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed Oakley Generating Station (OGS). The purpose of this alternatives analysis is to analyze 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 all environmental impacts can be mitigated to less than significant, 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 California Energy Commission (Energy Commission) does not have the authority to approve an alternative or require Contra Costa Generating Station, LLC (CCGS) 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

As specified in the Warren-Alquist Act, sections 25523 and 25525, the Energy Commission must find that a project complies with all applicable laws, ordinances, regulations, and standards (LORS). In addition, the Energy Commission generally acts as the Lead Agency under the California Environmental Quality Act (CEQA) for purposes of licensing thermal power plants. Under 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, subd. (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, subd. (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.)

PROJECT DESCRIPTION AND SETTING

CCGS (wholly owned by Radback Energy, Inc.) proposes a 624 MW natural gas-fired facility, using General Electric’s Rapid Response combined-cycle technology. The OGS would consist of two nominally-rated 213-MW General Electric Frame 7FA combustion turbine generators (CTGs), plus a single condensing steam turbine generator (STG). Associated equipment would include an air-cooled condenser, selective catalytic reduction (SCR), and oxidation catalyst emission control systems.

The OGS would be located in Contra Costa County, within Oakley city limits. The approximately 22-acre parcel is currently farmed for wine grapes; the California Department of Conservation designates the site as Farmland of Statewide Importance. However, the site falls within a designated urban growth boundary, and is zoned H-1, Heavy Industrial by the City of Oakley, which is consistent with the Utility Energy General Plan land use designation. It is south of the former DuPont facility, and included within the DuPont Specific Plan as a redevelopment area. The property is proposed for Utility Energy zoning on the City Redevelopment planning map.

The site is primarily surrounded by existing industrial uses. The site is bordered to the west by PG&E's Antioch Terminal, a major high-pressure natural gas transmission pipeline hub; to the north by DuPont property that is either industrial or vacant industrial; to the east by DuPont's titanium dioxide landfill area; and to the south by the Burlington Northern Santa Fe (BNSF) railroad. South of the railroad is an agricultural parcel, on which a 74.6-acre commercial development has been proposed. A project at the site would be visible from most directions; however the industrial nature of the area would lessen viewer sensitivity. The nearest residences are located in the Sandy Point (Shady Haven) Mobile Home Park, approximately 900 feet to the southwest. The nearest school, Bounton-Shaw Academy, is located 0.4 miles to the southwest. The Antioch Dunes – supporting 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*) – is located on the shores of the San Joaquin River, approximately 2.5 miles west of the proposed site.

The OGS would interconnect to PG&E's Contra Costa Substation via an existing 2.4-mile transmission corridor, extending south from the OGS (on the east side of Highway 160) and then due west (running north of Oakley Road). The OGS would replace one of the two existing 60-kV lines (on steel lattice towers) in the corridor with a new 230-kV line on monopole towers. Natural gas would be obtained from PG&E Line 303 (located in the southeastern portion of the Antioch Terminal) via an approximately 300-foot long, 6- to 10-inch diameter connection to the gas metering station. The project owner may also choose to include a 410-foot secondary natural gas supply connection from Line 400 (in the northeastern portion of the Antioch Terminal).

The OGS would require about 240 acre-feet of water per year (AFY) for plant cooling and process water, fire protection, and potable uses. The Diablo Water District would supply potable water for these purposes via an existing 24-inch diameter distribution pipeline that runs north-south through the OGS site (just east of PG&E's Antioch Terminal). The Ironhouse Sanitary District (ISD) is currently constructing a wastewater treatment plant located approximately 2.5 miles east of the project site. Per Conditions of Certification **Soil&Water-4** and **Soil&Water-8**, The OGS would be required to shift to a recycled water supply within a prescribed time after the Energy Commission determined it was economically feasible. To discharge wastewater, a new 0.44-mile sanitary force main would be constructed in Bridgehead Road and Main Street. It would interconnect with ISD's existing 18-inch gravity sewer line near the intersection of Bridgehead Road and Main Street.

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternative analysis is to determine the potential significant impacts of the OGS 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 to Contra Costa County and within reasonable proximity of transmission, gas, and water infrastructure. These location alternatives are generally consistent with CCGS's objectives and siting criteria:

- Consistency with general plans and zoning ordinances;
- Brownfield or industrial site preferred;
- Adequate size and configuration;
- Proximity to existing transmission and gas infrastructure;
- Located near demand centers; 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.

BASIC OBJECTIVES OF THE PROJECT

After studying CCGS's AFC (OG 2009a), Energy Commission staff has determined the OGS objectives to be:

- Provide efficient, reliable, and predictable power supply capable of supporting the growing power needs of the Bay Area;
- Provide operational flexibility and rapid-start and dispatch capability;
- Site the project within the area of electrical demand and near existing infrastructure, thus minimizing the project's linear facilities; and
- Site the project on a brownfield or industrial site.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

All environmental impacts can be mitigated to less than significant.

SITE ALTERNATIVES TO THE PROJECT

This section evaluates the alternative sites identified by CCGS. Staff has determined that the applicant-identified sites provide a range of reasonable alternative locations.

Staff considered the following criteria in reviewing potential alternative sites:

1. Avoid or substantially lessen one or more of the potential significant effects of the project; and
2. Satisfy the following criteria:
 - a. Site suitability. Approximately 22 acres are required for the site at its proposed location. 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 industrial site;
 - d. Compliance with general plan designation and zoning district; and
 - e. Availability of the site.

SITES IDENTIFIED BY THE APPLICANT FOR FURTHER ANALYSIS

In the OGS AFC (OG 2009a), the applicant identified four sites in the vicinity of the proposed OGS. For all sites, acquisition would be required, as CCGS does not have ownership. Staff used aerial imagery, property information, and the AFC, and conducted a drive-by of parcels on September 7, 2010, to analyze the alternative sites.

The alternative sites are shown on **Alternatives Figure 1**. Since proximity to transmission lines and the Antioch gas terminal are important considerations for assessing alternative sites, these are also shown on the figure.

OGS Alternative 1: 18th Street Site

The 18th Street Site is in the City of Antioch, 0.6 miles southwest of the proposed OGS site. It is located on 26 vacant acres of previously farmed land on the north side of 18th Street, just west of Drive-In Way. The site is adjacent to commercial uses, including a self-storage facility, automobile salvage yard, and fast-food eatery. The nearest residence is on the south side of 18th Street, 120 feet south of the project. The nearest school is located 0.25 miles to the east. The site is zoned Planned Business Center and Planned Development District; a General Plan amendment would be needed for the project. Site control is unknown.

Potable water, wastewater collection, and storm drainage facilities are presently available in E. 18th Street and Drive-in Way. A 2.6-mile recycled water connection would connect to the City of Antioch's new recycled waterline on 'A' Street. A 2.1 mile transmission connection, partially following existing corridors, would connect to the Contra Costa Substation; the most likely route would be east along 18th Street to join the existing 60-kV transmission line corridor that would be used for the proposed project. A 0.6-mile natural gas pipeline could potentially run east along 18th Street and north on Bridgehead Road to connect to the Antioch Terminal. A comparison of the 18th Street Alternative Site with the OGS site follows:

- **Linear Facilities.** The 18th Street Alternative would require a transmission connection to the Contra Costa Substation of similar length as the proposed project. However approximately 0.2 miles would be along heavily travelled 18th Street, not within an existing transmission line corridor. A 0.6-mile gas pipeline would be needed to tie into Antioch Terminal, whereas the proposed site would be adjacent to the terminal.
- **Air Quality.** The 18th Street Alternative is located within the same air basin, and the type and quantity of air emissions would be similar to the OGS. Receptors would be only 120 feet away at this site (versus 800 at the proposed site). Due to this proximity, there would be slightly greater impacts from air emissions. The need for emissions reduction credits would be similar to the OGS.
- **Biological Resources.** Both the 18th Street and proposed OGS sites have the potential for limited biological resources. The 18th Street alternative site is undeveloped (but previously farmed) land in proximity to actively farmed fields. In comparison, the proposed site is a currently farmed vineyard, with a 0.62-acre mitigation wetland located on the western portion of the site. Since the wetland area would be avoided, impacts to biological resources at the site would be similar. As with the proposed site, nitrogen deposition impacts to the Antioch Dunes could be mitigated to less than significant.
- **Cultural Resources.** The 18th Street site has been previously farmed, reducing the potential for undisturbed cultural resources. Although the alternative site has not been surveyed, cultural resource impacts would likely be similar to the proposed OGS site, where there are no known significant cultural resources.

- **Geological Resources and Hazards.** Effects of the project on geological resources and hazards are expected to be minimal and would be similar to the OGS site.
- **Hazardous Materials.** Hazardous material handling would be similar for the 18th Street site and the proposed OGS location. In addition, the differences in the distances and types of roads for transport of hazardous materials would be minor.
- **Land Use and Agriculture.** Impacts to agricultural resources would be similar. The 18th Street site is designated as Farmland of Statewide Importance (30%) and Other (70%), and is not under a Williamson Act contract. The OGS site is designated as Farmland of Statewide Importance, but is in a designated urban growth boundary. The 18th Street site is zoned Planned Business Center and Planned Development District. Power plants are not an approved use and a General Plan amendment would be required. Overall land use impacts would thus be greater for the 18th Street alternative than the proposed OGS site, which is zoned H-1, Heavy Industrial.
- **Noise.** A project located at the 18th Street alternative site would be about 120 feet from the nearest residence, compared to 900 feet for the OGS site. In addition, the alternative site is adjacent to commercial facilities, whereas the OGS site is surrounded by industrial facilities to the east, north, and west. Noise impacts would be slightly greater.
- **Paleontology.** Paleontological resources are not likely to be impacted at the 18th Street or proposed OGS site.
- **Public Health.** The project is unlikely to cause significant long-term public health impacts at either site.
- **Socioeconomics.** The 18th Street and OGS sites would draw similar numbers of workers, primarily from Contra Costa and other counties in the Delta region. For either site, most workers would commute, with a few possibly moving temporarily to the local area during construction. Local socioeconomic impacts to the region would be similar.
- **Soils.** The 18th Street site has not been farmed in several years, whereas the proposed OGS site is an active vineyard. With best management practices for soil erosion, impacts to soil resources are expected to be similar.
- **Traffic and Transportation.** Both sites are directly accessed by collector boulevards from Highway 160, and could use the 18th Street and Wilbur Avenue offramps. However, the alternative site would use a busy stretch of 18th Street, for slightly greater traffic and transportation impacts.
- **Visual Resources.** The 18th Street site is located in a relatively industrialized area, which includes the Gateway Generating Station and Contra Costa Power Plant. It would be directly visible to residences from the south. The proposed OGS site would also be visible to viewers from the south and east, where there are currently undeveloped parcels. However, the OGS site is further from residences and more closely surrounded by heavy industrial uses, for slightly less overall visual impacts than the 18th Street site. The two sites would have similar visual impacts from transmission and other linear infrastructure.
- **Water Resources.** A facility at the 18th Street site would also use air-cooled condensing, and would require similar water quantities as the proposed project.

Potable water, wastewater collection, and storm drainage facilities are presently available in E. 18th Street and Drive-in Way. A 2.6-mile recycled water connection would connect to the City of Antioch's new recycled waterline on 'A' Street.

- **Waste Management.** Similar quantities of waste would be generated at the 18th Street alternative site and at the OGS site.
- **Worker Safety.** No differences are expected with respect to worker safety at the 18th Street site or proposed OGS site.

OGS Alternative 2: Wilbur Avenue Site

The 29-acre alternative site is located approximately 0.5 miles to the west of the OGS. It contains active vineyards, and is located between the BNSF railroad tracks to the south and Wilbur Avenue to the north. PG&E transmission corridors diagonally traverse the western portion of the site, limiting the amount of space available for project construction. The Contra Costa Power Plant is immediately north, and PG&E's Gateway Generating Station is to the northeast. There are other industrial uses to the east (Budweiser facility) and west, and agriculture to the south. The currently farmed site is zoned Heavy Industrial and is under the jurisdiction of unincorporated Contra Costa County. The nearest residence is located approximately 1,200 feet west of the site, and the nearest school (Bouton-Shaw Academy) is 0.48 miles to the southeast. Site control is unknown.

A project at this site could tap into a City of Antioch water and sewer pipelines, both located in Wilbur Avenue. To obtain recycled water, a 2.2-mile recycled water connection would connect to the City of Antioch's new recycled waterline on 'A' Street. A 2.4-mile transmission interconnection would connect to the Contra Costa Substation; the transmission route could travel east along the BNSF railroad tracks to join the existing corridor that would be used for the proposed site. A 0.5-mile natural gas line running east along Wilbur Road and then south on Bridgehead Road would tie into the Antioch Terminal. A comparison of the Wilbur Avenue Alternative site with the OGS site follows:

- **Linear Facilities.** The Wilbur Avenue Alternative would require a slightly longer transmission connection (2.4 miles) than the proposed project (2.0). A 0.5-mile gas pipeline would be needed to tie into Antioch Terminal, whereas the proposed site would be adjacent to the terminal.
- **Air Quality.** The Wilbur Avenue Alternative is located within the same air basin, and the type and quantity of air emissions would be similar to the OGS. Receptors would be 1,200 feet away at this site, and air quality impacts would be similar. The need for emissions reduction credits would be similar to the OGS.
- **Biological Resources.** The Wilbur Avenue site is actively farmed, with limited habitat supporting biological resources. Impacts to biological resources would be similar at the proposed site, which is a current vineyard adjacent to a 0.62-acre mitigation wetland. Nitrogen deposition to the Antioch Dunes could also be mitigated to less than significant.
- **Cultural Resources.** The Wilbur Avenue site is farmed, reducing the potential for undisturbed cultural resources. Although the alternative site has not been surveyed,

cultural resource impacts would likely be similar to the proposed OGS site, where there are no known significant cultural resources.

- **Geological Resources and Hazards.** Effects of the project on geological resources and hazards are expected to be minimal and would be similar to the OGS site.
- **Hazardous Materials.** Hazardous material handling would be similar for the Wilbur Avenue site and the proposed OGS location. In addition, the differences in the distances and types of roads for transport of hazardous materials would be minor.
- **Land Use and Agriculture.** The Wilbur Avenue site is zoned Heavy Industrial, which is intended to allow most heavy manufacturing uses. It is designated as Unique Farmland (50%) and Farmland of Local Importance (50%), and is not under a Williamson Act contract. The proposed OGS site is zoned H-1, Heavy Industrial. It is designated as Farmland of Statewide Importance, but is in a designated urban growth boundary. Both sites would have similar impacts to land use and agricultural resources.
- **Noise.** A project located at the Wilbur Avenue alternative location would be about 1,200 feet from the nearest residence, compared to 900 feet for the OGS site. Both sites are adjacent to industrial facilities, for similar noise impacts.
- **Paleontology.** Paleontological resources are not likely to be impacted at the Wilbur Avenue or proposed OGS site.
- **Public Health.** The project is unlikely to cause significant long-term public health impacts at either site.
- **Socioeconomics.** The Wilbur Avenue and OGS sites would draw similar numbers of workers, primarily from Contra Costa and other counties in the Delta region. For either site, most workers would commute, with a few possibly moving temporarily to the local area during construction. Local socioeconomic impacts to the region would be similar.
- **Soils.** Both the Wilbur Avenue and proposed OGS sites are active vineyards, with flat topography. Impacts to soil resources are expected to be similar.
- **Traffic and Transportation.** Both sites are directly accessed by collector boulevards from Highway 160 and could use the Wilbur Avenue offramp. Traffic impacts would be similar, with mitigation required during peak construction traffic.
- **Visual Resources.** The Wilbur Avenue site is located in a relatively industrialized area, with heavy industry to the north and east. It would be directly visible to residences from the south, and have similar visual impacts as the proposed site. The two sites would also have similar impacts from transmission and other linear infrastructure.
- **Water Resources.** The Wilbur Avenue site would also use air-cooled condensing, and would require similar water quantities as the proposed project. A project at this site could tap into a City of Antioch water pipeline and sewer pipeline, both located in Wilbur Avenue. To obtain recycled water, a 2.2-mile recycled water connection would connect to the City of Antioch's new recycled waterline on 'A' Street.
- **Waste Management.** Similar quantities of waste would be generated at the Wilbur Avenue alternative site in comparison to the OGS site.

- **Worker Safety.** No differences are expected with respect to worker safety at the Wilbur Avenue or proposed OGS sites.

OGS Alternative 3: Riverfront Site

This 80-acre site (APN 051031005) is located 1.1 miles west of the OGS, on the north side of Wilbur Avenue. The site is bordered by the Contra Costa Power Plant (where the Marsh Landing Generating Station will be constructed) to the east, San Joaquin River to the north, Gaylord Container Facility to the west, and an undeveloped parcel to the south. The site is currently undeveloped, and characterized by weeds, scattered trash, and broken pavement. Four drums are visible from the road. Signage on the fence states “no smoking in vehicles,” possibly indicating the presence of combustible substances. It is zoned Heavy Industrial and is located in the unincorporated county. The nearest residence is located about 480 feet to the south, opposite the BNSF railroad; the nearest school is 0.52 miles to the southwest. According to the applicant, the owners of the site are unwilling to sell or lease the site. The site, however, appears to be for sale.

Water for a project at this site would be provided by tapping into an existing pipeline to the Contra Costa Power Plant, via a 500-foot connection. A 1.8-mile recycled water connection would be required to connect to the City of Antioch’s new recycled water line on ‘A’ Street. A 3.2-mile transmission line would connect to the Contra Costa Substation. The route could follow Wilbur Avenue east under Highway 160, and turn south on Bridgehead Road to meet the proposed site. It would then use the existing transmission corridor to the substation. A 1.1-mile natural gas line – potentially following Wilbur Avenue to the east and Bridgehead Road to the south – would tie into the Antioch Terminal. A comparison of the Riverfront and proposed OGS sites follows:

- **Linear Facilities.** The Riverfront Alternative would require a longer transmission connection (3.2 miles) than the proposed project (2.0 miles), and would use an existing corridor for only a portion of the length. A 1.1-mile gas pipeline would be needed to tie into Antioch Terminal, whereas the proposed site would be adjacent to the terminal.
- **Air Quality.** The Riverfront Alternative is located within the same air basin, and the type and quantity of air emissions would be similar to the OGS. However, receptors would be slightly closer (500 feet) at this site, versus 800 feet at the proposed site. Overall impacts to air quality would be similar. The need for emissions reduction credits would be similar to the OGS.
- **Biological Resources.** The Riverfront site is heavily disturbed, but adjacent to the San Joaquin River, which is known to contain threatened and endangered species. Due to the river’s proximity, additional mitigation and permitting for biological resources may be required to develop a power plant at the site. The site is adjacent to the proposed 930 MW Marsh Landing Generating Station and would add to cumulative impacts to biological resources at the Antioch Dunes; with mitigation, impacts would be less than significant. Overall impacts to biological resources would be slightly greater than at the proposed site.

