

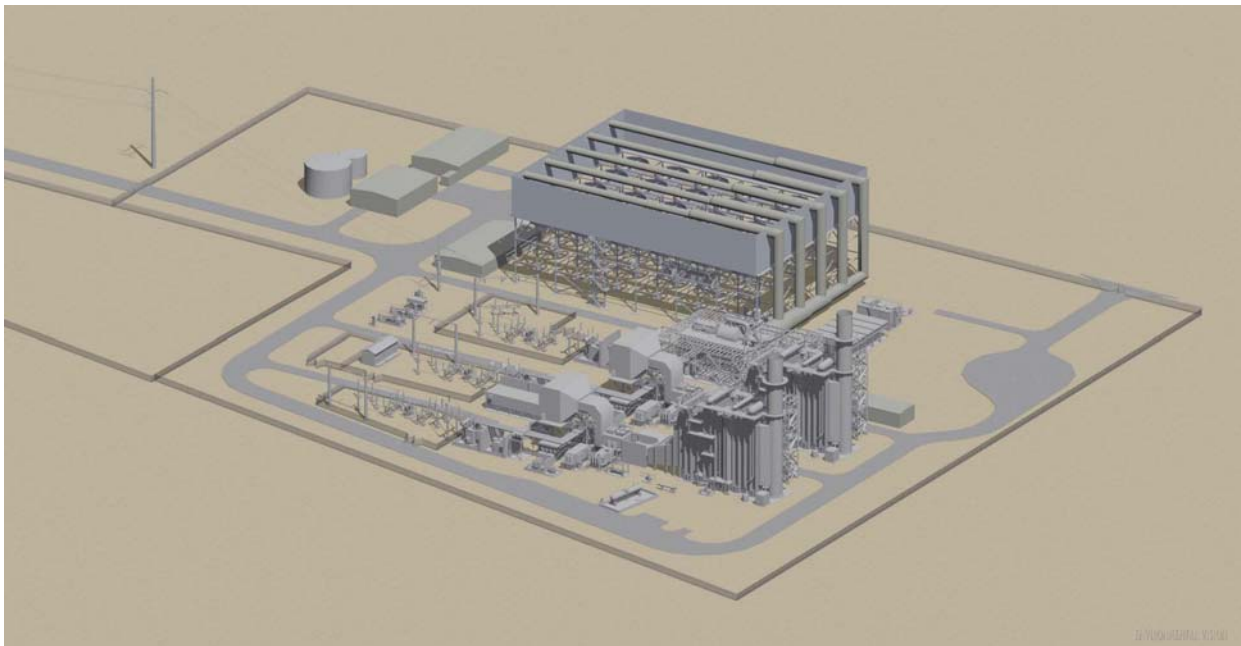
OAKLEY GENERATING STATION

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Preliminary Staff Assessment - Part A



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**OAKLEY GENERATING STATION
(09-AFC-4)
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EXECUTIVE SUMMARY

Pierre Martinez, AICP

INTRODUCTION

Contra Costa County Generating Station, LLC (CCCGS, LLC) is a limited liability corporation, wholly owned by Radback Energy, Inc. CCCGS, LLC 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 educate and 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 a thorough review and analysis of the project could be conducted.

This Preliminary Staff Assessment (PSA) contains the California Energy Commission staff's independent evaluation of the proposed Oakley Generating Station (OGS) project, Application for Certification (09-AFC-4). The PSA is being published in two parts, this being Part A, and Part B anticipated for a January 2011 publication. The PSA examines engineering, environmental, public health and safety aspects of the OGS project, based on the information provided by the applicant (CCG S, LLC) and other sources available at the time the PSA was prepared. Because the PSA is being published in two parts, not all sections typical of a PSA are being published at this time. This PSA contains staff's environmental and engineering evaluation of the OGS project in the following technical sections: Cultural Resources, Noise and Vibration, Public Health, Transmission Line Safety and Nuisance, Visual Resources, Waste Management, Worker Safety, Facility Design, Geology and Paleontology, Power Plant Efficiency, and Power Plant Reliability.

PSA Part B will contain staff's alternatives, environmental, and engineering evaluation of the OGS project for the balance of remaining technical sections: Air Quality, Biological Resources, Land Use, Socioeconomic Resources, Soil and Water Resources, Traffic and Transportation, and Transmission System Engineering. The PSA 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 process is functionally equivalent to the preparation of an EIR.

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

This PSA 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. The PSA will be superseded by staff's Final Staff Assessment (FSA), which 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 public hearing, 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 is 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 Atchison, Topeka and 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 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 percent capacity with the balance in downtime).

for maintenance), yet with an expected facility capacity factor at 60 to 80 percent. 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 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.

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 of approval, staff has prepared a summary table (Appendix A to this PSA Part A) which summarizes staff's response to each condition. Briefly, the table restates the exact wording of each recommended condition, the section where that particular recommended condition is addressed, and a specific reference to a Condition of Certification or discussion, if applicable. This table will only include responses to where the sections included in this PSA Part A are included. A similar table in the PSA Part B will address any remaining recommended conditions related to the remaining sections that will be included in the PSA Part B.

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.

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.

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.

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 PSA, of which those sections underlined are included in this PSA Part A: **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 at the end of the Executive Summary and to also be included in the Socioeconomics section of the PSA Part B publication) 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 PSA Part A (Hazardous Materials, Noise and Vibration, Public Health, Transmission Line Safety and Nuisance, Visual Resources, and Waste Management) 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'S IMPACTS

Each technical area section of the PSA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and proposed conditions of certification. The PSA 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, the OGS project would comply with all applicable laws, ordinances, regulations, and standards (LORS) for those sections included in this PSA Part A. For a more detailed review of potential impacts, see staff's technical analyses in this PSA Part A. The status of each technical area is summarized in the table below.

Technical Area	Complies with LORS	Impacts Mitigated
Cultural Resources	Yes	Yes
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Transmission Line Safety and Nuisance	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

ALTERNATIVES SUMMARY

This PSA Part A will not include an Alternatives Summary discussion as not all technical sections have been completed. The PSA Part B will provide a comprehensive Alternatives Summary discussion, taking into consideration all technical sections.

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

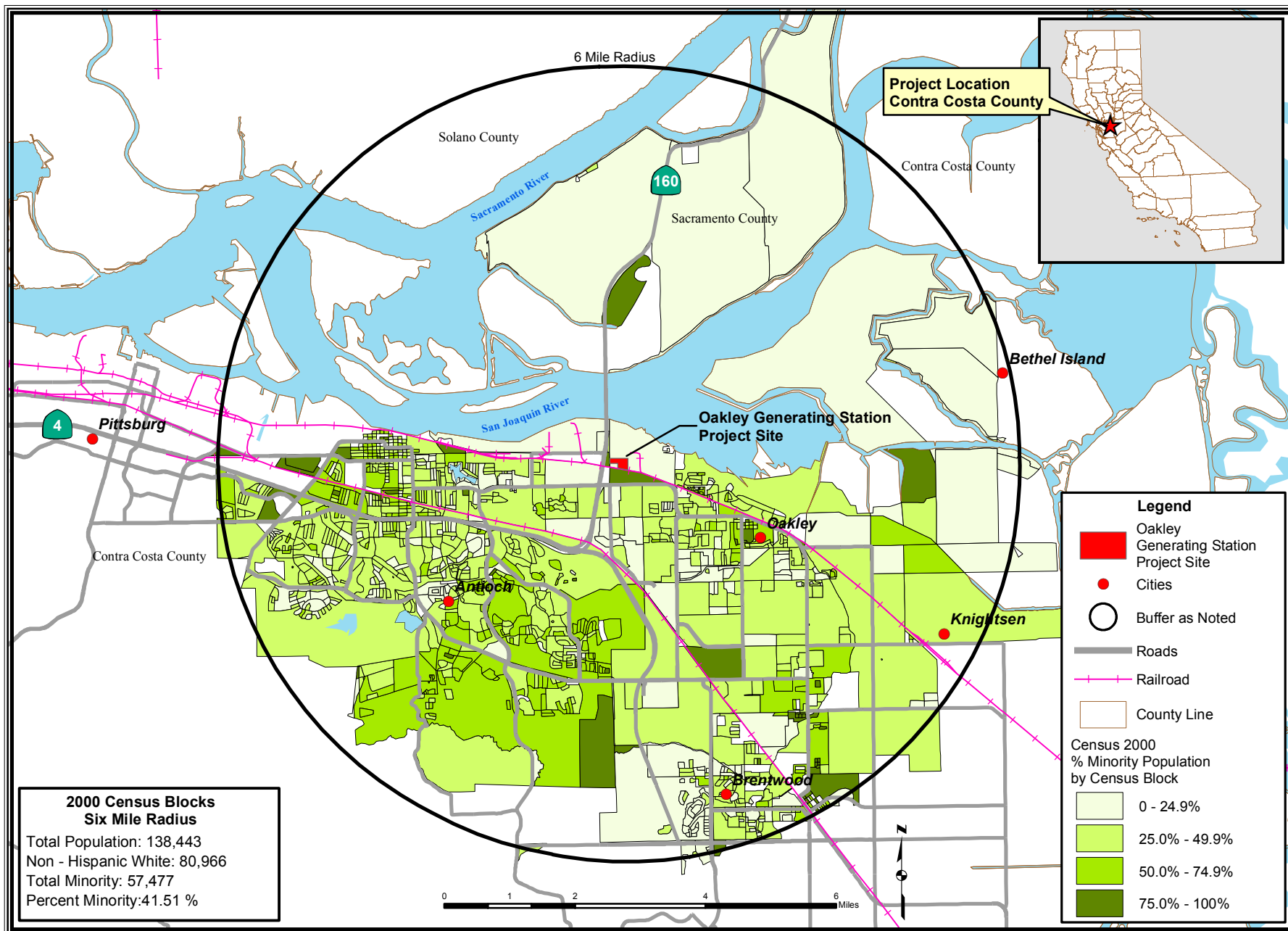
Based on the summary table above, and further supported by the detailed review of each technical section included in this PSA Part A, it appears that the OGS project will comply with all LORS and that any potential environmental impacts can be mitigated to a less-than-significant level, provided compliance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