- **Cultural Resources.** The Riverfront site's location on the San Joaquin River gives it a high sensitivity for cultural resources. The potential for impacts to cultural resources is therefore greater than at the proposed OGS site.
- **Geological Resources and Hazards.** Effects of the project on geological resources and hazards are expected to be minimal and would be similar to the OGS site.
- **Hazardous Materials.** Hazardous material handling could potentially be greater than for the proposed site. The proximity to other heavy industrial sites, and the possibility of combustible materials, could indicate the need for assessment and remediation. Differences in the distances and types of roads for transport of hazardous materials would be minor.
- **Land Use and Agriculture.** The Riverfront site is zoned Heavy Industrial, as is the proposed OGS site. The California Department of Conservation designates the Riverfront site as Urban and Built-Up under its Farmland Mapping and Monitoring Program; development would therefore not result in impacts to agricultural land. Overall, impacts would be similar to the proposed site.
- **Noise.** A project located at the Riverfront Alternative site would be about 500 feet from the nearest residence, compared to 900 feet for the OGS site. Both facilities are adjacent to industrial uses, and noise impacts would be similar.
- **Paleontology.** Paleontological resources are not likely to be impacted at either the Riverfront or proposed OGS site.
- **Public Health.** The project is unlikely to cause significant long-term public health impacts at either site.
- **Socioeconomics.** The Riverfront and OGS sites would draw similar numbers of workers, primarily from Contra Costa and other counties in the Delta region. For either site, most workers would commute, with a few potentially moving temporarily to the local area during construction. Local socioeconomic impacts to the region would be similar.
- **Soils.** The Riverfront site does not appear to be farmed, whereas the proposed OGS site is an active vineyard. With best management practices for soil erosion, impacts to soil resources are expected to be similar.
- **Traffic and Transportation.** Both sites are directly accessed by collector boulevards from Highway 160, and could use the Wilbur Avenue offramp. With mitigation during peak construction traffic, traffic and transportation impacts would be similar.
- **Visual Resources.** Similar to the proposed site, the Riverfront site is located in an industrialized area, with the Gateway Generating Station and Contra Costa Power Plant nearby. A power plant at this site would be directly visible to residences from the south. The two sites would also have similar impacts from transmission and other linear infrastructure.
- **Water Resources.** The Riverfront site would also use air-cooled condensing, and would require similar water quantities as the proposed project. With a connection of 500 feet or less, a project at the alternative site could tap into potable line from the City of Antioch that is in place for the Contra Costa Power Plant. A 1.8-mile recycled

water connection would be required to connect to the City of Antioch's new recycled water line on 'A' Street.

- **Waste Management.** Similar quantities of waste would be generated at the Riverfront alternative site in comparison to the OGS.
- **Worker Safety.** No differences are expected with respect to worker safety at the Riverfront site or proposed OGS site.

OGS Alternative 4: Sandy Lane Site

The 30-acre Sandy Lane site is located 0.6 miles south of the OGS, in the City of Oakley. It is on the north side of Oakley Road and east side of Sandy Lane. The site is actively farmed, and contains a large warehouse-type building in the southwest portion. The site and parcels immediately to the west, north, and east are zoned Light Industrial. The parcels include agricultural, residential, and light industrial uses. The nearest sensitive receptor is 120 feet to the south (opposite Oakley Road); other residences are on all sides of the site. Orchard Park Elementary School is 600 feet to the east. Site control is unknown.

Water for a project at this site would be provided by tapping into an existing line along Sandy Road. If that is unavailable, an approximately 0.9-mile connection would be required to tie into the DuPont water system. For recycled water, a 3.2 mile connection would be required to reach the ISD's treatment plant. Wastewater would be returned to the ISD. A 1.9-mile transmission line would connect to the Contra Costa Substation to the west; the route would travel west from the site along Oakley Road and then slightly north (east of Highway 160) to join the existing corridor that would be used for the proposed site. A 1.0-mile natural gas line would tie into the Antioch Terminal; running east from the site along Oakley Road, and then north on Bridgehead Road. A comparison of the Sandy Lane and proposed OGS sites follows:

- **Linear Facilities.** The Sandy Lane Alternative would require a transmission connection of similar length as the proposed project to the Contra Costa Substation. However, the portion along Oakley Road would not be within an existing corridor. A 1.0-mile gas pipeline would be needed to tie into Antioch Terminal, whereas the proposed site would be adjacent to the terminal.
- **Air Quality.** The Sandy Lane Alternative is located within the same air basin, and the type and quantity of air emissions would be similar to the OGS. However, receptors would be significantly closer (120 feet) at this site, including a school 600 feet away. Impacts from air emissions would thus be greater than for the proposed site. The need for emissions reduction credits would be similar to the OGS.
- **Biological Resources.** The Sandy Lane site is actively farmed, and includes a large developed portion. With limited habitat supporting biological resources, impacts to biological resources would be similar to the proposed site. Nitrogen deposition on the Antioch Dunes could also be mitigated to less than significant.
- **Cultural Resources.** The Sandy Lane site has been previously farmed, reducing the potential for undisturbed cultural resources. Although the alternative site has not been surveyed, cultural resource impacts would likely be similar to the proposed OGS site, where there are no known significant cultural resources.

- **Geological Resources and Hazards.** Effects of the project on geological resources and hazards are expected to be minimal and would be similar to the OGS site.
- **Hazardous Materials.** Hazardous material handling would be similar for the Sandy Lane site and the proposed OGS location. In addition, the differences in the distances and types of roads for transport of hazardous materials would be minor.
- **Land Use and Agriculture.** The Sandy Lane site is zoned Light Industrial. The site does not appear to fall within Master Planned District, P-1RA (Redevelopment Agency Planned Development), as indicated in the AFC. Land use impacts would be greater than the proposed site, which is zoned for Heavy Industrial uses.
- **Noise.** A project located at the Sandy Lane alternative location would be about 120 feet from the nearest residence, compared to 900 feet for the OGS site. Furthermore, the Sandy Lane site is adjacent to residential and agricultural uses, whereas the proposed site is surrounded by industrial and undeveloped parcels. Noise impacts would thus be greater.
- **Paleontology.** Paleontological resources are not likely to be impacted at either the Sandy Lane or proposed OGS site.
- **Public Health.** Although use of the latest technology would make the project unlikely to cause significant long-term public health impacts, the site is closer to residences and schools, for slightly greater overall impacts.
- **Socioeconomics.** The Sandy Lane and OGS sites would draw similar numbers of workers, primarily from Contra Costa and other counties in the Delta region. For either site, most workers would commute, with a few possibly moving temporarily to the local area during construction. Local socioeconomic impacts to the region would be similar.
- **Soils.** The Sandy Lane site is currently farmed, as is the proposed OGS site. With best management practices for soil erosion, impacts to soil resources are expected to be similar.
- **Traffic and Transportation.** The Sandy Lane site can be accessed via the Main Street (Highway 4) offramp from Highway 160. Vehicles would then proceed south on Neroly Road and east on Oakley Road. As these are secondary roads, traffic and transportation impacts would be greater.
- **Visual Resources.** The Sandy Lane site is located in an agricultural pocket, with surrounding agricultural, residential, and commercial uses. A project at the site would be highly visible from all directions, and have greater visual impacts than the proposed OGS site. The two sites would have similar impacts from transmission and other linear infrastructure.
- **Water Resources.** The Sandy Lane site would also use air-cooled condensing, and would require similar water quantities as the proposed project. Water for a project at this site could be provided by tapping into an existing line along Sandy Road. If that is not possible, an approximately 0.9-mile connection would be required to tie into the DuPont water system. For recycled water, a 3.2 mile connection to ISD's treatment plant would be required. Wastewater would be disposed to the ISD. Impacts to water resources would be similar.

- **Waste Management.** Similar quantities of waste would be generated at the Sandy Lane alternative site as with the OGS.
- **Worker Safety.** No differences are expected with respect to worker safety at the Sandy Lane site or proposed OGS site.

Alternatives Table 1 compares the approximate lengths of linear facilities (transmission line, gas pipeline and water lines) required for the proposed and the four alternative sites identified by the applicant. The distances to sensitive receptors and schools are also shown.

Alternatives Table 2 shows how the impacts of the four alternative sites compare to impacts of the OGS site.

ALTERNATIVES Table 1
Comparison of Approximate Length of Linear Facilities/Distance to Receptors

	OGS Site	18th Street Alternative Site	Wilbur Avenue Alternative Site	Riverfront Site	Sandy Lane Site
Transmission Line Length (to Contra Costa Substation)	2.4 miles (entirely in existing corridor)	2.1 miles (partially in existing corridor)	2.4 miles (partially in existing corridor)	3.2 miles (partially in existing corridor)	1.9 miles (partially in existing corridor)
Gas Pipeline Length (to Antioch Terminal)	140 feet	0.6 miles	0.5 miles	1.1 miles	1.0 miles
Potable Water Connections	[Onsite]	<500 feet	<500 feet	<500 feet	<500 feet or 0.9 miles
Recycled Water Connections	2.5 to 3.2 miles to ISD	2.6 miles to City of Antioch pipeline	2.2 miles to City of Antioch pipeline	1.8 miles to City of Antioch pipeline	3.2 miles to ISD
Distance to Sensitive Receptors (nearest residence)	900 feet	120 feet	1,200 feet	500 feet	120 feet
Distance to Schools	0.4 miles	0.25 miles	0.48 miles	0.52 miles	0.14 miles

ALTERNATIVES Table 2
Comparison of Impacts of Alternatives to the Proposed OGS *

Issue Area	18th Street Alternative Site	Wilbur Avenue Alternative Site	Riverfront Site	Sandy Lane Site
Environmental Assessment				
Air Quality	Slightly greater than proposed site	Similar to proposed site	Similar to proposed site	Greater than proposed site
Biological Resources	Similar to proposed site	Similar to proposed site	Slightly greater than proposed site	Similar to proposed site
Cultural Resources	Similar to proposed site	Similar to proposed site	Greater than proposed site	Similar to proposed site
Hazardous Materials	Similar to proposed site	Similar to proposed site	Greater than proposed site	Similar to proposed site
Land Use and Agriculture	Greater than proposed site	Similar to proposed site	Similar to proposed site	Greater than proposed site
Noise and Vibration	Slightly greater than proposed site	Similar to proposed site	Similar to proposed site	Greater than proposed site
Public Health	Similar to proposed site	Similar to proposed site	Similar to proposed site	Slightly greater than proposed site
Socioeconomic Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Soil and Water Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Traffic and Transportation	Slightly greater than proposed site	Similar to proposed site	Similar to proposed site	Greater than proposed site
Visual Resources	Slightly greater than proposed site	Similar to proposed site	Similar to proposed site	Greater than proposed site
Waste Management	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Worker Safety	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Engineering Assessment				
Geology, Mineral Resources, and Paleontology	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Transmission System Engineering	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site

*Shaded cells identify impacts slightly greater and greater than the proposed project

SITE IDENTIFIED BY STAFF FOR FURTHER ANALYSIS

Western Contra Costa County Alternative Site. Due to the concentration of power plants in the Pittsburg/Antioch/Oakley area, staff reviewed industrial parcels in Richmond, Pinole, and Martinez in major transmission corridor areas. However, staff found that the few vacant industrial sites in proximity to transmission lines are generally of insufficient acreage. Freethy Boulevard in Richmond is one such area; combining all of the 0.5-acre to 3-acre contiguous parcels would be significantly less than the 22

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 OGS project.

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 are 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 are 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 as does the OGS. They

would not be able to generate equivalent power at the proposed site and operational constraints at other locations in the region limit their effectiveness as alternatives to the OGS.

- **Solar.** 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 parabolic 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 300 AFY for the Palen Solar Power Project (500 MW parabolic trough with dry-cooling), 32.7 AFY for the Imperial Valley Solar Project (750 MW Stirling engine), and 150 AFY for the Rice Solar Energy Project (150 MW power tower). Although large-scale solar plants are proposed in remote regions, Eastern Contra Costa County has insufficient solar insolation (below 6.0 kWh/m²/day) for utility-scale solar thermal generation (NREL 2007).

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 10 acres/MW of capacity (CEC 2007). 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) over a 5-year period (SCE 2008). NCI (2007) calculated Contra Costa County’s economic potential for retrofitting¹ commercial and residential buildings using state subsidies and new business models² 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 624 MW generation capacity of the proposed project.

- **Wind.** Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which then feed alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40% of the wind’s kinetic energy into electricity. A single 1.5-MW turbine operating at a 40% capacity factor generates 2,100 MWh annually. Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development (AWEA 2008). The average capacity of wind turbines installed in the United States in 2007 was 1.65 MW (EERE 2008).

¹ Economic potential of new construction was essentially zero.

² For this analysis, NCI used three of the seven business models developed with the Energy Commission’s Public Interest Energy Research Program: PV as an Appliance (where PV systems can be sold to a homeowner and incorporated into the home like an appliance as “plug and play”), No Hassle PV (where a single entity bundles the system design, purchase, permitting, rebate application, installation, maintenance, and financing into one transaction for the customer), and PV Consumer Finance (in which initial PV system costs are financed using standard consumer finance models).

The perception of wind as an emerging energy source reached a peak in the early 1980s, when wind turbine generators to convert wind power into electricity were being installed in California at a rate of nearly 2,000 per year. Progress slowed a few years later, however, as start-up tax subsidies disappeared and experience demonstrated some deficiencies in design. At the present time, technological progress has caught up, contributing to lower cost and greater reliability. Wind technology is well developed and can be used to generate substantial amounts of power. There is now approximately 3,141 MW of wind-generated power being produced in California (CalWEA 2010). Modern wind turbines represent a viable renewable energy technology, as exemplified by the number of wind projects applications pending at the BLM in California. The BLM has received approximately 55 applications for wind projects in the California Desert District as of July 2010, for use of more than 665,049 acres of land (BLM 2010). The Oakley area, however, 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 percent. Plants, however, must be built near geothermal reservoir sites, as steam and hot water cannot be transported long distances without significant thermal energy loss. Geothermal plants are currently operating in the California counties of Lake, Sonoma, Imperial, Inyo, Mono, and Lassen. Larger geothermal areas in the Mojave Desert are in Coso Hot Springs (southwestern Inyo County) and Imperial County. 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.

The emissions due to biomass fuel-fired power plant operation are generally unavoidable. Direct impacts of criteria pollutants could cause or contribute to a violation of the ambient air quality standards. Significant impacts can potentially occur for PM10 and ozone because emissions of particulate matter and precursors and ozone precursors could contribute to existing violations of the standards for those criteria pollutants. Biomass/biogas facility emissions could also adversely affect visibility and vegetation in federal Class I areas or state wilderness areas as a result of significantly deteriorating air quality related values in the wilderness areas. Toxic air contaminants from routine operation would also cause health risks that could adversely affect sensitive receptors in the local area of the plant.

- **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

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 LINEAR ROUTES AND WATER SUPPLY OPTIONS

The OGS would interconnect to PG&E's Contra Costa Substation via an existing 2.4-mile transmission corridor, extending south from the OGS (on the east side of Highway 160) and then due west (along the north side of Oakley Road). One of the two existing 60-kV lines (on steel lattice towers) in the corridor would be replaced with a new 230-kV line on monopole towers. The applicant identified an alternative 2.3-mile transmission route along East 18th Street/Main Street that follows an existing transmission corridor for the last 1,300 feet. However, the alternative route would have greater impacts (to traffic and residences/businesses along heavily developed East 18th Street) and would have no advantages over the proposed route. As the proposed route follows an existing corridor for the entire route, staff did not consider any additional alternatives.

Natural gas would be obtained from PG&E Line 303 (located in the southeastern portion of the Antioch Terminal) via an approximately 300-foot-long, 6- to 10-inch-diameter connection to the gas metering station. The project owner may also choose to include a similar secondary natural gas supply connection from Line 400 (in the northeastern portion of the Antioch Terminal). Due to the short distance to the adjacent Antioch Terminal, neither the applicant nor staff analyzed any alternatives to the natural gas pipeline route.

The OGS would require about 240 AFY for plant cooling and process water, fire protection, and potable uses. The Diablo Water District would supply potable water for these purposes via an existing 24-inch diameter distribution pipeline that runs north-south through the OGS site (just east of PG&E's Antioch Terminal). This use of potable water has the potential for significant adverse impacts. However, the OGS has committed to using recycled water when it becomes available from the ISD's wastewater treatment plant located at 450 Walnut Meadows Drive in Oakley. Construction on the plant started on April 22, 2009, with anticipated completion in October 2011 (ISD 2010). With measures in the **Soil & Water Resources** section of this FSA requiring the transition to recycled water when it is determined to be economically feasible by the Energy Commission, staff did not consider any alternative water supplies.

The OGS would annually discharge approximately 43 million gallons of wastewater to an existing ISD sewer line located in Main Street via the construction of a new force main in Bridgehead Road, which borders the west side of the site. Alternative wastewater routes were not evaluated due to the short length and direct connection.

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 decisionmakers 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, subd. (1).) 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, subd. (e)(2).) CEQA Guidelines and Energy Commission regulations require consideration of the “no project” alternative. The no project alternative is compared to the effects of constructing the proposed project. In short, the impacts associated with the new power plant would not occur at this site if the project does not go forward.

Selection of the “no project” alternative would render all concerns about project impact moot. The “no project” alternative would preclude any construction or operation and, thus, installation of new foundations, piping, or utility connections.

If the project were not built, the region would not benefit from the local and efficient source of 624 MW of new generation that this facility would provide nor would jobs be created in support of project construction and operation. As noted above, the OGS project would also increase reliability and compensate for the intermittency of renewable energy sources.

In the absence of the OGS 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 OGS project. New plants constructed in the area could utilize undeveloped land (greenfield sites), possibly creating significant environmental impacts. If no new natural gas plants were constructed, reliance on older power plants may increase. 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 levels of pollutants, could operate more than they do now. Thus, the “no project” alternative is not environmentally superior to the OGS project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comment	Response
Public (Galey, J. 2010): Rather than purchase new land for the OGS, use the old Contra Costa Power Plant site units 1-3.	CCPP units 1-3 were built in 1951 and have been retired. Removal of these units and replacement with new units would entail significant additional cost. The Marsh Landing Generating Station has already been approved for construction on a portion of the Contra Costa Power Plant site. It is unlikely that the OGS applicant could acquire land at this location. Furthermore, the area occupied by the retired units would be less than a third of the size required by the proposed 22-acre OGS.
City of Antioch (COA 2011a): Corrections to potable, sewer, and recycled water connections are as follows: <ul style="list-style-type: none">• Alternative Site 1- Potable water, wastewater collection, and storm drainage facilities are presently available in E. 18th Street and Drive-in Way. The City of Antioch has a new recycled waterline on 'A' Street; a 2.6-mile connection would be required.• Alternative Site 2- City of Antioch water pipeline and sewer pipelines are located in Wilbur Avenue. The City of Antioch has a new recycled waterline on 'A' Street; a 2.2-mile connection would be required.• Alternative Site 3- The City of Antioch has a new recycled waterline on 'A' Street; a 1.8-mile connection would be required.	Changes made in analysis of alternative sites.

CONCLUSIONS AND RECOMMENDATION

As determined by Energy Commission staff in the FSA, all environmental impacts associated with the OGS could be mitigated to less than significant.

Located in a heavy industrial area adjacent to the Antioch gas terminal, the proposed site is suitable for the project. The alternative sites in the vicinity have disadvantages (e.g. longer gas and transmission interconnections, greater visual presence, closer to receptors) and no significant advantages over the proposed site.

Staff does not believe that alternative technologies such as solar, wind, geothermal, biomass, tidal, and wave present feasible alternatives to the proposed project. The alternative linear routes are feasible but present no clear advantage. Staff does not recommend an alternative over the project as proposed.

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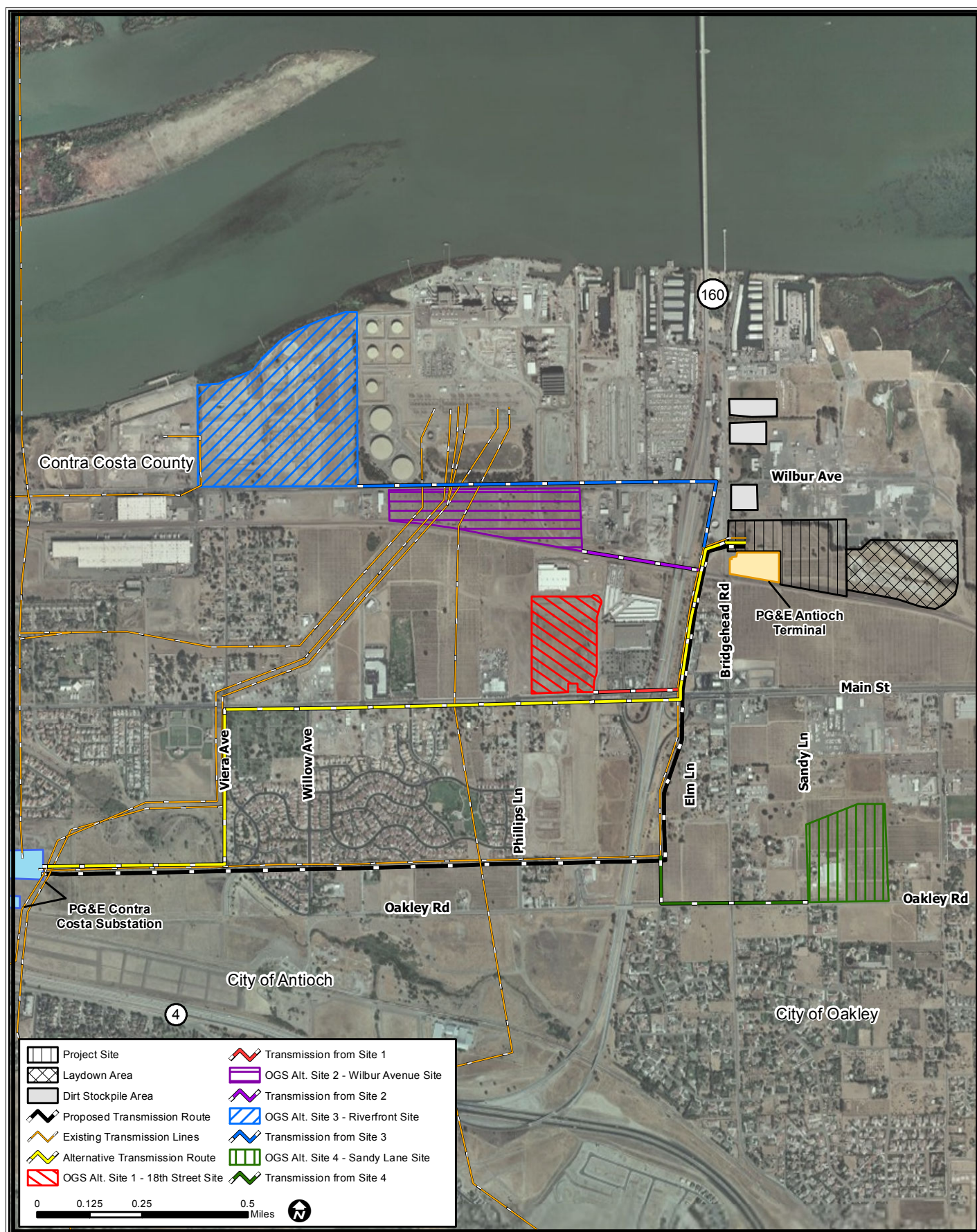
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ALTERNATIVES - FIGURE 1 Oakley Generation Station - Alternative Sites



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2011

SOURCE: California Energy Commission and OG 2009a

**GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN**
Testimony of Craig Hoffman

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:

**Craig Hoffman, Compliance Project Manager
(09-AFC-4C)
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	<p>Construction shall not commence until the all of the following activities/submittals have been completed:</p> <ul style="list-style-type: none"> • 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.

CONDITION NUMBER	SUBJECT	DESCRIPTION
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.
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

**ATTACHMENT A
COMPLAINT REPORT/RESOLUTION FORM**

COMPLAINT LOG NUMBER: _____ DOCKET NUMBER: _____

PROJECT NAME: _____

COMPLAINANT INFORMATION

NAME: _____ PHONE NUMBER: _____

ADDRESS: _____

COMPLAINT

DATE COMPLAINT RECEIVED: _____ TIME COMPLAINT RECEIVED: _____

COMPLAINT RECEIVED BY: _____ ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE: _____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION): _____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL: _____

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS: _____

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION: _____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN: _____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED: _____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED): _____

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED): _____

OTHER RELEVANT INFORMATION: _____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE: _____ DATE: _____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

PREPARATION TEAM

OAKLEY GENERATING STATION

09-AFC-4

PREPARATION TEAM

Executive Summary	Pierre Martinez, AICP
Introduction	Pierre Martinez, AICP
Project Description	Pierre Martinez, AICP
Air Quality.....	Joseph Hughes and Brewster Birdsall
Biological Resources.....	Ann Crisp and Heather Blair
Cultural Resources.....	Kathleen Forrest
Hazardous Materials Management.....	Geoff Lesh, P.E., Rick Tyler
Land Use.....	Negar Vahidi and Susanne Huerta
Noise and Vibration	Erin Bright and Shahab Koshmashrab
Public HealthObed Odoemelam, Ph.D.
Socioeconomics	Kristin Ford
Soil and Water Resources.....	Mark Lindley and Paul Marshall
Traffic and Transportation	Scott Debauche
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Visual Resources	Melissa Mourkas
Waste Management	Ellie Townsend-Hough, REA
Worker Safety	Geoff Lesh, P.E., Rick Tyler
Facility Design	Erin Bright
Geology and Paleontology	Patrick Pilling, Ph.D., P.E., G.E., D.GE.
Power Plant Efficiency.....	Shahab Koshmashrab
Power Plant Reliability.....	Shahab Koshmashrab
Transmission System Engineering.....	Laiping Ng and Mark Hesters
General Conditions.....	Craig Hoffman
Project AssistantMaria Santourdjian

**DECLARATION OF
Pierre Martinez, AICP**

I, Pierre Martinez, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Project Manager (Planner III).
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Executive Summary, Introduction and Project Description** sections for the **Oakley Generating Station (09-AFC-4)** 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: February 16, 2011

Signed: _____

At: Sacramento, California

PIERRE MARTINEZ, AICP

PROFESSIONAL EXPERIENCE

Mr. Martinez has significant experience in public sector (State, County and City) project management as a land use planner as well as private sector project management experience with a national homebuilding company. His experience includes review, planning, inspection, and advocacy of a myriad of land use development proposals, including agricultural operations, retail, office, and industrial developments; low, medium, and high density residential developments; mixed-use master planned communities; general plan and other policy-level documents; and power plant developments.

California Energy Commission – Project Manager

2010 – Present

Siting, Transmission and Environmental Protection Division

Mr. Martinez is responsible for the day-to-day management of the certification/licensing process for thermal power plants of 50 megawatts or greater along with transmission lines, fuel supply lines, and related facilities that serve them. He works as a team leader on the coordination of activities and work products of technical specialists in as many as twenty distinct environmental and engineering disciplines to prepare Staff Assessments (functional equivalent of Environmental Impact Reports). His duties also include coordinating project calendaring, public noticing, public workshops and public hearing meetings. Additionally, Mr. Martinez is responsible for identifying and solving technical and process issues and recommends actions, policies and procedures to ensure that needed energy facilities are authorized in an expeditious, safe, and environmentally acceptable manner, consistent with the requirements of the Warren-Alquist Act and the California Environmental Quality Act (CEQA).

City of Rocklin – Planning Commissioner

2011 – Present

Mr. Martinez was recently appointed by the City of Rocklin City Council to serve as a Planning Commissioner for a four-year term. His responsibilities include implementing City Council policy by making decisions and/or recommendations on land development proposals ranging from residential, retail, office, and industrial uses to recommending policies to the City Council regarding long range planning, zoning criteria changes, and other land development related topics.

Lennar Communities, Inc. – Community Planning Manager

2005 – 2009

Land Division

Mr. Martinez's was the Project Manager for the Managing Partner of Joint Venture development group seeking approval of a 7,500-acre master-planned mixed-use community. His duties included, but were not limited to; hiring and contracting all consultants to assist with the entitlement effort, managing and reviewing all consultant work; providing development partners with schedules, business plans, budgets, and status reports; managing company assets and managing property managers; payment of property taxes and other expenses; collection of rents, securing lease agreements, administering management agreements, assistance with due diligence and option agreement administration, and more. Additionally, Mr. Martinez was also responsible for reviewing, commenting on, and directing the preparation of technical and legal documents. He also coordinated a community benefits program and participated in local business and civic organizations.

City of Rocklin – Associate Planner
Community Development Department

2000 – 2005

Mr. Martinez managed and coordinated the processing of various land use development proposals during an unprecedented era of growth in the City of Rocklin. His project load ranged from residential subdivisions and office/industrial parks to regional-serving commercial shopping centers. He also assisted the public, engineers, architects and other developer representatives in maneuvering through and understanding the complex process of obtaining land use/development permits and was involved from early application consultation through certificate of occupancy. Mr. Martinez's duties also included research of State and local jurisdictional land use regulations and preparation, recommendation, and implementation of new land use regulations. Mr. Martinez also prepared environmental documents and staff reports and delivered presentations for Planning Commission and City Council consideration of new land use proposals and/or on other land use related topics.

County of Sutter – Assistant/Associate Planner
Community Services Department

1995 – 2000

Mr. Martinez managed and coordinated the processing of various land use development proposals primarily related to a rural environmental, including agricultural and industrial operations, residential subdivisions, and office parks. He also assisted the public, engineers, architects and other developer representatives in maneuvering through and understanding the complex process of obtaining land use/development permits and was involved from early application consultation through certificate of occupancy. Mr. Martinez also participated in an over two-year effort to comprehensively update the County's General Plan. His duties related to this effort included preparation of various elements of the General Plan, participation in numerous Citizen Advisory Committee, Planning Commission, and Board of Supervisor meetings. Mr. Martinez was also responsible for implementing various programs mandated by the new General Plan, including Housing Element programs and an effort to resolve Zoning and General Plan land use inconsistency throughout the entire County. Mr. Martinez also trained new staff and drafted a training/guidance manual for project processing.

EDUCATION/PROFESSIONAL ASSOCIATIONS

University of California at Berkeley

Major: B.A. Sociology

Minor: City & Regional Planning

Additional Education

Coursework completed through UC Davis Continuing Education and other American Institute of Certified Planners (AICP) certified programs on the following topics: Land Use Law Review, California Environmental Quality Act, Subdivision Map Act, Design Review, Surface Mining and Reclamation Act, Urban Site Design, Smart Growth, Public Real Estate Transactions, Economic Development, Redevelopment, and more.

Memberships/Associations - American Institute of Certified Planners (AICP), American Planning Association (APA), California Chapter of APA, Cal Alumni Association, 2005 Graduate of Rocklin Leadership.

**DECLARATION OF
James Brewster Birdsall**

I, James Brewster Birdsall, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division under Contract No. 700-08-001.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Air Quality and Greenhouse Gas Emissions** for the **Oakley Generating Station (09-AFC-4)** 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: February 22, 2011

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
Joseph Hughes**

I, Joseph Hughes, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Air Resources Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Air Quality** for the **Oakley Generating Station (09-AFC-4)** 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: 2/3/11

Signed: Joseph Hughes

At: Sacramento, CA

Education

Sacramento State University 2003-2008

Sacramento, Ca

Bachelor of Science, Mechanical Engineering Technology, 3.25GPA-May 2008

AA degree in liberal arts and science 3.0 GPA

Experience

California Energy Commission March 2009-Present

Sacramento, Ca

Air Resources Engineer

- Currently co-authoring air quality staff assessments for thermal power plant projects in California producing more than 50 megawatts of electricity.
- Currently working on American Recovery and Reinvestment Act (ARRA) projects, along with natural gas fired projects.
- Review and process compliance reports for multiple power plants in California.
- Currently working on project amendments and modifications requiring air quality analysis.
- Trained in CEQA and NEPA analysis, along with AERMOD air modeling.

Capital Engineering Consultants, Inc April 2008-2009

Sacramento, Ca

Mechanical Engineer

- Responsible for detailed and accurate take off calculations to ensure successful project completion.
- Completing engineering design for Heating Ventilation Air Conditioning and Plumbing by utilizing complex engineering calculations and software.
- Responsible for meeting code regulation and requirements to the degree acceptable by various organizations.
- Lead productive weekly team meetings to discuss project scheduling, cost effectiveness, request for information, and change orders.

**DECLARATION OF
Ann Crisp**

I, Ann Crisp, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner I.

OR

I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Biological Resources** for the **Oakley Generating Station (09-AFC-4)** 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: February 24, 2011

Signed: _____

At: Sacramento, California

Ann M. Crisp

Employment History

California Energy Commission

Planner I – Staff Biologist

03/2010 to present

As a staff biologist with the Energy Commission, Ms. Crisp analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable local, state, and federal laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to ensure the best available information is included in staff analyses.

Robertson-Bryan, Inc.

Staff Biologist

11/2006 to 03/2010

Ms. Crisp's duties with Robertson-Bryan, Inc. included development of technical study reports and presentations based on the conclusions of field studies for the Middle Fork American River Project (MFP) Integrated Licensing Process for the Placer County Water Agency. She conducted field studies in preparation of the biological resources component of the MFP and the Big Creek System Alternative Licensing Process for Southern California Edison Company (SCE) including wildlife reconnaissance surveys, protocol-level wildlife surveys (including bald eagle wintering and nesting surveys and California red-legged frog surveys) and botanical surveys (including special-status plant species, noxious weeds, and plants of cultural concern for Native Americans). Ms. Crisp prepared documents supporting various management plans as part of the Big Creek No. 4 Traditional Licensing Process for SCE, including yearly monitoring reports for the Sediment Management Plan, Noxious Weed Management Plan, and Valley Elderberry Longhorn Beetle Management Plan. She also prepared and reviewed technical reports and California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) chapters on terrestrial resources.

Pacific States Marine Fisheries Commission/ California Department of Fish and Game

Research Technician

03/2006 to 11/2006

While working with the California Department of Fish and Game through a partnership with the Pacific States Marine Fisheries Commission, Ms. Crisp conducted various focused wildlife surveys including reptile and amphibian cover board surveys, small mammal mark-recapture surveys, burrowing owl nest surveys, and California tiger salamander larval surveys. She collaborated on design and execution vegetation sampling protocol at multiple survey areas.

California Department of Fish and Game

Scientific Aid

11/2005 to 01/2006

Ms. Crisp led tours of the Nimbus Fish Hatchery to provide information on the function of the hatchery and fish biology to school groups and the general public.

Humboldt State Foundation / California Department of Fish and Game

Wildlife Research Assistant

03/2005 to 10/2005

While working with the California Department of Fish and Game (CDFG) through a partnership with the Humboldt State Foundation, Ms. Crisp conducted field-based vegetation sampling to classify vegetation types/wildlife habitats on multiple CDFG Wildlife Areas and Ecological Reserves. She was responsible for data management and preparation for inclusion in a statewide database. Ms. Crisp also conducted focused wildlife surveys including reptile and amphibian cover board surveys, small mammal live-trapping surveys, and nocturnal mammal spotlight surveys.

Oregon State University

Research Technician

06/2004 to 09/2004

Ms. Crisp conducted bat surveys and vegetation inventories and assessments on a bat survey crew in western Oregon. This included collecting data on bat activity using Anabat II detectors, capturing bats using mist nets and H-nets and collecting biological samples and morphological data and vegetation sampling.

Sacramento Regional County Sanitation District – Bufferlands

Senior Student Intern

07/2003 to 03/2004

Ms. Crisp assisted with various habitat restoration and management projects within the 2,650-acres surrounding the Sacramento Regional Wastewater Treatment Plant. She conducted waterfowl and shorebird surveys as well as sensitive species surveys. Other duties included landscape maintenance and water quality monitoring.