Staff anticipates publishing a PSA Part B in January 2011 that will include staff's alternatives, environmental and engineering evaluation of the OGS project for the

balance of remaining technical sections: Air Quality, Biological Resources, Land Use, Socioeconomic Resources, Soil and Water Resources, Traffic and Transportation, and Transmission System Engineering. At least one public workshop on the PSA is anticipated to be conducted in January 2011, others may be conducted if warranted, and based on the comments received on the PSA and any other pertinent information, staff will prepare a Final Staff Assessment (FSA), which will represent staff's final analysis, conclusions, and recommendations on the OGS project.

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

INTRODUCTION

Pierre Martinez, AICP

PURPOSE OF THIS REPORT

This Preliminary Staff Assessment (PSA) 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 PSA is a staff document. It is neither a California Energy Commission Committee document nor a draft decision. The PSA 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 PSA 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) 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 PSA presents preliminary 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 PRELIMINARY STAFF ASSESSMENT

The PSA 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. They include the following: air quality, public health, worker safety and fire protection, transmission line safety and nuisance, hazardous materials management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 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 published with a 30-day comment period to allow for interested parties to review and comment on the document. 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, will be published in the FSA. 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

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 site that is part of a larger 210-acre property owned by E.I. du Pont de Nemours and Company (DuPont). The applicant intends to record a lot line adjustment to create a separate 21.95-acre parcel should the Commission approve the application.

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 Atchison, Topeka and 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. 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. PG&E has recently issued a Request for Offers (RFO) to obtain these energy resources from qualified bidders and OGS is participating in this RFO. 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.

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 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

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.

that will be purchased locally during construction is estimated at \$3.7 – 4.0 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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CEC 2009e – California Energy Commission/J. Douglas (tn 53813). Issues Identification Report, dated October 27, 2009. Submitted to CEC/Docket Unit on October 27, 2009.