EDUCATION

Wildlife, Fish, and Conservation Biology
University of California, Davis

BS
June 2004

Natural Science
College of Marin

AA
June 1998

DECLARATION OF Heather Blair

I, Heather Blair, 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 an Associate Biologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared staff testimony on **Biological Resources** for the **Oakley 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: 1/31/11 Signed: Heather Blair

At: Sacramento, California



HEATHER BLAIR

Associate 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 the managerial and technical aspects of environmental review of energy infrastructure projects. Her particular expertise is terrestrial biological resources throughout California. This expertise is backed by experience 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 and managing the preparation of environmental documents pursuant to applicable federal, state and local environmental regulations, including but not limited to 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 served as the lead technical staff for the analysis of impacts to biological resources from the 250 MW solar thermal power plant in the Mojave Desert. Important biological issues for this fast-track American Reinvestment and Recovery Act (ARRA) funded project included impacts to Harper Dry Lake from potentially decreased water availability, desert tortoise, and Mojave ground squirrel. Ms. Blair testified as an expert witness in biological resources during Evidentiary Hearings before the Commission.
 - **Biological Resources Assessment for the San Joaquin Solar 1&2 Hybrid Project.** Ms. Blair served 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. This project was cancelled prior to issuance of a Decision.
 - **Biological Resources Assessment for the Genesis Solar Energy Project.** Ms. Blair served as the assistant technical staff for the analysis of impacts to biological resources from this 250 MW solar thermal power plant in an undeveloped area of the Sonoran Desert. Important biological issues for this fast-track ARRA project 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 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 Assessment for the Marsh Landing Generating Station.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 930 MW MLGS. Important biological issues include indirect impacts to State and federally listed plants and insect species in the Antioch Dunes National Wildlife Refuge from nitrogen deposition. Ms. Blair presented her findings before the Commission.
- **Biological Resources Assessment for the Willow Pass Generating Station.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 550 MW WPGS. Important biological issues include direct impacts to California red-legged frog and indirect impacts to State and federally listed plants and insect species in the Antioch Dunes National Wildlife Refuge from nitrogen deposition.
- **Biological Resources Assessment for the Oakley Generating Station.** Ms. Blair is currently co-preparing the analysis of impacts to biological resources from the 624 MW OGS. Important biological issues include indirect impacts to State and federally listed plants and insect 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.
- **Downstream Transmission Upgrades.** Ms. Blair prepared the impact assessment of various issue areas (e.g., biological, geological, and water resources) for reasonably foreseeable upgrades required to interconnect the Palen Solar Power Plant, Blythe Solar Energy Project, Genesis Solar Energy Project, Abengoa Mojave Solar Project, and Los Esteros Critical Energy Facility Phase 2 to the electrical grid.
- **Tule Wind EIS, Third Party NEPA Review.** Under contract to the BLM, Ms. Blair is assisting the BLM in reviewing the biological resources section of the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects.
- **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.
- **Review of the Trans Alta Blue Trail Wind Project for RPS Certification.** Assessed whether the Trans Alta Wind Project's application for Renewable Energy Credits met the Energy Commission's data adequacy requirements and would be consistent with applicable federal, California, and local laws, ordinances, regulations, and standards. The Blue Trail Wind Project is located in Alberta, Canada.
- **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 Plan 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.
- **Talega-Escondido/Valley-Serrano 500 kV Interconnect Project EIR.** Ms. Blair is providing management and oversight of preparation of the biological resources section of an EIR for this application before the CPUC. The Proposed Project involves construction of a pumped storage facility; over 80 miles of high-voltage transmission lines; a new reservoir in Cleveland National Forest; an underground tunnel, penstock, and generation facility; two substations and a switchyard; upgrades to the SDG&E system, and local 115 kV transmission lines in the Lake Elsinore vicinity. Ms. Blair will also be conducting the analysis of impacts to wilderness and recreation.
- **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 dozens of 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.
- **Windsor Substation Project.** Under contract to the CPUC, Ms. Blair prepared the biological resource section of an Initial Study/Mitigated Negative Declaration for a proposed 3.2 acre 115/12 kV substation and transmission interconnection in Sonoma County, California. Important biological issues included potential indirect impacts to adjacent USACE-jurisdictional wetlands.
- **Colorado River Substation Expansion Project.** Ms. Blair is preparing the biological resource section of a Supplemental EIR for the proposed expansion of the Colorado River Substation. The CRS was originally approved in the Devers Palo Verde No. 2 Transmission Line EIR/EIS and needs to be expanded to accommodate interconnection of utility-scale solar thermal generation projects in the Sonoran Desert. Important biological issues include indirect (downwind) impacts to Mojave fringe-toed lizard habitat from impediments to Aeolian sand transport.
- **South San Joaquin Irrigation District, Plan to Provide Retail Electric Service, Sphere Plan, Municipal Services Review and Annexation.** Ms. Blair is preparing the biological resources section of a Subsequent EIR for Municipal Services Review and sphere expansion to allow the public takeover and upgrade of electric distribution facilities by SSJID in southern San Joaquin County.
- **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 woollystar (*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.
- **Indian Springs Telecommunication Project.** Under contract to the CPUC, Ms. Blair is preparing the biological resource section of an Initial Study/Mitigated Negative Declaration for three proposed telecommunication facilities in Shasta County, California. Important biological issues include impacts to the northern clarkia, a CNPS List 1B species.
- **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 California 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 San Francisco giant 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
Kathleen Forrest**

I, Kathleen Forrest, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner II.
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 **Cultural Resources** for the **Oakley Generating Station (09-AFC-4)** 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: 2/2/11

Signed: _____

At: Sacramento, CA

Kathleen A. Forrest

PROFESSIONAL EXPERIENCE

Planner II, Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento, CA, December 2009-Present

Cultural resource specialist performing technical analyses assessing cultural resources implications of energy resource utilization and electric power generation.

Environmental Review

- Review and analyze applications for adequacy, including identification of cultural resources, project-related impacts, and mitigations
- Negotiate with applicants, consultants and other staff to develop solutions that achieve project objectives
- Prepare and present complex and comprehensive reports and recommendations orally and in writing, including analysis of complex data and working knowledge of the legal requirements protecting cultural resources
- Formulate mitigation techniques to prevent significant impacts to cultural resources
- Testify as subject expert at Energy Commission project certification hearings
- Participate in site visits, public workshops and hearings

Associate Planner, Preservation Office, City of Sacramento, Development Services Department

Sacramento, CA, July 2006-July 2009

Cultural resource specialist in City's Preservation Office responsible for a wide range of complex cultural resources programs, policies and project reviews.

Development Project Application Review & Management

- Interpret the Secretary of the Interior's Standards and negotiate with developers, property owners, design professionals, contractors and other city staff to reach design solutions that achieved development project objectives
- Analyzed 36 development proposals for consistency with the Secretary of the Interior's Standards
- Managed Certified Local Government Program grant-funded survey project, including RFQ and consultant selection process, contract negotiations, schedule, review of consultant work, and reporting requirements to State Office of Historic Preservation
- Led multi-disciplinary Matrix review teams to facilitate a timely, seamless and predictable development review for the applicant through planning and building permit processes
- Worked with City Council members and staff on politically sensitive issues

Environmental Review

- Reviewed and provided comments on adequacy of Cultural Resources sections of CEQA and NEPA documents, including identification of cultural resources, project-related impacts, and mitigations
- Prepared 430 recommendations to the Preservation Director and Planning staff regarding potential cultural resources eligibility for ministerial and discretionary projects

Historic Resource Nomination & Management

- Presentations to the City Council, Preservation Commission, Preservation Director, community groups and staff regarding Landmark and Historic District nominations and preservation programs, including preparation of staff reports, informational handouts and visual presentations
- Managed Preservation Commission's Historic Resources Survey Committee
- Updated and maintained the Sacramento Register of Historic and Cultural Resources

Kathleen A. Forrest

Historic Compliance Coordinator, Presidio Trust, San Francisco, CA, January 2004-July 2006

Monitored and assisted in discharging the agency's responsibilities for historic structures within the Presidio of San Francisco

NEPA and Section 106 Review

- Communicated with Presidio Trust personnel regarding NEPA and Section 106 compliance responsibilities and internal procedures to ensure that the required review & consultation occurred
- Collected, analyzed and interpreted information for all Section 106 documentation (determinations of no effect and no adverse effect by the Federal Preservation Officer) for weekly NHPA/NEPA compliance meeting, including preparation of annual report
- Carried out mitigation monitoring of commercial and residential real estate development projects
- Led organization-wide training and compliance on NHPA the Secretary of the Interior's Standards for the Treatment of Historic Properties
- Represented the Presidio Trust at public and partner agency meetings
- Managed preservation compliance files and database
- Assisted FPO in formal consultation for undertakings outside the Programmatic Agreement

Project Management

- Facilitated a successful relationship with trades crews and technical personnel to affect positive historic preservation projects. Began in non-communicative situation and built trust and open communication with those Operations and Maintenance employees that are essential to preservation projects
- Managed building preservation studies and residential rehabilitation projects
- Visited project sites to advise project managers and trades people during project planning and implementation regarding compliance requirements and mitigations

Special Project: Volunteer Coordinator, California Preservation Foundation Conference Steering Committee, 2004.

- Recruited 80 volunteers to staff the 29th annual California Preservation Foundation Conference (2004) at the Presidio of San Francisco from local and state-wide historical associations, local neighborhood associations, regional parks, and interested individuals. Joined Steering Committee halfway through the planning process with no volunteers in place; recruited most volunteers in history of conference to that date
- Coordinated and trained volunteers based on availability, interest and need

Architectural Conservator, Carey & Co., San Francisco, CA. April 2002-December 2003

Staff architectural conservator conducting laboratory analysis and historic research and documentation.

- Performed conditions assessments of historic structures, including identification of character-defining features, finishes analysis of historic paint samples, and treatment recommendations
- Supervised on-site product testing for effectiveness and consistency with the Secretary of the Interior's Standards
- Conducted historical assessments of prospective development project areas to identify potential historic resources
- Prepared historic structures reports, including historic research, surveys, identification of significant features and characteristics, and treatment recommendations

Bandelier National Monument, Los Alamos, NM. June 2000 and June-September 2001

Architectural conservation intern and seasonal employee. Conducted historical research and documentation of cliff dwellings.

Kathleen A. Forrest

Mesa Verde National Park, Mesa Verde, CO. July 2000

Architectural conservation intern. Carried out documentation and on-site treatment at Cliff Palace site.

RELEVANT EDUCATION AND TRAINING

Graduate Program in Historic Preservation, University of Pennsylvania, Philadelphia, PA

Master of Science, May 2001

Emphasis on conservation of architectural materials, conditions assessment methodology and technological applications in documentation, architectural history and archival and site documentation.

University of Massachusetts, Amherst, MA

Bachelor of Arts, cum laude, May 1999.

Major, History. Minor, Anthropology.

Junior semester abroad, University College London, London, England

Environmental Impact Analysis: CEQA and NEPA, Spring 2007, CSU Sacramento

Review of legislative and judicial requirements for environmental impact analysis.

NEPA Workshop. March 28, 2004. UC Santa Cruz Extension

One-day workshop in NEPA policy.

DECLARATION OF

Geoffrey Lesh

I, **Geoffrey Lesh** 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 helped prepare the staff testimony on the **Hazardous Materials Management Section** and the **Worker Safety and Fire Protection Section** for the **Oakley 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:_____ Signed:_____

At: Sacramento, California

WORK HISTORY

- Review and analyze applicants' plans for safe management of hazardous materials, fire prevention, and worker safety.

- Wrote market analysis computer software.

- Designed and developed wafer manufacturing processes for computer data storage systems. Managed team of engineers and technicians responsible for developing wet and dry chemical processes for manufacturing, including process and safety documentation.
- Managed process and equipment selection for manufacturing processes.
- Processes included vacuum processed metals and ceramics, grinding-polishing, plating, etching, encapsulation, process troubleshooting, and SPC reporting.

- Developed wafer processes for new technology recording head for hard disk drives.
- Managed team of engineers and technicians.
- This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

- Developed new vacuum-deposited recording alloys
- Responsible for planning and carrying-out tests, designing experiments, analyzing results, managing test lab conducting materials characterizations.
- Extensive process modeling and data analysis.

- Mechanical engineering for computer disk manufacturing, including product, process, and equipment including metal-ceramic-plastic processes for optical disk development.
- Production processes included plating, metal evaporation, reactive sputtering, laser-based photolithography, injection molding.
- Steering Committee Member, *Center for Magnetic Recording Research, UC San Diego*
- Steering Committee Member, *Institute for Information Storage Technology, University of Santa Clara*

- Product development for photocopiers and computer tape-storage systems.

Stanford University, Master of Science Degree
UC-Berkeley, Bachelor of Science Degree
(Double Major)
University of Santa Clara, Graduate Certificate
Registered Professional Engineer, California

Materials Science and Engineering
Mechanical Engineering,
Materials Science and Engineering
Magnetic Recording Engineering
Mechanical #M32576
Metallurgical #MT1940

All-Solid Lithium Electrodes with Mixed-Conductor Matrix, J. Electrochem. Soc. **128**, 725 (1981).

Proc. Symp. on Lithium Batteries, H.V. Venkatesetty, Ed., Electrochem Soc (1981),
p. 467.

PATENTS

Method of Preparing Thermo-Magneto-Optic Recording Elements, US Pat# 4,892,634
(assigned to Eastman Kodak Co.)

**DECLARATION OF
Rick Tyler**

I, Rick Tyler, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Sr. Mechanical Engineer.

OR

I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I supervised the preparation of the staff testimony on the Hazardous material Management / Worker Safety Sections for the **Oakley Generating Station (09-AFC-4)** 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: 2/24/2011

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
Negar Vahidi

I, **Negar Vahidi**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a consultant 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 **Oakley Generating Station (09-AFC-4)** 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: January 26, 2011 Signed: _____

At: Agoura Hills, California

Academic Background

Master of Public Administration, University of Southern California, 1993

BA (with Highest Honors), Political Science, University of California, Irvine, 1991

Professional Experience

Ms. Vahidi has over 17 years of experience managing and preparing a variety of federal, State, and local environmental, planning, and analytical documents for large-scale energy and water infrastructure and development projects. She currently serves as a Senior Project Manager and Aspen's Group Manager for land use, policy analysis, and socioeconomics issues. She brings the experience of being both a public and private sector planner, specializing in the integration and completion of NEPA and CEQA documentation, land use and public policy analyses, socioeconomics and environmental justice analyses, and public involvement programs. Her diversity and experience in management and technical analyses can be shown through a sample of her projects described below.

Aspen Environmental Group..... 1992-1998 and 2001-present

Ms. Vahidi has participated in CEQA and NEPA analyses of major utility development projects throughout the State, providing land use, agriculture, public policy, and socioeconomics expertise as well as managing Public Participation Programs. Her specific projects are described below.

POWER GENERATION PROJECTS

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 four separate contracts. Ms. Vahidi has served as expert witness and Technical Senior for land use (since 2001), and a specialist for socioeconomics 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 MW 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 MW 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 MW 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.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of this 180 MW 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.** Senior Technical Specialist for the Land Use Assessment for a 1,100 MW 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.** Senior Technical Specialist for the Land Use Staff Assessment of this 169 MW 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. The agriculture Condition of Certification from the Land Use Staff Assessment resulted in an Agricultural Mitigation Plan currently being implemented, and amended for continued implementation for the Tracy Combined-cycle Power Plant (see below).
- **Avenal Energy Project, Kings County, CA.** Socioeconomics Technical Specialist for this 600 MW 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 nominal 1,120-MW electrical generating power plant with commercial operation planned for third quarter of 2004. The Tesla Power Project would 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 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.** Senior Technical Specialist for the Land Use Assessment for a 670 MW 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, in 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 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 of Staff Assessments for various power plants.
- **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 Socio-economics 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; and 4/11/06 through present); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/10)
- **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, including recently adopted city environmental justice policies. 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 MW 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. The document was prepared in compliance with both NEPA and CEQA requirements. Issues of concern included taxation, property values, environmental justice, local labor force concerns, project-related worker housing.
- **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 MW peaking electrical generating facility near SCE's Devers Substation. The proposed project site consisted 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 included the project's compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **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 would 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 MW net. The CESF site was proposed to be located in an unincorporated area of eastern San Luis Obispo County, west of Simmler and northwest of California Valley. The CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site encompassed 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 included the impacts of the power plant on agricultural land conversion, compatibility with adjacent land uses, and compliance with applicable local LORS. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.
- **Carlsbad Energy Center Project, Carlsbad, CA.** Senior Technical Specialist and expert witness 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. Ms. Vahidi conducted the California Coast Act Consistency Determination in lieu of the California Coastal Commission (CCC), because the CCC opted to have the CEC conduct the consistency analysis with the Coastal Act.

- **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. Issues of concern included impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Canyon Power Plant, Anaheim, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 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. Issues of concern included impacts to local employment and housing.
- **Willow Pass Generating Station, Pittsburg, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a new, approximately 550 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. Issues of concern include impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.
- **Calico Solar One Project (a.k.a. Stirling Energy Systems Solar One), San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 850 MW Stirling engine project. The primary equipment for the generating facility would include the 34,000 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, access to landlocked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Currently, staff is working on analyzing two new reduced project alternatives, because of the significant impacts of the project as proposed.
- **Imperial Valley Solar Project (a.k.a. Stirling Energy Systems Solar Two), Imperial County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 750 MW Stirling engine project. 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, compliance with the BLM's CDCA plan and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Ms. Vahidi coordinated extensively with Imperial County regarding the project's inconsistencies with local LORS.
- **GWF Tracy Combined-Cycle Power Plant, San Joaquin County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment for GWF's proposal to modify the existing

TPP (see description above), a nominal 169 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. Major issues of concern included conversion of Important Farmlands, and the continued implementation of the Agricultural Mitigation Plan resulting from the agriculture Condition of Certification imposed on the Tracy Peaker Project.

- **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. Also, authored the comprehensive land use analysis of two transmission line alternatives included as an appendix to the Staff Assessment. 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). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.
- **Lodi Energy Center, Lodi, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225 MW power generating facility. Issues of concern included impacts to local workforce and employment, and taxation.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of a nominal 250 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 Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **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 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, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands.
- **Oakley 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 MW. The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.

Other Agencies

- **Topaz Solar Project EIR, County of San Luis Obispo, 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 California 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** (Applicant: SunPower), **County of San Luis Obispo, CA.** 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 California Department of Conservation LESA Model. She will be guiding the analysis.
- **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 for the California Public Utilities Commission (CPUC). 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 US Marine Corps Base at Camp 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 prepared for the CPUC. 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.
- **EIR for South San Joaquin Irrigation District's (SSJID) Plan to Provide Retail Electric Service, Sphere Plan, MSR, and Annexation, San Joaquin County, CA.** This Subsequent EIR (SEIR) evaluates environmental impacts associated with the SSJID application to provide retail electric service, and evaluates changes in the project and changes with respect to the circumstances under which the project would be undertaken that have occurred since the original 2006 Final EIR was certified. LAFCo may then certify the Final SEIR and take action to adopt the Sphere Plan and MSR, adopt the proposed SOI, approve the annexation, and approve the application to provide retail electric service. Ms. Vahidi is providing CEQA expertise to SSJID, and serves as the Senior Technical lead for the social science sections of the SEIR, including agriculture, land use, policy analysis, and socioeconomics.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, CA.** Under contract to the Bureau of Land Management (BLM), Ms. Vahidi is serving as Aspen's Project Manager and assisting the BLM in reviewing the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.
- **Valley Generating Station Site Survey & Documentation Report, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the LADWP, 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.

TRANSMISSION LINE AND SUBSTATION PROJECTS

- **TANC Transmission Project (TTP), several Northern California Counties.** Ms. Vahidi served 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 US 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. The project was cancelled in July 2009.
- **El Casco System Project, Riverside, CA.** Ms. Vahidi served as the Project Manager for this EIR 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. The project is currently under construction.
- **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.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by US 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 (a.k.a. TRTP Segment 1) EIR/EIS, Los Angeles County.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi 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 (a.k.a. TRTP), Segments 2 & 3 EIR, Los Angeles and Kern Counties.** 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, to SCE's existing Vincent Substation in Los Angeles County. 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, Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties.** 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 vast recreational resources, and evaluation of several route alternatives.
- **Miguel-Mission 230 kV #2 Project EIR, San Diego County, 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 struc-

tures. 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.
- **SCE Calnev Power Line and Substation Project IS/MND, Colton, CA.** 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, Valencia, CA.** 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. 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.
- **Alturas Transmission Line Project EIR/EIS, several Northeastern California counties.** 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.

WATER INFRASTRUCTURE AND SUPPLY PROJECTS

- **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.

- **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, CA.** 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.
- **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.

OIL AND GAS PROJECTS

- **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 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, Socio-economics, 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, Offshore Southern California, CA.** Aspen assisted the US 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.
- **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.
- **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, Norwalk, CA.** Ms. Vahidi was responsible for development and screening of alternatives for a 13-mile petroleum products pipeline from Carson to Norwalk. Prepared analyses of project impacts on socioeconomics, public services, utilities, and aesthetics.
- **Pacific Pipeline Project Mitigation Monitoring, Compliance, and Reporting Program (MMCRP), Los Angeles and Kern Counties, CA.** 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, Santa Barbara, Ventura, and Los Angeles Counties.** 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, Los Angeles and Kern Counties, CA.** 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 US 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.