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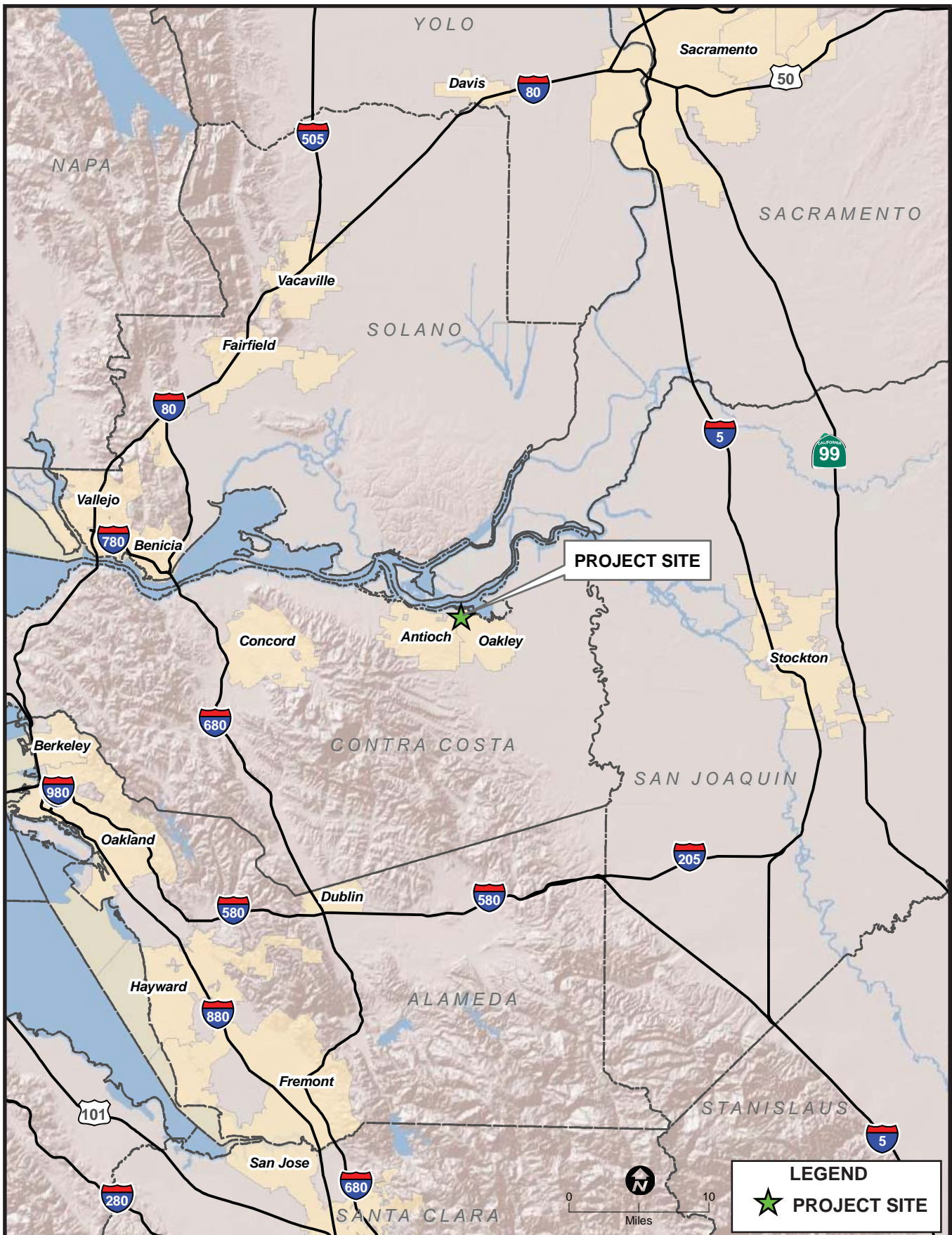
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OG 2009a – Oakley Generating Station (tn 52219). Application for Certification for the Contra Costa Generating Station, Volumes 1 and 2, dated June 30, 2009. Submitted to the CEC/Docket Unit on June 30, 2009.

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.

RBE 2009a – RadBack Energy/B. Betacchi (tn 52934). Applicant's Data Adequacy Supplement, dated August 24, 2009. Submitted to CEC/Docket Unit on August 24, 2009.