FIBER OPTIC PROJECTS

- **MARS EIR/EIS, Monterey Bay, 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.

- **Looking Glass Networks Fiber Optic Cable Project IS/MND, several northern and southern California counties.** 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.

OTHER PROJECTS

- **Otay River Watershed Management Plan (ORWMP) and Special Area Management Plan (SAMP), 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-acre) area through the issuance of Corps and CDFG programmatic permits.
- **US 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.
 - **US 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.
- **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.

INSTITUTIONAL PROJECTS

- **Los Angeles Unified School District (LAUSD).** Between 2002 and 2008, Ms. Vahidi served as the Program/Contract 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 was 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. Aspen

was awarded 54 work authorizations, of which 48 were CEQA document assignments for new school projects, school expansions and additions. In addition to her duties as the contract manager, Ms. Vahidi managed the preparation of several CEQA documents under this contract, including:

- **East Valley Middle School No. 2 EIR, Los Angeles, CA.** 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, Los Angeles, CA.** 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 Los Angeles, CA.** 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, socioeconomic, 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, Los Angeles, CA.** Under Aspen's on-going 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, Los Angeles, CA.** 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.

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- **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, Huntington Beach, CA.** 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, Los Angeles, Beverly Hills, and Santa Monica, CA.** 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, Santa Clarita, CA.** 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, Santa Barbara, CA.** 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, Culver City, CA.** 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, Dana Point, CA.** 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, Huntington Beach, CA.** 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. Ms. Vahidi served as EIR Project Manager.

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 1999-2001
- Association of Environmental Professionals (AEP)

DECLARATION OF
Susanne Huerta

I, **Susanne Huerta**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a consultant to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **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 **Oakley Generating Station (09-AFC-4)** 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: January 26, 2011 Signed: _____

At: Agoura Hills, California

Academic Background

Master of Urban Planning, New York University, 2007
BA, Geography, University of California, Los Angeles, 2004

Professional Experience

Ms. Huerta is an Environmental Planner with five years of experience in environmental consulting, city planning, economic development, and GIS analysis. She has worked with Aspen Environmental Group since earning her Master's degree in 2007. While attending graduate school, Ms. Huerta interned for a city planning firm in New Jersey. Her city planning background includes experience in the preparation of master plans, the evaluation of site plans and subdivisions, and conducting land use surveys. At Aspen Environmental Group, Ms. Huerta conducts research and prepares environmental analyses in accordance with CEQA, NEPA, and various other environmental laws and regulations. She is currently conducting the technical analysis for land use and agricultural resources for several renewable energy projects, including solar and wind energy generating facilities, and transmission line projects. In addition, Ms. Huerta is regularly involved with document coordination and production, public involvement, and client interaction. Her project-specific efforts are provided below.

Aspen Environmental Group.....2007-present

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 four separate contracts. Ms. Huerta has served as a Staff Professional for Land Use Staff Assessments since 2008.

- Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; and 4/11/06 through 3/30/10); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/12)
 - **Carrizo Energy Solar Farm, San Luis Obispo County.** Staff Technical Analyst for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which would 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 MW net. The proposed CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site would 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, compliance with applicable local LORS, and the conversion of agricultural land. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.
 - **Willow Pass Generating Station, Pittsburg.** Staff Technical Analyst for the Land Use Staff Assessment for a new, approximately 550 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. Issues of concern include impacts to nearby agricultural resources, com-

patibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.

- **Calico Solar Project (a.k.a. Stirling Energy Systems Solar One), San Bernardino County.** Staff Professional for the Land Use Staff Assessment/BLM EIS for a nominal 850 MW Stirling engine project. The primary equipment for the generating facility would include the 34,000 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 and compliance with BLM's CDCA Plan, access to landlocked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands.
- **Imperial Valley Solar Project (a.k.a. Stirling Energy Systems Solar Two), Imperial County.** Staff Professional for the Land Use Staff Assessment/BLM EIS for a nominal 750 MW Stirling engine project. 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, and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Ms. Huerta was involved in staff's extensive coordination efforts with Imperial County regarding the project's inconsistencies with local LORS.
- **City of Palmdale Hybrid Power Plant Project, Palmdale.** Staff Professional 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). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.
- **Abengoa Mojave Solar One Project, San Bernardino County.** Staff Professional for the Land Use Staff Assessment of a nominal 250 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 Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **Oakley Generating Station, Contra Costa County.** Staff Professional for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 MW. The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.
- **Topaz Solar Farm Project Environmental Impact Report (EIR), San Luis Obispo County, Project Assistant/Technical Specialist (2009-present).** Ms. Huerta prepared the Project Description and the technical analysis for the agriculture resources for this 550 MW solar photovoltaic power plant on

the Carrizo Plain of eastern San Luis Obispo County. The project includes solar arrays that would cover approximately 4,200 acres, as well as an electric substation and switching station. A major issue of concern is the conversion of agricultural land, including approximately 1,200 acres of land under Williamson Act contracts. Ms. Huerta has conducted extensive coordination with the San Luis Obispo County Agriculture Department to develop the approach and analysis for land conversion.

- **California Valley Solar Ranch Project EIR, San Luis Obispo County, Technical Specialist (2009-present).** Ms. Huerta prepared the technical analysis for the agricultural resources for this 250 MW solar photovoltaic power plant on the Carrizo Plain of eastern San Luis Obispo County. The project includes solar arrays that would cover nearly 2,000 acres, as well as an electric substation, a 2.5-mile transmission line, and expansion of a surface aggregate mine. Conversion of Important Farmlands, and disturbance to nearby agricultural production activities are major concerns.
- **Seven Oaks Dam Water Conservation Project Supplemental EA, US Army Corps of Engineers, Technical Specialist (2010).** Ms. Huerta is preparing the land use and utilities analyses for the Supplemental EA. The project entails impoundment of additional water and controlled releases from Seven Oaks Dam on the Santa Ana River for water conservation purposes.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, Technical Specialist (2010).** Under contract to the BLM, Ms. Huerta assisted the BLM in reviewing the land use and agricultural analyses of the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.
- **Ocotillo Express Wind Project, Imperial County, Technical Specialist (2010-present).** Ms. Huerta is currently preparing the technical analysis for lands (including agriculture and grazing), realty, and recreation resources. The project is proposed to be a 550 MW wind generation facility on approximately 15,000 acres in Imperial County.
- **Alcoa Dike Project Supplemental Environmental Assessment EA/EIR, US Army Corps of Engineers, Technical Specialist (2009-present).** Ms. Huerta is preparing the land use and visual analysis for the Supplemental EA/EIR Addendum under the NEPA/CEQA for the United States Army Corps of Engineers. A Supplemental EA/EIR Addendum is being performed to address design changes to the approved Alcoa Dike located in the Prado Basin, Riverside County.
- **Auxiliary Dike Project Supplemental Environmental Assessment (EA)/EIR, US Army Corps of Engineers, Technical Specialist (2009).** Ms. Huerta prepared the land use and visual analysis for the Supplemental EA/EIR Addendum under the NEPA/CEQA for the United States Army Corps of Engineers. A Supplemental EA/EIR Addendum is being performed to address design changes to the approved Auxiliary Dike located in the Prado Basin, Riverside County.
- **Pacific Wind Project EIR, Kern County, Technical Specialist (2009-2010).** Ms. Huerta prepared the technical analysis for land use and public services. The project is proposed to be located on approximately 8,300 acres of land with up to 250 wind turbines to produce up to 250 MW of wind energy.
- **Baldwin Hills Community Standards District (CSD), City of Culver City, Technical Specialist (2009).** Technical Specialist for the review of a County of Los Angeles environmental document and preparation of an oil and gas drilling ordinance for the City of Culver City in Los Angeles County. Ms. Huerta reviewed the technical comments on the Baldwin Hills Community Standards District EIR prepared by the County of Los Angeles for the Inglewood Oil Field. The technical review included the evalua-

tion of the County's proposed CSD (drilling ordinance), which the County revised based on public comments. The City used the review comments as part of their formal comments submitted on the County's EIR and CSD.

- **California River Parkways Trailhead Project Initial Study/Mitigated Negative Declaration (IS/MND), Ventura County Watershed Protection District, Technical Specialist (2009).** The project would provide a new point of entry to the Ventura County-maintained Ojai Valley Trail and the Ventura River Trail, building on an existing trails network, and would include a new parking lot and crosswalk. Ms. Huerta performed the analyses for land use, agricultural and mineral resources, public services, and recreation resources.
- **TANC Transmission Project, Transmission Agency of Northern California, Staff Professional (2009).** Public scoping for 600 miles of proposed 230 kV and 500 kV transmission lines and associated infrastructure extending from eastern Lassen County south through the Sacramento Valley, and branching west to the Bay Area and east to Tuolumne County: Ms. Huerta assisted in the acquisition and processing of 6,600 scoping comments and information requests; responded via phone, email, and postal mail to public and agency inquiries throughout the twice extended, five-month scoping period; quantitatively evaluated scoping data; and authored sections of the scoping report. The project was cancelled in July 2009.
- **Alta–Oak Creek Mojave Project EIR, Kern County, Technical Specialist (2008-2009).** Ms. Huerta is prepared the technical analysis for land use, public services, population, and housing resources. The project is proposed to be located on approximately 11,000 acres of land with up to 350 wind turbines to produce up to 800 MW of wind energy. This would be the first project of the Alta Wind Energy Center which is designed to produce 1,500 MW of wind power in the Tehachapi Wind Resource Area of Kern County.
- **Santa Maria River Levee Repair Project, US Army Corps of Engineers, Technical Specialist (2008).** An Environmental Assessment (EA) is being performed for the corrective action to repair the design deficiency of the Santa Maria River Levee in order to avoid the potentially catastrophic consequences of a levee breach that would affect the population of the city of Santa Maria. Ms. Huerta has prepared technical analysis of potential land use and socioeconomic impacts for the EA under NEPA, including NEPA-required environmental justice issues.
- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, Technical Reviewer (2008).** Under Aspen's environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Huerta assisted in preparation of the potential impacts to recreational resources for this EIR. 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.
- **Tehachapi Renewable Transmission Project (TRTP Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, Technical Specialist (2007-present).** In preparation of a joint EIR/EIS for the CPUC and USDA Forest Service (Angeles National Forest), Ms. Huerta conducted research and analysis for impacts related to public services and utilities, and prepared the Cumulative Impact Scenario. In addition, she prepared the EIR/EIS Summary; and assisted in preparation of the Project Description, Alternative Screening Report, Scoping Report, and the public comment period of the Draft EIR/EIS.

Previous Experience

Burgis Associates, Inc. 2006-2007

Ms. Huerta worked as a consultant for city planning departments and private developers throughout northern New Jersey. Her primary projects were to draft a master plan reexamination report and an open space and recreation element of a master plan. Within these projects she evaluated existing socio-economic conditions and land uses, and conducted an inventory of recreational facilities and open space. She also used ArcGIS to illustrate zoning recommendations and update land use and zoning maps. Other routine projects included the evaluation of site plan, subdivision and variance applications for compliance with local, State and federal regulations.

Brooklyn Economic Development Corporation 2005

Ms. Huerta conducted research and field surveys for community revitalization projects. She also participated in collaborative meetings with other community organizations.

Additional Training and Courses

- Successful CEQA Compliance (February 2009)
- CEQA Basics Workshop Series (November 2008)
- Advanced courses in ArcGIS
- Graduate courses in Environmental Impact Assessment and Environmental Policy

Professional Affiliations

- American Planning Association

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 **Facility Design** and **Noise and Vibration** for the **Oakley Generating Station Project** 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: February 17, 2011

Signed: _____

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

Three 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 Siting, Transmission and Environmental Protection Division, as a Staff Toxicologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimonies on the **Public Health and Transmission Line Safety and Nuisance Section(s)** for the **Oakley Generating Station (09-AFC-4)** 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: Feb 4, 2011

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, Planner I**

I, Kristin Ford, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner I.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the Socioeconomics section for the **Oakley Generating Station (09-AFC-4)** 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: 1/26/11

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
Mark Lindley**

I, Mark Lindley, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the Soil & Water Resources for the **Oakley Generating Station (09-AFC-4)** 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: February 24, 2011

Signed: 

At: San Francisco, CA

Mark Lindley, P.E.

Senior Associate

Mr. Lindley is a water resources engineer with experience in stormwater management, hydraulic design, creek and wetland restoration design, construction management, environmental impact/CEQA review, surface and groundwater hydrology, field data collection, water quality, and remediation. His graduate studies focused on the application of analytical and numerical modeling techniques to hydraulic routing and sedimentation in wetlands, impoundments, detention basins and small sediment control structures.

Mr. Lindley combines his expertise in technical analyses and engineering design with his project management responsibilities to effectively address client needs. His technical work has included analysis and engineering design guidance in creek and wetland restoration projects, as well as hydraulic design guidance for stormwater management and flood control projects and environmental impact analysis for CEQA projects.

Education	M.S., 1994	Biosystems & Agricultural Engineering, Oklahoma State University, Stillwater, OK
	B.S., 1989	Mechanical Engineering University of Kentucky, Lexington, KY
Professional Registration	2004 Civil Engineer, California (License No. C 66701)	
Awards	Phoenix Award for Outstanding Master's Student—First Runner-Up	
Professional Societies	American Society of Agricultural Engineers	
Selected Project Experience	GWF Hanford Combined Cycle Power Plant, Environmental Impact Review. Hanford, California. Provided environmental review of a proposed power plant upgrade in Kings County for the California Energy Commission. The environmental review was focused on the conversion of the existing simple cycle plant to a combined cycle plant utilizing air cooled condensers to provide plant cooling. The analysis also examined the stormwater drainage, treatment, and flood control facilities shared with the adjacent Hanford LP Plant and required improved stormwater treatment practices to address existing contamination associated with the existing plants.	
	GWF Henrietta Combined Cycle Power Plant, Environmental Impact Review. Lemoore, California. Provided environmental review of a proposed power plant upgrade in Kings County for the California Energy Commission. The environmental review was focused on the conversion of the existing simple cycle plant to a combined cycle plant utilizing air cooled condensers to provide plant cooling. The analysis also examined the potential to utilize recycled water from the neighboring Lemoore Naval Air Station as an alternate water supply. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.	
	Carrizo Energy Solar Farm, Environmental Impact Review. Carrizo Plain, California. Provided environmental review of a proposed solar thermal power plant in Carrizo for the California Energy Commission. The environmental review was focused on the use of groundwater for collector mirror washing and other process needs and the potential for impacts to neighboring groundwater users. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.	

Selected Project Experience
(continued)

San Francisco Electric Reliability Project, Environmental Impact Review. San Francisco, California. Provided environmental review of a proposed power plant in San Francisco for the California Energy Commission. The environmental review was focused on the utilization of recycled wastewater from the City of San Francisco's combined sewer system and treated onsite for power plant evaporative cooling. In addition, the project site is located in a historic industrial area with existing subsurface impacts from previous land uses that required specific assessment and management to limit risks to onsite workers and neighboring businesses and residences. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

Soil and Water Resource Compliance Reviews, Storm Water Pollution Prevention Plan review and implementation. Throughout California. Provided technical review of construction and operation Storm Water Pollution Prevention Plans (SWPPPs) for several power plants located throughout California on behalf of the California Energy Commission. Review of SWPPPs to determine if the SWPPPs met the requirements of Conditions of Certification specified in the Energy Commission's licensing decision and included sufficient detail and specified appropriate Best Management Practices (BMPs) to address potential erosion and water quality impacts. Site visits involved inspection of installed BMPs to verify that the measures included in the SWPPP were properly installed in preparation for the rainy season.

Blythe Energy Project - Phase II, Environmental Impact Review. Blythe, California. Provided environmental review of a proposed power plant in Blythe for the California Energy Commission. The environmental review was focused on the impacts of the proposed use of groundwater on the neighboring Colorado River. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's evaporation pond, retention basin, and storm water drainage channels.

University of California – Santa Cruz, Stormwater Improvement Projects. Santa Cruz County, California. Developed the design of stormwater management projects intended to increase infiltration and percolation of runoff from paved surfaces to address impacts of increased runoff on downstream creeks. Conducted analysis and design of detention facilities, bio-retention facilities, vegetated bio-swales, and infiltration channels. Managed the development of the designs from the conceptual level through final design and construction.

Pond A8 Phase I Restoration. Orange County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

Interstate 5 - Runoff Management Plan. Orange County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

Selected Project Experience
(continued)

Windemere Development, Surface Runoff Management. Contra Costa County, California. Conducted analysis and design of water quality treatment and flood control detention facilities for the Windemere Development. Developed a sediment management and monitoring plan for a wetland detention basin, collecting runoff from the Windemere Development.

Wendt Ranch Development, Surface Runoff Management. Contra Costa County, California. Conducted hydrologic and hydraulic analysis and design of water quality treatment and flood control detention facilities for the Wendt Ranch Development.

Knightsen, Runoff Management Plan. Contra Costa County, California. Developed a conceptual runoff management plan utilizing treatment wetlands and bio-swales to treat runoff and agricultural wastewater while addressing local flooding issues.

Petaluma Marsh Restoration Project, Construction Management. Marin County, California. Provided construction management and observation services for the Petaluma Marsh Restoration Project, which entailed re-creation of a 102-acre tidal marsh on diked and subsided farmland. The restoration plan included excavation of tidal slough channels, breaching and lowering the existing perimeter levee, creation of wind-wave berms, construction of a significant new levee to protect an adjacent railroad easement, and revegetation.

Martinez Salt Marsh Restoration Project, Post-Construction Marsh Restoration Monitoring. Contra Costa County. Managed mitigation monitoring for a restored salt marsh for the California Department of Transportation. The mitigation project included removing fill, excavating a slough channel network, revegetation, and public access trails and bridges. Post-construction mitigation monitoring involves geomorphic monitoring of marshplain and slough channel development and biological monitoring of vegetation establishment and endangered species habitat development.

Bahia Marsh Restoration Project, Wetland Design. Marin County. Developed wetland restoration design plans to restore both diked and filled baylands to tidal marsh. Restoration designs include grading plans, an excavated slough channel network, breaching and lowering levees, phased water level management with culvert structures, seasonal wetland enhancement, and revegetation. Performed construction support and post-construction monitoring.

Los Capitancillos Wetland Mitigation Project, Wetland Design. San Jose, California. Conducted hydrologic and hydraulic analysis and design of freshwater mitigation wetland facility for Santa Clara Valley Water District. Provided preliminary design of grading, clean soil liner, as well as, inlet and outlet channels and structures. Analyses included water usage, percolation and seepage, rainfall-runoff, and flood routing.

Hamilton Seasonal Wetland Design Guidelines, Wetland Design. Novato, California. Developed design guidelines for seasonal wetland at the Hamilton Airfield. Provided water balance and percolation analyses related to placement of dredged materials at pilot seasonal wetland sites.

Selected Project Experience
(continued)

Lincoln Creek Restoration, Creek Restoration Design. Auburn, California. Developed Creek Restoration design plans for day-lighting a 500 feet reach of Lincoln Creek within the Auburn School Park Preserve for the City of Auburn. Conducted hydraulic analyses and engineering design for the restored creek to determine design sections and rock sizes that met the client's aesthetic requirements for the park and engineering design/stability requirements. Developed design drawings from conceptual level through 100% construction plans.

Sonoma Baylands Wetlands Demonstration Project, Post-Construction Marsh Restoration Monitoring. Sonoma County, California. Managed a team of surveyors and vegetation, avian, and fish scientists in the monitoring of a marsh restoration project for the U.S. Army Corps of Engineers. The Sonoma Baylands Wetlands Demonstration Project utilized dredge materials to raise the elevation of subsided farmland by several feet to approximately mean tide level to accelerate the establishment of wetland vegetation. Post-Construction Restoration Monitoring is focused on slough channel development, tidal elevation monitoring, sedimentation, bird and fish use, and vegetation establishment.

Alamo Creek Restoration Project, Construction Management. Contra Costa County, California. Provided construction management and observation services for the Alamo Creek Restoration Project which entailed re-creation of a multi-stage channel for 6,000 feet of the deeply incised main branch and channel relocation of 3,000 feet of the east branch. The restoration plan included grading, grade control, bank restoration and vegetative treatments.

Laguna de Santa Rosa, Suspended Sediment/Turbidity Monitoring. Santa Rosa, California. Monitored turbidity, water level and flow at three locations discharging into the Laguna de Santa Rosa for the U.S. Army Corps of Engineers. Turbidity was measured with optical backscatter instruments calibrated to estimate suspended sediment concentrations at each location. Suspended sediment data was utilized with flow data to estimate sediment yield into the Laguna de Santa Rosa to help determine sedimentation rates within the Laguna and to guide decisions on projects to limit sedimentation.

**DECLARATION OF
Paul Marshall**

I, Paul Marshall, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Senior Engineering Geologist.
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 **Soil and Water Resources Section** for the **Oakley Generating Station (09-AFC-4)** 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: February 24, 2011

Signed: _____

At: Sacramento, California

Paul D. Marshall

EDUCATION

SAN DIEGO STATE UNIVERSITY, CALIFORNIA

Bachelor of Science Degree in Engineering Geology

Completed post-baccalaureate courses in Engineering Geology

FRESNO STATE UNIVERSITY, CALIFORNIA

Completed post-baccalaureate courses in Civil Engineering

LICENSES

California Registered Geologist, No. 5718

California Certified Engineering Geologist, No. 1817

California Certified Hydrogeologist, No. 468

EMPLOYMENT HISTORY

CALIFORNIA ENERGY COMMISSION

Siting, Transmission, and Environmental Protection Division – Supervisor, Soil, Water Resources, and Waste Management Unit/ January 2008 -Present

Supervise a multidisciplinary team of engineers and geologists responsible for analysis of potential environmental impacts from power plant construction and operation to soil and water resources and from waste management activities. Provide guidance and technical assistance to staff for complex analysis of power plant impacts on water supply, water quality, wastewater disposal, discharges to surface water and groundwater, development and utilization of groundwater, flood impacts and storm water management, and assessment of potential impacts on human health and the environment. Ensures staff work products are consistent with laws, regulations, and policies of the US EPA, US ACOE, SWRCB, RWQCB's, CDFG, DTSC, and other local ordinances. Contract with and direct the work of consultants conducting technical reviews of power plants. Schedule and confer with a multidisciplinary staff of planners, engineers, and scientists to ensure staff analyses are coordinated with other disciplines where there is overlap. Ensure product delivery in a timely manner. Hire and develop staff, complete probationary and performance reports, counsel and mentor staff. Take adverse actions when appropriate.

CALIFORNIA DEPARTMENT OF CONSERVATION

Office of Mine Reclamation – Supervisor, Compliance Unit/October 2006 – January 2008

Supervise a team of engineering geologists responsible for ensuring compliance with mine reclamation plans and specifications. Review and approve staff work conducted to ensure plans and specifications were adequate and enforceable. Direct staff responsible for enforcement actions and preparation of data and reports for presentation to the State Mining and Geology Board. Oversight of staff review of cost estimates for mine reclamation and conduct statewide workshops outlining requirements for mine reclamation cost estimates. Implement Lead Agency review and audit program.

STATE WATER RESOURCES CONTROL BOARD

Division of Financial Assistance – Chief, Project Implementation Unit/January 2001 – September 2006

Supervise a multidisciplinary team responsible for contract and project management associated with Prop 13, Prop 40, Prop 50, Water Bond 1986 and 1996, and the Federal Clean Water Act funding programs. Develop program policies and procedures for implementation and management of grant and loan programs and projects. Direct the work of staff and coordinate with state and federal agencies in the development of technical review criteria for selection of projects recommended for grant award. Direct the work of staff and contractors developing a Project Assessment and Evaluation Program used to evaluate program effectiveness. Provide guidance and technical support to stakeholders for project development. Represent SWRCB at public meetings and conduct training on program procedures. Ensure project integrity and compliance with State and Federal laws.

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Division of Local Assistance - Senior Engineering Geologist/ July 2000 – January 2001

Manage multidisciplinary staff to identify and develop conjunctive water management programs throughout Southern California. Organize, guide, and support local stakeholder groups in development of conjunctive water management plans. Develop partnering opportunities with other local, state, and federal agencies to spread program benefits region-wide and implement CALFED goals and objectives. Write and review contract documents, task orders, grant applications, and provide input on program policy. Solicit and assist agencies with loan and grant applications for various Water Bond 2000 programs.

Division of Safety of Dams - Senior Engineering Geologist/October 1995 – June 2000

Serve as an engineering geology consultant to a staff of 47 design and field engineers performing regulatory oversight of dam construction and operation. Evaluate existing and proposed dam sites for geologic and seismic hazards; review and comment on geotechnical site assessments and construction plans and specifications; act as technical adviser to staff during construction; inspect and document geologic conditions. Communicate findings to staff, consultants, and owners through written reports, briefings, and meetings. Give presentations to DSOD Board of Consultants on development of state-of-the-art procedures. Develop information and monitor changes in the regional geologic environment.

Division of Local Assistance - Associate Engineering Geologist/November 1993 - October 1995

As a member of the Water Quality Assessment Program I independently performed surface and groundwater studies, and environmental site assessments for both DWR and federal and local government agencies. Negotiated contracts, authored task assignments, and oversaw the work of consultants. Authored reports with analysis of data from various types of exploration and sampling programs. Assembled a Department-wide Site Assessment Project Team and assisted in developing DWR policy for site assessments. Trained team members and gave staff presentations outlining program and team goals.

Division of Local Assistance - Associate Engineering Geologist/October 1992 - October 1993

Under the auspices of the Proposition 82 Water Conservation Bond Law of 1988, I directed the Department's technical, environmental, and economic review of ground water recharge and water supply loan applications. Performed independent technical review and certified feasibility and construction loan applications. Provided assistance to public water agencies regarding compliance with environmental and water rights regulations, and institutional and legal requirements for project development. Coordinated Department's technical review and comment on various CEQA documents.

KLEINFELDER, INC.

Project Geologist - 4 years

Worked in regional offices throughout Central and Southern California, Western Arizona and Southern Nevada performing geotechnical investigations and environmental site characterizations. Supervised field exploration activities throughout the Central Valley and Central Coast of California. Directed water resource, groundwater recharge, geotechnical, and environmental site characterization studies. Marketed clients, determined scope of services, and prepared cost proposals. Monitored project schedules and billing. Briefed clients and supervisors on project status. Authored reports providing geotechnical recommendations for various federal, state, municipal, and commercial projects. Inspected remediation and stabilization projects. Other responsibilities included compilation of data using spreadsheets and databases, conducting literature and aerial photograph review, and writing reports.

EARTH SYSTEMS, INC.

Staff Geologist - 3 years

Designed and supervised installation of monitoring well arrays, extraction wells, drains, dewatering, and slope monitoring equipment throughout central and southern California. Directed subsurface exploration using various drilling and geophysical techniques. Conducted liquefaction, fault rupture hazard, and coastal bluff stability studies. Conducted special inspections of excavations, deep foundations, reinforced earth, and concrete. Performed numerical analyses for slope stability, liquefaction, and earthquake ground motion studies. Authored reports containing cross-sections, maps, and graphs presenting various types of water resource and geotechnical data.

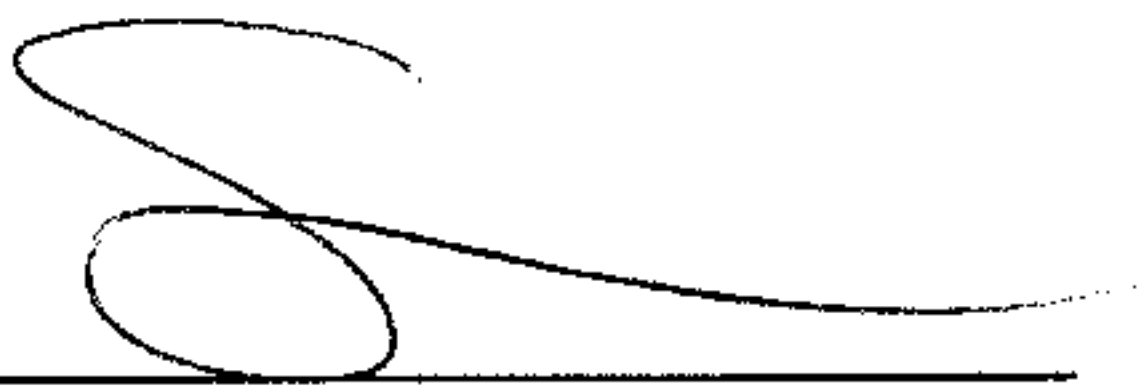
**DECLARATION OF
Scott Debauche**

I, Scott Debauche, 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 **Traffic and Transportation 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 **Transportation and Traffic** for the **Oakley Generating Station (09-AFC-4)** 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: 1/26/11

Signed: 

At: [Agoura Hills, California]



SCOTT DEBAUCHE

Associate

ACADEMIC BACKGROUND

B.S., Urban & Regional Planning, University of Minnesota, 1995

PROFESSIONAL EXPERIENCE

Mr. Debauche is an associate level environmental planner with over 15 years of experience preparing a variety of federal and State of California environmental, planning, and analytical documents for a variety of infrastructure and development projects. Mr. Debauche specializes in the completion of NEPA and CEQA documentation, specializing in the following issue area analysis: Transportation/Traffic, Noise, Air Quality, Socioeconomics/Environmental Justice, and Alternatives. The projects described below highlight his experience NEPA and CEQA compliance for large-scale infrastructure projects, with particular experience in large-scale renewable energy, power plants, and transmission line (linear) projects.

Aspen Environmental Group

2001 to present

California Energy Commission (CEC), Technical Assistance in Application for Certification Review.

In response to California's power shortage, Aspen is assisting the California Energy Commission in evaluating the environmental and engineering aspects of new power plant applications throughout the State, including a number of renewable energy projects. As part of this effort, Mr. Debauche works as a technical specialist for Transportation/Traffic, Glint and Glare, Socioeconomics and Environmental Justice, and Alternatives analyses for the following power plant projects:

- **Rice Solar Energy Generating System Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic joint CEQA compliant Staff Assessment/BLM EIS for a 50,000 megawatt hours (MWh) of renewable energy annually, with a nominal net generating capacity of 150 MW and associated transmission line infrastructure located in an unincorporated area of eastern Riverside County, California. The proposed facility will use concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system. The Staff Assessment included detailed military aviation analysis as well as glint and glare safety impacts from solar panel glare to adjacent transportation resources.
- **Calico Solar Project, San Bernardino, CA.** Technical Specialist for the Transportation/Traffic joint CEQA compliant Staff Assessment/BLM EIS for the 850 MW solar electric generating facility and associated transmission line infrastructure. Project was highly contested with major issues of concern including solar mirror glare impacts to transportation facilities. The Staff Assessment included detailed military aviation analysis as well as glint and glare safety impacts from solar panel glare to adjacent transportation resources.
- **Carlsbad Energy Center Project, San Diego County, CA.** Technical Specialist and expert witness in charge of preparation of the Transportation/Traffic and Alternatives CEQA compliant Staff Assessments for Carlsbad Energy Center, LLC's application to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility along the coastline of the City of Carlsbad. Issues of concern include major incompatibilities with local LORS, potential aviation impacts to the nearby Palomar Airport, and cumulative impacts from widening of I-5.

- **Oakley Generating Station Project, Contra Costa County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic CEQA compliant Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 MW and associated transmission line infrastructure. The proposed project would be located in the City of Oakley, in Contra Costa County.
- **Hydrogen Energy California Power Plant Project, Kern County CA.** Technical Specialist in charge of preparation of the Transportation/Traffic and Socioeconomics/Environmental Justice CEQA compliant Staff Assessments for Hydrogen Energy International, LLC integrated gasification combined cycle (IGCC) power 600 MW generating facility which will gasify petroleum coke (or blends of petroleum coke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The Staff Assessment evaluated potential impacts on nearby residential local roadway land uses, including roadways being traversed by associated transmission line infrastructure.
- **CPV Vaca Station Power Plant Project, Vacaville, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic CEQA compliant Staff Assessment prepared for the CPV Vaca Station (CPVV) project, a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 660 MW and associated transmission line infrastructure. The Staff Assessment included a detailed aviation analysis to adjacent crop dusting activities.
- **GWF Henrietta Peaker Project, Kings County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic CEQA compliant Staff Assessment for GWF's proposal to modify the existing Henrietta Power Plant. New once-through steam generators (OTSGs) will be installed to allow the plant to be operated in its current simple-cycle configuration with no steam generation but with the selective catalytic reduction (SCR) and oxidation catalyst in operation, or to operate as a combined-cycle power plant generating an additional 25 MW of power with new proposed emission limits. The Staff Assessment included a detailed aviation analysis to adjacent crop dusting activities.
- **Watson Cogeneration Steam and Electric Reliability Project, Los Angeles County, CA.** Technical Specialist for the Transportation/Traffic CEQA compliant Staff Assessment for a nominal 85 MW combustion turbine generator (CTG), with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson refinery, to the existing cogeneration facility owned by Watson. The project site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within BP's existing Carson Refinery (BP Refinery), in the City of Carson.
- **GWF Tracy Combined Cycle Power Plant Project, San Joaquin County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic CEQA compliant Staff Assessment for GWF's proposal to construct a nominal 169 MW simple-cycle power plant, by converting an existing gas fired power plant into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity. The Staff Assessment included a detailed aviation analysis.
- **Kings River Conservation District Community Peaker Power Plant Project, Fresno County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic CEQA compliant Staff Assessment for the Kings Rivers Conservation District, who filed a Small Power Plant Exemption for the King River Conservation District Peaking Power Plant. The proposed 97 MW natural gas-fired plant will be located south of the City of Fresno and near the community of Malaga in Fresno County.
- **Palen Solar Power Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice joint CEQA compliant Staff Assessment/BLM EIS for a 500 MW solar thermal electric generating facility and required new transmission line interconnections. The Project will utilize solar parabolic trough technology to generate electricity. The Staff Assessment included detailed socioeconomic analysis of potential construction worker in-migration impacts as well as economic beneficial impacts. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with both NEPA and CEC policy. Mr. Debauche also provided technical assistance to the Traffic and Transportation Staff Assessment regarding military aviation analysis as well as glint and glare safety impacts from solar panel glare to adjacent transportation resources.
- **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist and expert witness in charge of preparation of the Socioeconomics/Environmental Justice joint CEQA compliant Staff Assessment/BLM EIS for a 400 MW solar thermal electric power generating system and

associated transmission line infrastructure. 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 substantial transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. In addition, to addressing environmental justice impacts in compliance with NEPA and CEC policy, the Staff Assessment included detailed socioeconomic analysis of potential construction worker in-migration impacts as well as economic beneficial impacts.

- **Blythe Solar Power Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice joint CEQA compliant Staff Assessment/BLM EIS for a 1,000 MW solar thermal electric generating facility and required new transmission line interconnections. The project will utilize solar parabolic trough technology to generate electricity. The Staff Assessment included detailed socioeconomic analysis of potential construction worker in-migration impacts as well as economic beneficial impacts. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with both NEPA and CEC policy.
- **Genesis Solar Power Project, Riverside County, CA.** Technical Specialist for the Socioeconomics/Environmental Justice joint CEQA compliant Staff Assessment/BLM EIS for a 250 MW solar thermal electric generating facility and required new transmission line interconnections. The Staff Assessment included detailed socioeconomic analysis of potential construction worker in-migration impacts as well as economic beneficial impacts. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with both NEPA and CEC policy.
- **Abengoa Mojave Solar Power Project, San Bernardino County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessment for a nominal 250 MW solar electric generating facility and associated transmission line infrastructure to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. The project will implement well-established parabolic trough technology to solar heat a heat transfer fluid (HTF) technology. The Staff Assessment included detailed socioeconomic analysis of potential construction worker in-migration impacts as well as economic beneficial impacts. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with CEC policy.
- **Canyon Power Plant Project, Orange County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessments for a nominal 200 MW simple-cycle plant, using four natural gas-fired combustion turbines and associated transmission line infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with CEC policy.
- **Lodi Energy Center Project, San Joaquin County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessment for a combined-cycle electrical generating facility rated at a nominal 225 MW and associated transmission line infrastructure. The Lodi Energy Center is proposed for a site parcel of approximately 4.4 acres adjacent to the City of Lodi's White Slough Water Pollution Control Facility (WPCF). In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with CEC policy.
- **Avenal Energy Project, Kings County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessments for a 600 MW combined cycle electrical generating facility and associated transmission line infrastructure. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with CEC policy.
- **Inland Empire Energy Center Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessment for a 670 MW 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. The project would be located on approximately 46-acres near the City of Romoland, within unincorporated Riverside County. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with CEC policy.
- **Valero Cogeneration Project, Benicia County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessment for a proposed cogeneration facility at the Valero Refinery in the City of Benicia. Issues addressed included impacts on public services

and other project-related population impacts such as school impact fees. In addition, Mr. Debauche conducted the screening level environmental justice analysis in compliance with CEC policy.

- **Magnolia Power Project, Los Angeles County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice CEQA compliant Staff Assessment for this nominal 250 MW 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.
- **Coastal Plant Study, California.** Technical Specialist in charge of preparation of the Socioeconomics section of the Coastal Plant Study, which considered the re-tooling, or expansion of California's 25 coastal power plants. Issues of importance included environmental justice and impacts on local economies and housing markets.