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



LEGEND

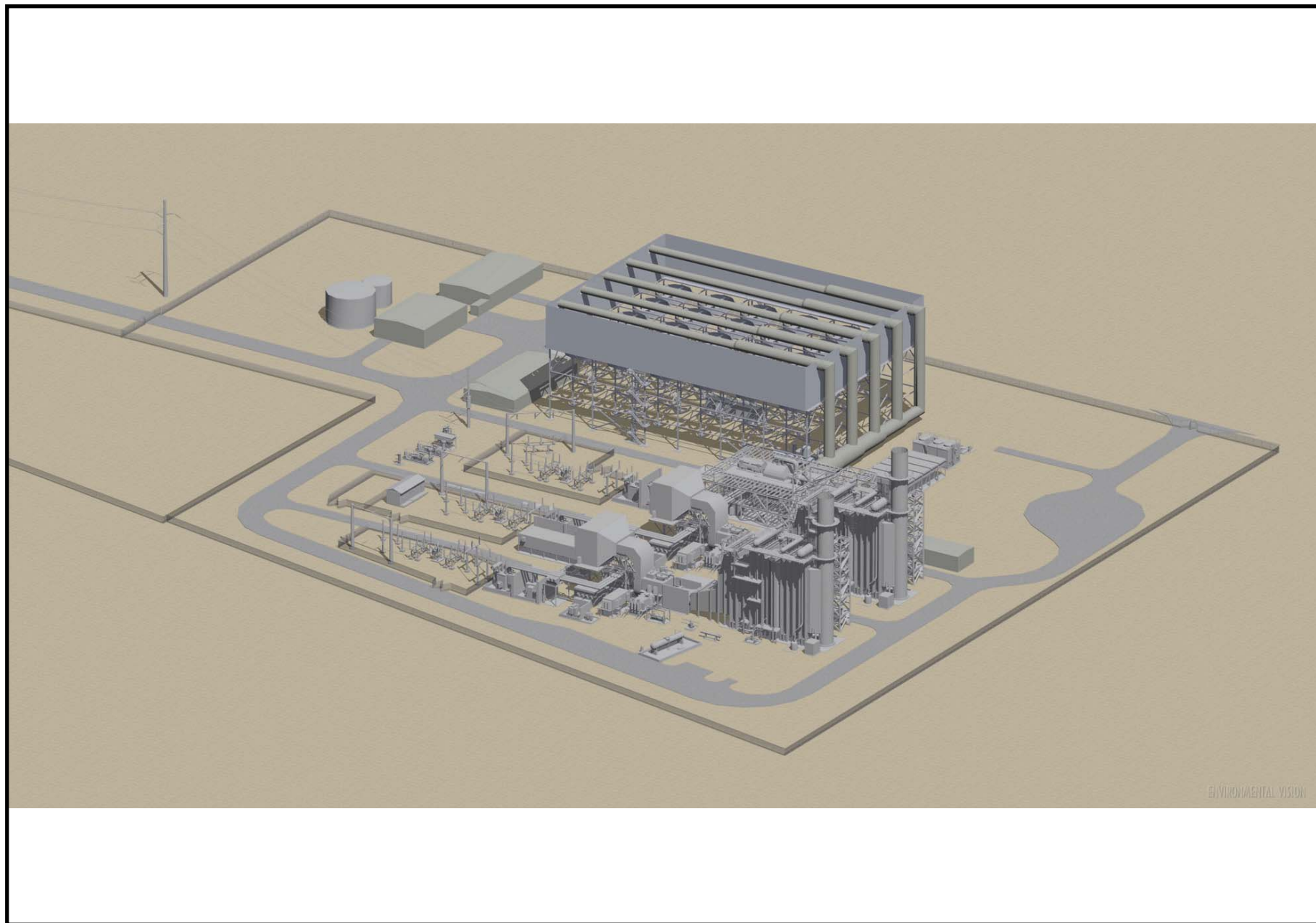
-  EXISTING 60kV TRANSMISSION LINE
-  DIRT STOCKPILE AREAS
-  LAYDOWN AREA
-  PROJECT SITE