California Public Utilities Commission (CPUC). Under Aspen's environmental services contract with the CPUC, Mr. Debauche has prepared environmental analysis sections of environmental reports analyzing large-scale transmission line infrastructure projects as well as renewable energy projects. His project experience with the CPUC includes the following:

- **Desert Sunlight Solar Farm Project EIS/EIR, Riverside County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of reviewing the joint CPUC/BLM EIS Transportation/Traffic, Noise, Air Quality, and Alternatives analysis for CEQA compliance regarding Sunlight's project to construct and operate a 550-MW photovoltaic (PV) Solar Farm and associated generation interconnection line (Gen-Tie Line), and to facilitate the construction and operation by SCE of the Red Bluff Substation in order to provide renewable electric power onto California's existing transmission grid to help meet federal and state renewable energy supply requirements.
- **Downs Substation Project EIR, Kern County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparing the CEQA Transportation/Traffic and Noise analysis for the proposed project and alternatives for the proposed upgrades to the existing SCE operated Downs Substation and proposed 55-miles of transmission line and fiber optic line upgrades.
- **Indian Springs Telecom Project MND, Kern County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparing the CEQA Noise and Air Quality analysis for the proposed project and alternatives for the proposed construction of cell towers, underground power transmission lines, equipment buildings, and access roads in Shasta County which would provide cellular communications service to residents and commuters within the coverage area of Hatchet Mountain, Round Mountain, and Bear Mountain. Project construction would include grading of new access roads and driveways, grading of the tower sites, construction of concrete slabs and/or footings to accommodate the towers, construction of telecommunications towers on the footings, installation of security fencing, and installation of new power lines.
- **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, Mr. Debauche served as Technical Specialist in charge of preparation of the Noise and Socioeconomics/Environmental Justice evaluations 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 and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC. One major issue of concern included visual impacts on property values with the Socioeconomics analysis presenting a detailed analysis regarding property value impacts. The Environmental Justice analysis of this project included minority and low-income data retrieval and analysis for a 0.5-mile radius of the transmission line corridor.
- **El Casco System Project EIR, Riverside, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the EIR Transportation/Traffic, Noise, Socioeconomics, and Alternatives analysis for SCE's 115 kV subtransmission line from Banning Substation westward toward the new El Casco Substation. Major issues of concern included Noise impacts to existing and planned residential land uses, which led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE.

- **Antelope-Pardee 500 kV Transmission Line Project (TRTP Segment 1) EIS/EIR, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche served as Technical Specialist in charge of preparation of the Noise, Public Services and Utilities, and Socioeconomics/Environmental Justice, analysis for SCE's 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 visual impacts on property values with the Socioeconomics analysis presenting a detailed analysis regarding property value impacts and corona noise to adjacent residential receptors. The Environmental Justice analysis of this project included minority and low-income data retrieval and analysis for a 0.5-mile radius of the transmission line corridor.
- **Antelope Transmission Project (TRTP Segments 2 & 3) EIR, Los Angeles and Kern Counties, CA.** For this EIR prepared by the CPUC, Mr. Debauche served as the Technical Specialist in charge of preparation of the Noise and Socioeconomics evaluations. The project included both Segment 2 and Segment 3 of the Antelope Transmission Project, and involved construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County to SCE's Vincent Substation in Los Angeles County. One major issue of concern included visual impacts on property values with the Socioeconomics analysis presenting a detailed analysis regarding property value impacts.
- **Tehachapi Renewable Transmission Project (TRTP Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche served as Technical Specialist in charge of preparation of the Noise and Socioeconomics/Environmental Justice evaluation 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. Both construction and operational noise were of particular concern for this project due to the distance and number of sensitive receptors located in proximity of the transmission line.
- **Viejo System Project IS/MND, Orange County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation prepared on behalf of the CPUC to evaluate SCE's Viejo System Project, which included construction of a new 220/66/12 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 impacts on property values.
- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project. This CEQA document evaluated impacts associated with network fiber optic line upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Prepared the socioeconomic analysis 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.

Additional Infrastructure and Renewable Energy Projects

- **North Sky River/Jawbone Wind Project EIR, Kern County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparation of the Transportation/Traffic analyses for this EIR. The project, as approved, includes the commercial production of up to 87 MW of electricity from wind turbine generators, their ancillary facilities, and supporting transmission line infrastructure.
- **Topaz Solar Project EIR, San Luis Obispo County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparation of the Air Quality and Socioeconomics sections of this EIR for this 500 MW solar photovoltaic project in the Carrizo Plain area. This project requires the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use and includes detailed mitigation and coordination with the County regarding potential population in-migration impacts regarding a high influx of construction workers to a remote area.

- **Panoche Valley Solar Farm EIR, San Benito County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparation of the Air Quality section of this EIR for the construction and operation of a 420 MW photovoltaic solar power plant in Panoche Valley, an unincorporated area of eastern San Benito County. The proposed project will be constructed in five phases with the first phase being 20 MW and each subsequent phase consisting of 100 MW each. The project would be located on approximately 4,885 acres.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, City of Palmdale, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, and Socioeconomics/Environmental Justice analyses for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on US Forest Service (NEPA Lead Agency) lands in Los Angeles County. Aspen is currently working on the Administrative Draft EIR/EIS.
- **South San Joaquin Irrigation District (SSJID) Sphere Plan and Municipal Services Program EIR, San Joaquin County, CA.** Mr. Debauche is serving as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, Visual Resources, and Socioeconomics sections of this Program EIR allowing SSJID to expand its existing services to provide retail electric service throughout southern San Joaquin County. SSJID's proposal to provide retail electric service throughout its service territory, with the exception of customers currently served by Modesto Irrigation District, affects the incorporated Cities of Manteca, Ripon, and Escalon, and the unincorporated areas within and contiguous to the SSJID service area boundaries.
- **California Valley Solar Ranch EIR, San Luis Obispo County, CA.** Mr. Debauche is serving as the technical specialist in charge of preparation of the Air Quality analysis of this EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. This project requires the conversion of approximately 4,000 acres of open space to an industrial use.
- **Tule Wind EIS, Third Party NEPA Review, US Bureau of Land Management.** Under contract to the BLM, Mr. Debauche is assisting the BLM in reviewing the Traffic and Transportation, Noise, and Socioeconomics/Environmental Justice sections of the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects.
- **Alta Wind Project EIR, Kern County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, and Air Quality analyses for this EIR. The project, as approved, includes the commercial production of up to 800 MW of electricity from up to 350 wind turbine generators, their ancillary facilities, and approximately 20-miles of supporting transmission line infrastructure located on three distinct land areas comprising a total of approximately 10,750 acres located approximately 3 miles west of State Route (SR) 14 (Antelope Valley Freeway) and 3 miles south of SR-58 in the Willow Springs area of eastern Kern County.
- **Baldwin Hills Oil Field Community Standards District EIR Review and Ordinance Preparation, City of Culver City, CA.** Mr. Debauche served as the Technical Specialist for the City of Culver City reviewing the Los Angeles County Baldwin Hills Oils Field Community Standards District EIR Noise analysis and policy mechanisms evaluating the impacts of expanding and future operations of the existing Baldwin Hills oil field. Upon completion of environmental review, Mr. Debauche then prepared the Noise section of the newly enacted City of Culver City Community Standards District overlay zone restricting noise generation by the Baldwin Hills Oil Field on the residents of Culver City.
- **Pacific Wind Project EIR, Kern County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic analyses for this EIR. The project, as

approved, includes the commercial production of up to 250 MW of electricity from wind turbine generators, their ancillary facilities, and supporting transmission line infrastructure.

- **TANC Transmission Project (TTP) EIR/EIS, several Northern California Counties, Western Area Power Administration.** As the designated Technical Specialist in charge of preparing of the EIR/EIS Transportation/Traffic and Socioeconomics analyses, he prepared the associated sections of the NOP and project scoping report per Western's guidance and requirements. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), served as the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist 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. Aspen recently completed the scoping and NOP process per Western's guidance and requirements. The project was canceled in July 2009.
- **MARS EIR/EIS, Monterey Bay Aquarium Research Institute.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice analysis for this EIR/EIS, evaluating the effects associated with the installation and operation of the Monterey Bay Aquarium Research Institute (NEPA Lead Agency) Monterey Accelerated Research System (MARS) Cabled Observatory in Monterey, CA. The project operates, in State and Federal waters, an advanced cabled observatory in Monterey Bay that provides a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serving 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 Environmental Justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers.
- **Liberty Energy Power Plant EIR, Riverside County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Noise, Air Quality, Socioeconomics, and Public Services and Utilities analyses for this CEQA document. The project, as approved, includes the construction of a new biomass power plant, located at the eastern terminus of Westward Avenue in the City of Banning. The generating facility includes three power generation units (trains) to produce 15 MW (17.5 MW gross) utilizing a bubbling fluidized bed gasifier boiler to generate heat to produce high pressure steam.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project EIR, San Luis Obispo County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Socioeconomics and Alternatives analyses sections 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 DCPP facility occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County.
- **Long Beach LNG Import Project EIS/EIR, City of 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. Mr. Debauche reviewed the document for technical adequacy and assisted the City in preparing written comments for the Transportation/Traffic and Noise sections of the EIS/EIR.
- **Sunset Substation and Transmission and Distribution Project EIR, Riverside County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this EIR. The project, as approved, includes the Sunset Substation and supporting 33 kV transmission line that interconnects with the City of Banning's existing distribution system. The purpose of the 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.

- **Lake Canyon Dam and Detention Basin Project EIR, Ventura County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, and Hazardous Materials analyses for this CEQA document. The proposed project included an earthfill dam and detention basin located in an unincorporated area of Ventura County to detain peak storm flows and capture the associated debris expected from a 100-year storm event.
- **Colton Substation Project IS/MND, Riverside County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, Cultural Resources, Hydrology, and Hazardous Materials analyses for this CEQA document. The City of Colton constructed the 1.9 acre North Substation and supporting 1.7 miles of 69 kV subtransmission line with the existing city-owned distribution systems.
- **San Antonio Creek Giant Reed Removal Project IS/MND, Ventura County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, and Hazardous Materials issues area analyses for this CEQA document. The project removed the giant reed invasive plant species within the upper reaches of the San Antonio Creek watershed and several tributaries to ensure flood control protection to adjacent residential areas.

Los Angeles Department of Water and Power (LADWP). Under Aspen's environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Mr. Debauche was responsible for conducting the analyses of the technical and social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Projects included:

- **Taylor Yard Water Recycling Project (TYWRP) IS/MND, Los Angeles County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Population/Housing, and Alternatives analyses for this project. LADWP constructed the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles, with major issues of concern including temporary road closures and disruptions to local businesses.
- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives CEQA analyses. The RSC is a major transmission pipeline in the LADWP water distribution system, transporting 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 project constructed 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.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project IS/MND, Los Angeles County, CA.,** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Population/Housing, and Alternatives analyses for this project. LADWP replaced 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. Major issues of concern included impacts to housing.
- **DC Electrode Project IS/MND, Los Angeles County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Population/Housing, and Alternatives analyses for this project. LADWP constructed a new electrode distribution line from West Los Angeles to the Pacific Ocean stopping point in Malibu, CA up the Pacific Coast Highway.

- **District Cooling Plant Project IS/MND, Los Angeles County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Population/Housing, and Alternatives analyses for this project. LADWP constructed the District Cooling Plant and Distribution System (proposed project) in order to provide a centralized system for producing chilled water for use by area users, which are generally large commercial, governmental, industrial and institutional buildings who generate their own chilled water utilizing individual chiller plants for space cooling and air-conditioning. As this project was located in Downtown Los Angeles, major issues of concern included traffic and access impacts.

U.S. Army Corps of Engineers, Los Angeles District. Responsible for conducting the analyses of the social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Projects included:

- **Prado Basin/Norco Bluffs/Reach 9 of the Santa Ana River Dikes Supplemental EAs, Riverside County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic analysis of two structural alternatives for the Norco Bluffs Toe Stabilization project as well as the No Action/No Project Alternative. Aspen developed the alternatives analyzed in this Supplemental NEPA Environmental Assessment document, a description of the alternatives' physical, construction, and operational characteristics, and a discussion of the potential environmental impacts.
- **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** Mr. Debauche served as a Technical Specialist in charge of preparation of the 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.
- **Murrieta Creek Flood Control and Environmental Restoration Project, Riverside County, CA.** Mr. Debauche served as a Technical Specialist in charge of preparation of the complete Environmental Assessment and Mitigation Monitoring plan for Phase 1 of a flood control and restoration project in Riverside County.

California Department of Water Resources. Responsible for conducting the environmental analyses for CEQA compliance as part of two environmental services contracts. Projects included:

- **Piru Creek Stabilization and Restoration Project IS/MND, northern Los Angeles County.** Mr. Debauche served as Technical Specialist in charge of preparation of the Initial Study Transportation/Traffic, Noise, Population/Housing, and Alternatives analyses for the project. The California Department of Water Resources (CDWR) conducted restoration to repair erosion damage at a series of three locations downstream of Pyramid Dam and seismically retrofit the Pyramid Dam access bridge that crosses Piru Creek.
- **Pyramid Lake Repairs and Improvements Project IS/MND and EA, northern Los Angeles County.** Mr. Debauche served as Technical Specialist in charge of preparation of the Initial Study Transportation/Traffic, Noise, Population/Housing, and Alternatives analyses for the project. DWR and the Department of Boating and Waterways (DBW) conducted 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. 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.

Los Angeles Unified School District (LAUSD), Los Angeles County, CA. Technical specialist for a number of CEQA documents (EIRs and IS/MNDs) prepared as part of Aspen's services contract with the LAUSD to help approve school projects that would meet existing overcrowded conditions in the greater Los Angeles area. Projects included:

- **New School Construction Program EIR.** Served as a Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this Program EIR prepared for the LAUSD. The LAUSD 2020 Program would provide student seats throughout the LAUSD via a combination of the addition of portable classrooms to existing campuses, modernization and reconfig-

uration of existing campuses, and the construction of new schools. Major issues of concern included a non CEQA required Environmental Justice study and detailed construction labor analysis.

- **East Valley Middle School No. 2 EIR.** Served as a Technical Specialist for this middle school project located at the previous Van Nuys Drive-In site, preparing the Transportation/Traffic and Noise analyses. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize noise impacts.
- **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** Served as the Technical Specialist in charge of preparation of the complete IS/MND for 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 Visual Resources, Transportation/Traffic, Air Quality, and Noise. Of particular concern, was impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.
- **Canoga Park New Elementary School IS/MND.** Served as the Technical Specialist in charge of preparation of the complete IS/MND for this elementary school project proposed to 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, Transportation/Traffic, Air Quality, Land Use, and Noise.
- **Hughes Magnet Span School IS/MND.** Served as the Technical Specialist in charge of preparation of the Hydrology, Public Services and Utilities, Population/Housing, and Recreational analyses for the proposed re-opening of the existing Hughes Middle School as a Magnet Span School serving up to 1,620 District 6th through 12th grade students. The re-opening of the Hughes Middle School required the relocation of the existing uses of the campus.
- **Wonderland Elementary School Portable Classroom Additions IS/MND.** Served as the Technical Specialist in charge of preparation of the complete IS/MND for a proposed addition to the Wonderland Avenue Elementary School. Issues of concern included Noise to nearby residential receptors.
- **Pio Pico Elementary School Playground Expansion IS/MND.** Technical Specialist in charge of preparation of the complete IS/MND for the expansion of a playground at the existing Pio Pico School in the LAUSD. The playground was proposed on five residential properties. One of the residences is a potentially significant historical resource because of its association with an African-American woman journalist, Fay M. Jackson. This project was cancelled by the LAUSD after completion of the IS/MND due to significant land use impacts.
- **Fairfax Senior High School Portable Classroom Addition IS/MND.** Served as Technical Specialist in charge of preparation of the complete IS/MND for the addition of portable classrooms at the school. Major issue areas covered were Transportation/Traffic, Air Quality, Land Use, and Noise.
- **Polytechnic Senior High School Portable Classroom Addition IS/MND.** Served Technical Specialist in charge of preparation of the complete IS/MND for the addition of portable classrooms at the school. Major issue areas covered were Transportation/Traffic, Air Quality, Land Use, and Noise.
- **Washington Senior High School Portable Classroom Addition IS/MND.** Technical Specialist in charge of preparation of the Complete IS/MND for the addition of portable classrooms at the school. Major issue areas covered were Transportation/Traffic, Air Quality, Land Use, and Noise.

EIP Associates

1998 to 2001

Metropolitan Transit Agency (MTA) Mid Cities/Westside Transit Corridor Study EIS/EIR, Los Angeles MTA. Was a key Technical Specialist in charge of preparation of the EIS/EIR 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 preparing several issue area chapters of this

comprehensive joint EIS/EIR, Mr. Debauche prepared the Transportation/Traffic and Environmental Justice analysis, as well as assisting with the Section 4(f) Parklands discussion, and the Land Use sections of the EIS/EIR.

Pacific Gas and Electric (PG&E) Proposed Divestiture of Hydroelectric Assets Project EIR, PG&E.

Mr. Debauche prepared several key sections of the Draft EIR, including Hazardous Materials and Socioeconomics analysis. 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 these hydroelectric assets also included approximately 140,000 acres of land proposed for sale with the hydroelectric system throughout California. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated Socioeconomic models that analyze power generation and resource management.

Wes Thompson Ranch Development Project EIR, City of Santa Clarita, CA. Served as Technical Specialist 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. As the technical writer for Air Quality, Noise, Hazardous Materials, and Public Services, Mr. Debauche conducted the Transportation/Traffic and Alternatives analyses.

City of Santa Monica Environmental Assessments. Was key Technical Specialist in charge of preparation of several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA. As the technical writer for Transportation/Traffic, Noise, Air Quality, Hazardous Materials, and Public Services/Utilities, Mr. Debauche conducted the analyses for:

- **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 St. 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 Technical Specialist for Transportation/Traffic, Air Quality, Noise, Hazardous Materials, and Public Services/Utilities, Mr. Debauche conducted analyses and prepared these environmental sections for:

- **Cabrillo Plaza Specific Plan EIR, Santa Barbara County, CA.** This project consisted 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. Issues of concern evaluated by Mr. Debauche included Traffic and Air Quality.
- **Culver City Redevelopment Plan and Merger EIR, City of Culver City, CA.** 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. Issues of concern evaluated by Mr. Debauche included Traffic and Air Quality.
- **Dana Point Headlands Specific Plan EIR, City of Dana Point, CA.** 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-generate population inducement. Issues of concern evaluated by Mr. Debauche included Air Quality.
- **Triangle Gateway Redevelopment Project EIR in Beverly Hills, CA, City of Beverly Hills, CA.** This EIR evaluated the development of a supermarket, retail shops, and office space in the triangle gateway portion of downtown Beverly Hills. Issues of concern evaluated by Mr. Debauche included Traffic and Air Quality.
- **University of California Los Angeles (UCLA) Campus Housing Expansion, UCLA.** This EIR evaluated the development and expansion of campus housing within the UCLA campus. Issues of concern evaluated by Mr. Debauche included Traffic.