0 1,000 2,000
 Feet

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

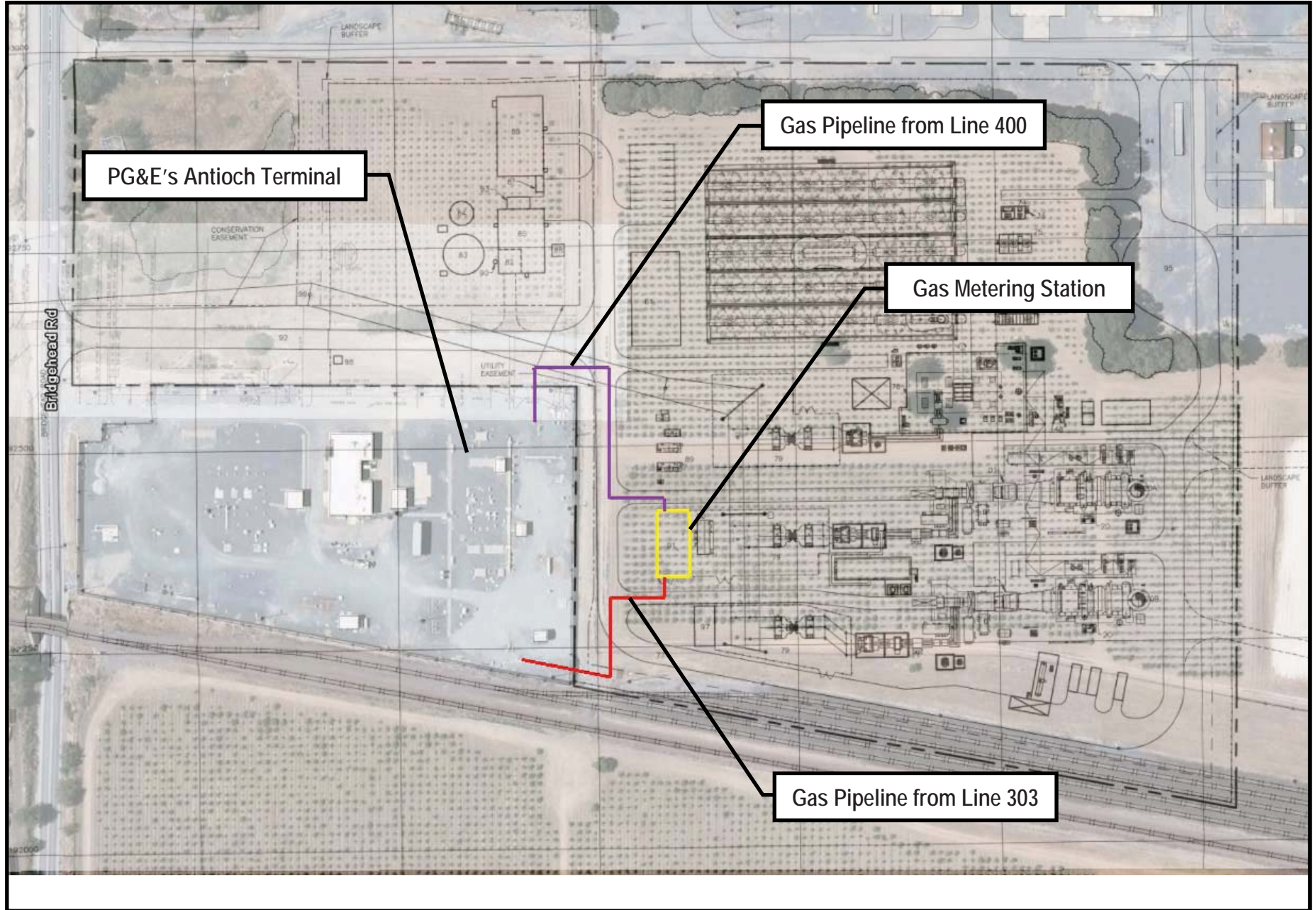
PROJECT DESCRIPTION - FIGURE 3
Oakley Generating Station - Architectural Rendering



PROJECT DESCRIPTION

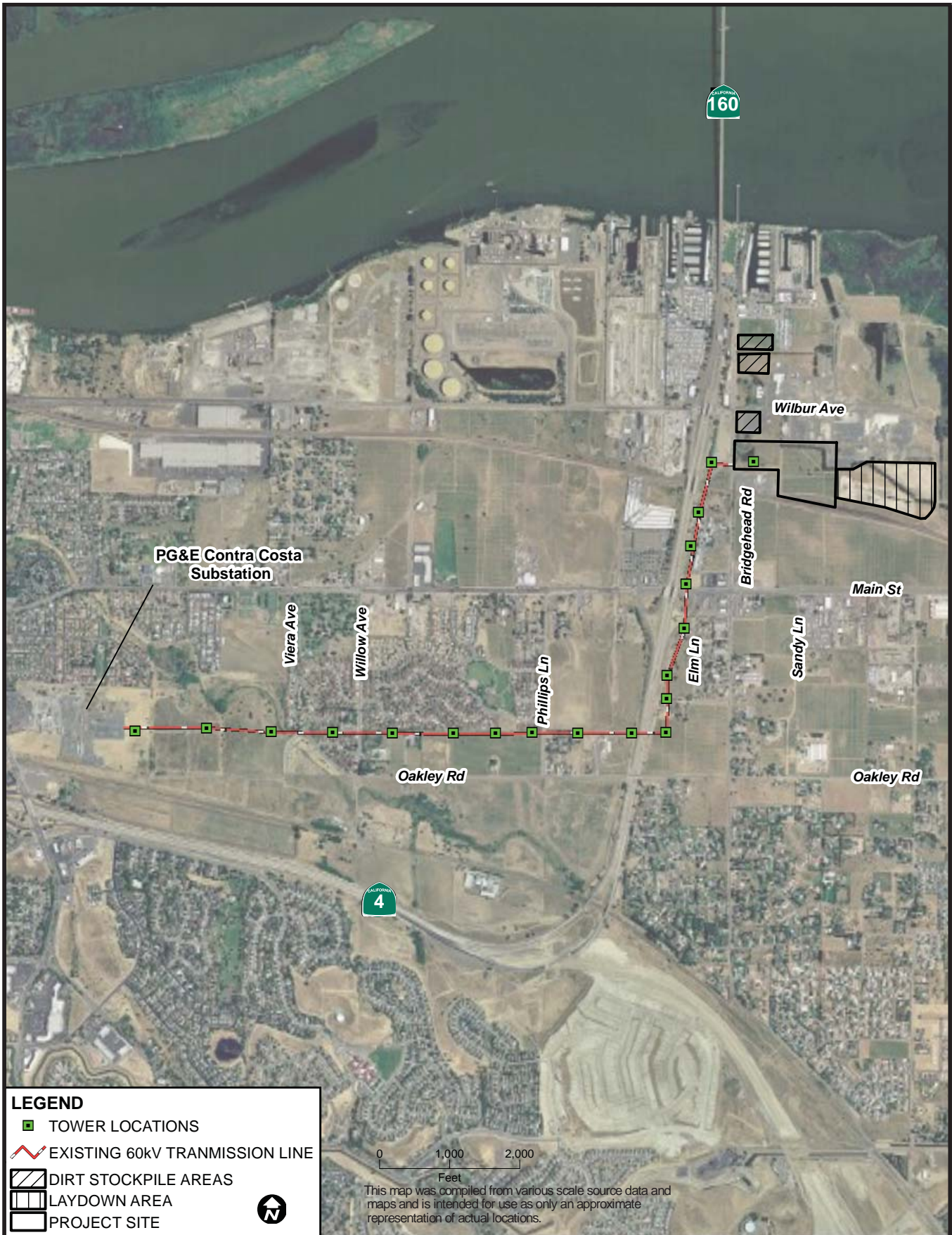
ENVIRONMENTAL VISION

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



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
 SOURCE: AFC Figure 3.2-1

ENVIRONMENTAL ASSESSMENT

CULTURAL RESOURCES

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-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. 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>
<p>City of Antioch General Plan (<i>City of Antioch, 2003</i>)</p>	<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 140-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, 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. A railroad spur runs north through the area and an associated small building remains. 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 used 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 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 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 Burlington Northern Santa Fe (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, 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 to 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/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 (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 resources 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.

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.

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.

CEC 2010a—California Energy Commission/J. Douglas (tn 55449). Data Request Set 1A (#44-67), dated February 17, 2010. Submitted to CEC/Docket Unit on February 17, 2010.