CH2M Hill - Minneapolis, MN

1995 to 1998

- **Minneapolis/St. Paul International Airport Expansion EIS, Federal Aviation Administration.** Mr. Debauche was a key writer of the EIS for this \$4 million technical and environmental study, including the preparation of an Environmental Impact Statement (EIS), and an evaluation of the urban design implications of a proposed \$800 million expansion of the existing MSP International airport, including transit and terminal modifications and the inclusion of a new perpendicular runway. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. In addition to preparing several issue area chapters of this comprehensive EIS, Mr. Debauche was critical in preparation of a technical report on airport noise effects on nearby housing and mitigation programs for the impacts of the proposed runway.
- **Minneapolis/St. Paul Wastewater Treatment Facility Expansion EIS, Metropolitan Council Environmental Services.** Mr. Debauche was a key writer of the EIS for expansion of the existing wastewater treatment facility serving the twin cities area. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. Mr. Debauche prepared several issue area chapters of this comprehensive EIS, including the Traffic and Noise sections of the EIS.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Chapter Member

**DECLARATION OF
Melissa Mourkas**

I, Melissa Mourkas, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner II.
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 **Visual Resources section** for the **Oakley Generating Station (09-AFC-4)** 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: January 27, 2011

Signed: _____

At: Sacramento, CA

MELISSA E. MOURKAS

EDUCATION

MASTER OF ARTS, LANDSCAPE DESIGN & PLANNING, 1994

CONWAY SCHOOL OF LANDSCAPE DESIGN, CONWAY, MASSACHUSETTS

Graduate landscape design program providing professional training in site design and land-use planning. Curriculum emphasis is on sustainable landscape planning and design. Graduate projects: Master Plan for a 45-acre historic resort, original landscape designed by F.L. Olmsted in Lenox, MA and Performance Standards for a proposed industrial park in Millbury, MA.

BACHELOR OF ARTS, HISTORY OF ARCHITECTURE & ART, 1981

SCRIPPS COLLEGE, CLAREMONT, CALIFORNIA

Major studies in Art History, Architectural History, and Urban Development. Senior thesis: documentation and analysis of the innovative residential designs and construction techniques of California architect Rudolf M. Schindler. Minor studies in Art and the Humanities.

PROFESSIONAL EXPERIENCE

Licensed Landscape Architect, California #5139, Montana #211
Historical Landscape Architect, Secretary of the Interior's Standards
Certified Landscape Irrigation Auditor

LANDSCAPE ARCHITECTURE:

1994 to Present: Landscape Architecture and Design. Experience in landscape architecture, landscape construction estimating, site planning and landscape master plans. Provide landscape architecture and consulting services to private clients, public organizations, contractors, and design firms. Preparation of Cultural Landscape Reports. Frequent speaker to various groups on landscape design, construction and cultural landscapes. Owner of Landscape Legacy, est. 1998. Currently serve as Vice Chair, City of Sacramento Preservation Commission.

PLANNING:

April 2010 to Present: Planner II, California Energy Commission, Siting, Transmission and Environmental Protection Division. Provide technical analysis of proposed energy planning, conservation, and development programs on land use, traffic, visual and cultural resources. Specific tasks include: the analysis of potential impacts; identification of suitable mitigation measures under CEQA; preparation of testimony; participation in public workshops; present sworn testimony during evidentiary hearings, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

2005 to 2008: Assistant Planner, Historic Preservation Office, City of Sacramento, CA
Responsible for design review and approval for private and public development projects involving rehabilitation, preservation and restoration of historic resources and districts under CEQA. Prepared staff reports for Preservation Commission and Council, and coordinated with other planning staff on concurrent entitlements. Staff liaison on municipal development projects involving historic resources, including buildings and other structures, parks and roadways.

DECLARATION OF
Ellen Townsend-Hough, REA

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Siting Transmission & Environmental Protection Division as an Associate Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on Waste Management for the Oakley 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: _____ Signed: _____

At: Sacramento, California

Ellen Townsend-Hough, REA
(Registered Environmental Assessor, REA 1 – 05465)

SUMMARY

I am a chemical engineer with 30 years of experience. My professional career has afforded me many unique growth and development opportunities. I have a working knowledge of the California Environmental Quality Act. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

PROFESSIONAL EXPERIENCE

Writing

- Write environmental impact reports , negative declarations that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems
- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects
- Provides licensing recommendations and function as an expert witness in regulatory hearings.
- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.
- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure
- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would result in significant health impact or health risk in any segment of the exposed population.
- Assist with on-site audits and inspection to assure compliance with Commission decisions.
- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.
- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.
- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.
- Represent Commissioner's position in policy arenas and power plant siting discussions.
- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.
- Wrote speeches for the Commissioner's presentations.

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education

Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer

DECLARATION OF
Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.

I, **Patrick A. Pilling**, declare as follows:

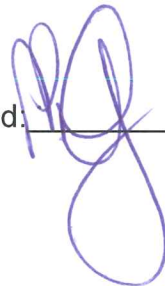
1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a Geotechnical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Geology and Paleontology** for the **Oakley Generating Station (09-AFC-4)** 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: January 26, 2011

Signed: _____

At: Reno, Nevada



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

President

Education

- B.S. – Civil Engineering –1986 – Santa Clara University
- M.S. – Civil Engineering – 1991 – San Jose State University
- Ph.D. – Civil Engineering – 1997 – University of Nevada, Reno

Registrations

- P.E. – Civil – Nevada, California, Oregon, Arizona, Utah, Idaho
- P.E. – Geotechnical – California, Oregon
- D.GE. – Diplomate, Geotechnical Engineering – Academy of Geo-Professionals

Experience

1997 to Present: Black Eagle Consulting, Inc. Dr. Pilling acted as the Executive Vice President from 1997 until the end of 2007, and assumed the role of President of Black Eagle Consulting, Inc. in January 2008. Dr. Pilling maintains more than 20 years of construction, geotechnical, transportation, and mining engineering experience, and has supervised the engineering and construction of such projects throughout the western United States and South America. Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinating company marketing efforts, and performing project management, engineering and laboratory analyses, and report preparation on most projects. Over the past 8 years, Dr. Pilling has assisted the California Energy Commission (CEC) in reviewing geology and paleontology portions of Applications for Certification (AFC) for various power plants throughout the State of California. The power plants included:

Valero Cogeneration Project
Colusa Energy Project
Central Valley Energy Center
Blythe Energy Project Phase II
Tesla FPL Project
Eastshore Energy Center
Panoche Energy Center
Niland Gas Turbine Power Plant
Los Esteros Critical Energy Facility
Pico Power Project
Roseville Energy Center
Contra Costa Energy Project

Gilroy II Project
San Francisco Electric Reliability Project
Russell City Energy Center
Starwood Energy Center
Ivanpah Solar Plant
Marsh Landing Generating Station
Willow Pass Generating Station
Tracy Expansion
Lodi Energy Center
San Joaquin Solar 1 & 2
Vacaville CPV
Mariposa Energy Project

1996 to 1997: SEA, Incorporated; Senior Geotechnical Engineer. Dr. Pilling provided project coordination, management, supervision, and development, and performed field exploration, engineering analyses, and report preparation.

1990 to 1996: WESTEC; Project Manager. Mr. Pilling was responsible for general geotechnical analyses on most projects, as well as design, management, and permitting of heap leach and tailings storage facilities projects. His

experience varied from foundation design recommendations for small pump house structures to detailed liquefaction and seepage/slope stability analyses for large earthen embankments.

1986 to 1990: Case Pacific Company; Project Manager. Mr. Pilling provided cost estimating, project management, and contract negotiation on a wide variety of projects.

Affiliations

- American Concrete Institute: Concrete Field Testing Technician Grade I
- National Society of Professional Engineers
- Secretary/Treasurer - National Society of Professional Engineers, Northern Nevada Chapter
- American Society of Civil Engineers
- International Association of Foundation Drilling
- National Council of Examiners for Engineering and Surveying

Publications

Ashour, M., P. A. Pilling, and G. M. Norris, "Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Isolated Piles and Pile Groups," Proceedings, 32nd Symposium on Engineering Geology and Geotechnical Engineering, Boise, Idaho, March 1997.

Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, "Development of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects," Report No. CCEER-96-4, University of Nevada, Reno, 1996.

Ashour, M., Norris, G., and Pilling, P., "Lateral Loading of a Pile in Layered Soil Using the Strain Wedge Model," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998, pp. 303-315.

Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, "The Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis," Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, March 1995, pp. 40-53.

Pilling, P. A., "The Response of a Group of Flexible Piles and the Associated Pile Cap to Lateral Loading as Characterized by the Strain Wedge Model," Doctoral Dissertation, University of Nevada, Reno, 1997.

Pilling, P.A., Ashour, M., and Norris, G., "Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group," Transportation Research Board Paper No. 01-0174, 2001.

Pilling, P. A. and P. V. Woodward, "Dependent Facility Closure in California," Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, March 1995, pp. 315-326.

Pilling, P.A. and Beeston, H. E., "Expansion Testing of Clay Soils in Forensic Investigations," Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, March 1998, pp. 119-127.

Pilling, P.A., M. Ashour, and G.M. Norris, "Strain Wedge Model Hybrid Analysis of Laterally Loaded Pile Group," Journal of the Transportation Research Board, Transportation Research Record No. 1772, 2001, Paper No. 01-0174, pp. 115-121.

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Noise and Vibration** for the **Oakley 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 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: _____

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 Siting, Transmission, and Environmental Protection Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Oakley 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 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: _____

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 Siting, Transmission, and Environmental Protection Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Oakley 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 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: _____

Signed: _____

At: Sacramento, California

Shahab Khoshmashrab, P.E.
Mechanical Engineer

Experience Summary

16 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

2001-2011—Mechanical Engineer – Engineering Office – Siting, Transmission and Environmental Protection Division – 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 LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in Strategic Transmission Planning 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 Oakley 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: _____

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 **Oakley Generating Station (09-AFC-4)** 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: February 16, 2011

Signed: _____

At: Sacramento, CA

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 Phinney, D.Env.**

I, Suzanne Phinney, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Alternatives** for the **Oakley Generating Station (09-AFC-4)** 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: 1-31-2011

Signed: _____

At: Sacramento, CA



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 33 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 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 power plants under review by the Energy Commission:
 - **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
 - **Vaca Station Power Plant** – 660 MW natural-gas plant in Vacaville, Solano County

- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) facility near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) facility near Ridgecrest, Kern County
- **Rice Solar Energy Project** – 150 MW solar thermal (power tower) facility with storage capability in Riverside County
- **Almond 2 Power Plant Project** – 174 MW natural gas peaking plant located adjacent to the existing 48 MW TID Almond Power Plant in Stanislaus County
- **Palmdale Hybrid Power Project** – 570 MW natural gas/solar thermal facility in Palmdale, Kern County
- **Oakley Generating Station** – 624 MW natural gas plant in the City of Oakley, Contra Costa 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 plant in the Carrizo Plain, San Luis Obispo County
- **Imperial Valley 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
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) facility in Riverside County
- **Palen Solar Power Project** – 250 MW solar thermal (parabolic trough) facility in Riverside County
- **Palmdale Hybrid Power Project** – 570 MW natural gas/solar thermal facility in Palmdale, Los Angeles County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) facility near Ridgecrest, Kern County

Dr. Phinney coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

She managed the preparation of CEQA-equivalent reviews of downstream telecom and transmission system elements associated with the Abengoa Mojave, Blythe, Palen, Genesis and Rice solar power plants. The downstream system elements included telecom facilities, new or expanded substations, transmission loops to substations, distribution lines into substations, and downstream transmission upgrades or modifications.

Dr. Phinney managed the preparation of responses to public comments received on the Blythe, Palen and Genesis Solar Power Projects. The documentation identified the comments that were received, the issues raised in each comment, whether the comment was addressed in staff's Revised Staff Assessment and the adequacy of the response.

- **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 technical and editorial 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.
- **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.
- **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*.
- **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.
- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009 – Present).** 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. Legislative and policy drivers for transmission and electricity generation are highlighted.
- **RETI Stakeholder Steering Committee Support, CEC, Project Team (2010).** For the Renewable Energy Transmission Initiative, Dr. Phinney supported 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.
- **DRECP Stakeholder Engagement, CEC, Project Manager (2010 – Present).** The Desert Renewable Energy Conservation Plan effort involves significant stakeholder involvement. Dr. Phinney is providing support for the DRECP stakeholder meetings, including the preparation of detailed meeting minutes.
- **Out-of-Country Assessment for RPS Certification, CEC, Project Manager (2010).** For the Renewables Division, Dr. Phinney reviewed application package materials for a wind facility located in Alberta, Canada to determine consistency with California laws, ordinances, regulations and standards. Additional support will be providing on upcoming RPS Guidebook revisions.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of 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.

Energy Foundation, Energy Foundation, Technical Author (2007-2008). Dr. Phinney supported the assessment of the potential for renewable energy and energy efficiency alternatives to fill in the gap left by cancelled coal plants in Nevada. The project included evaluating Nevada and western utility resource plans, characterizing renewable resource and energy efficiency potential and performance, and evaluating the infrastructure needs associated with more aggressive preferred resource alternatives. Dr. Phinney was a co-author of the February 2008 report entitled, "Laying a Foundation for Nevada's Energy Future."

Western Resource Advocates, Technical Author (2010). WRA hired Aspen to perform a Western Clean Energy Targets project, which investigated the land requirements associated with an 80% reduction in western electricity sector carbon emissions below 1990 levels by 2050. Dr. Phinney prepared a comprehensive literature review identifying estimates of the maximum potential penetration of distributed generation resources. Renewable resource portfolios were then constructed using the Western Renewable Energy Zone (WREZ) Peer Analysis Tool to meet the net need for energy after accounting for DG, EE and coal plant retirements. Acres of land use requirements to develop the portfolio and deliver the resources to load were calculated for several build out alternatives. For each portfolio build out, the GWh renewable energy requirements and the associated acres of land use requirement were presented

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.
- Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.
- Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.
- Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.
- 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.
- Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.
- 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.
- Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.
- Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.
- Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.
- Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AIChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.
- Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.
- 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.
- Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981
- 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.
- Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.
- Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

**DECLARATION OF
Craig Hoffman**

I, Craig Hoffman, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Project Manager (Planner III).
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **General Conditions** for the **Oakley Generating Station (09-AFC-4)** 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: January 12, 2011

Signed: Original signed by C. Hoffman

At: Sacramento, California

CRAIG D. HOFFMAN

EDUCATION

Master of Rural and Town Planning May 1997
California State University, Chico

Bachelor of Arts in History; Minor in Planning and Development May 1995
California State University, Chico

PROFESSIONAL EXPERIENCE

California Energy Commission June 2009 to Present
Siting, Transmission and Environmental Protection Division

Project Manager

Responsible for the day-to-day management of the certification process for thermal power plants of 50 megawatts or greater along with transmission lines, fuel supply lines, and related facilities to serve them. Works as a team leader on the coordination of activities and work product of technical specialists in 20 environmental and engineering disciplines. Coordinates project calendaring, public notices, workshops and public hearing meetings, the preparation of a preliminary staff assessment (draft EIR) and final staff assessment (final EIR). Responsible for identifying key technical and process issues and notifying management team of issues and process concerns. Recommends actions, policies and procedures affecting projects and program direction in order to ensure that needed energy facilities were authorized in an expeditious, safe and environmentally acceptable manner, consistent with the requirements of the Warren-Alquist Act and the California Environmental Quality Act (CEQA).

Trinity Investment Partners December 2008 to June 2009

Senior Associate

Was involved in project site investigation, due diligence, feasibility reports, budgets, funding source books and presentations to financial investors and institutions. Projects ranged in complexity and were typically impaired brownfield developments. Interacted with local jurisdiction community development staff to determine appropriate project land use mix and determine design feature limitations. The selection of project sites and land use assumptions were important to gain funding and financial backing to move

forward with the entitlement and development of projects. Prepared CEQA screening studies in order to determine potential impacts and provide the jurisdictions base line information for preparation of CEQA environmental reviews.

RCH Group / The Hodgson Company

November 2007 to December 2008

Project Manager

Provided a full-range of real estate consulting and advisory services in mixed-use land development, entitlement processing, urban design and project management. These services included a range of legal, strategic, management and political advisory services - from advocating a project property before government agencies to resolving conflicts among project participants. Was the project manager for several large specific plans in the Sacramento region. This included coordination with owners groups, consultants, city and county jurisdictions, preparation of budgets, time lines and process charts and interaction with public and jurisdictional groups. Coordinated the preparation of EIRs and EIS's for projects along with securing proposals from various consultants to prepare technical studies for the environmental document. Also prepared numerous property evaluation and feasibility reports for lending institutions on foreclosed properties including large development entitlements.

Dunmore Communities / Dunmore Capital

April 2005 to September 2007

Project Manager

As a project manager, was involved in project development from the acquisition of undeveloped property to the ultimate development of a successful project. These projects included the entitlement of large land parcels for master planned communities, commercial developments and residential subdivisions. Prepared due diligence, feasibility reports, and budgets; interacted with local jurisdiction staff; was involved in the layout and development of land plans; worked on design charrettes; presented projects at public hearings; processed construction documents and helped facilitate building contracts and activities. Coordinated the preparation of EIRs and EIS's for projects along with securing proposals from various consultants to prepare technical studies for the environmental document. Prepared CEQA screening studies in order to determine potential impacts and provide the jurisdictions base line information for preparation of CEQA environmental reviews.

Pacific Municipal Consultants

January 2000 to April 2005

Associate and Senior Planner

As a public agency contract planner, provided current, long range and environmental planning services to numerous city and county jurisdictions. Work efforts included the processing of General Plan Amendments, Specific Plans, Rezones, Williamson Act Contracts, Annexations, Vesting Tentative Subdivision Maps, Tentative Subdivision

Maps, Use Permits, Design Review for large scale residential master plans, commercial centers, multi-family projects, and mixed-use sites, policy document preparation, and appropriate environmental documentation for projects consistent with the requirements of CEQA. Presentations to community groups, Planning Commissions, City Councils and Board of Supervisors were routine activities and an integral part of public hearing process.

Was a senior planner from 2001 to 2003 and was the lead current planner for the City of Elk Grove from 2003 to 2005. Was responsible for the management of projects that were complicated, had the potential for public scrutiny and the city needed the projects to move forward. Was the lead planner on the Laguna Ridge Specific Plan and coordinated the planning process, the EIR and all approval documents.

Sierra County Planning Department

October 1997 to January 2000

Planner II

Responsible for current planning functions including review, recommendation, and presentation to Planning Commission and Board of Supervisors. Evaluation of land-use and development applications, including general plan amendments, zone amendments, zone variances, special use permits, site plan review, reclamation plans, and tentative parcel map review, for consistency with County and State regulations. Prepared environmental documents as required by CEQA for development projects. A typical environmental document was the preparation of a mitigated negative declaration with attached technical studies. Review of building applications for consistency with General Plan, Zoning Ordinance and other County policies. Answer public inquiries regarding county planning and building issues, demographics and statistics.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION
FOR THE *OAKLEY GENERATING STATION***

**Docket No. 09-AFC-4
PROOF OF SERVICE
(Revised 1/25/2011)**

APPLICANT

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DECLARATION OF SERVICE

I, Maria Santourdjian, declare that on March 1, 2011, I served and filed copies of the attached Final Staff Assessment, dated March 1, 2011. 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/oakley/index.html>.

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

- ☒ sent electronically to all email addresses on the Proof of Service list;
- ☐ by personal delivery;
- ☐ 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:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

- ☐ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 09-AFC-4
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.

Originally Signed by
Maria Santourdjian