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.

City of Oakley 2020 General Plan 2002, Amended 2010.
[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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Levy 1978—Richard Levy. "Eastern Miwok," in *Handbook of North American Indians*, Vol. 8. Robert F. Heizer, ed. Washington, D. C.: Smithsonian Institution, 1978.

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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.

Railway, The Employee Magazine of Burlington Northern Santa Fe Corporation, "The History of BNSF, A Legacy for the 21st Century." http://www.bnsf.com/about-bnsf/our-railroad/company-history/pdf/hist_overview.pdf, accessed September 14, 2010.

HAZARDOUS MATERIALS MANAGEMENT

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 21.95 acres located within the boundary of an existing 210-acre site owned by 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 Atchison, Topeka, and 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 PSA as per staff's proposed condition **HAZ-1**.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless 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.

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 fence line 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. The City of Oakley regulates the use of trucks on truck routes within the 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.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use will pose no significant impact to the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop a Risk Management Plan (RMP). To ensure the adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the CCCEHS-HMP and by Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval of the RMP by staff prior to the delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia, in addition to site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed, and operated to comply with all applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release. If all mitigation proposed by the applicant and staff are required and implemented, the use, storage, and transportation of hazardous materials will not present a significant risk to the public.

Staff proposes eight conditions of certification mentioned throughout the text (above), and listed below. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **Appendix B** of the staff assessment, unless there is prior approval by the Energy Commission compliance project manager. Condition of Certification **HAZ-2** requires that an RMP be prepared and submitted prior to the delivery of aqueous ammonia.

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario and therefore proposes Condition of Certification (**HAZ-3**) requiring the development of a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. The development of a safety management plan addressing the delivery of all liquid hazardous materials during construction, commissioning, and operations will further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the required RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. Condition of Certification **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-5** and **HAZ-6**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-7** and **HAZ-8**.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix B, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide 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. After receiving comments from the CCCHSD-HMP and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final updated 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 a final updated Business Plan and updated SPCC Plan to the CPM for approval. At least thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final updated RMP to the CCCHSD-HMP and the 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 site security plan is available for review and approval. In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

(Company name)

for employment at

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

(Company name)

for contract work at

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

(Company name)

for hazardous materials delivery to

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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HAZARDOUS MATERIALS
Appendix A

**Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure
Criteria**

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BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (ppm) to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by the U.S. Environmental Protection Agency and the California Environmental Protection Agency in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. California Environmental Quality Act requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL.

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HAZARDOUS MATERIALS Appendix A Table-1 Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH ²	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 minutes	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury, or impairment of the ability to escape.
IDLH/10 ¹	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 minutes	Protects nearly all segments of general population from irreversible effects.
STEL ²	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL ³	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	Significant irritation, but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one-time exposure.
STPEL ⁴	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 minutes 30 minutes 10 minutes	Significant irritation, but protects nearly all segments of general population from irreversible acute or late effects. One-time accidental exposure.
TWA ²	NIOSH	Adult healthy male workers	25 ppm	8 hours	No toxicity or irritation on continuous exposure for repeated 8-hour work shifts.
ERPG-2 ⁵	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 minutes	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin).

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The WHO (1986) warned that the young, elderly, asthmatics, those with bronchitis, and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists

AIHA, American Industrial Hygienists Association

EEGL, Emergency Exposure Guidance Level

EPA, Environmental Protection Agency

ERPG, Emergency Response Planning Guidelines

IDLH, Immediately Dangerous to Life and Health Level

NIOSH, National Institute of Occupational Safety and Health

NRC, National Research Council

STEL, Short Term Exposure Limit

STPEL, Short Term Public Emergency Limit

TLV, Threshold Limit Value

WHO, World Health Organization

HAZARDOUS MATERIALS
Appendix B
Hazardous Materials Proposed for Use at the 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.

NOISE AND VIBRATION

Erin Bright

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.

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.

² VdB is the common measure of vibration energy.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **Noise: Table 2**.

**Noise Table 2
Land Use Compatibility for Community Noise Environment**

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (db)							
	50	55	60	65	70	75	80	
Residential - Low Density Single Family, Duplex, Mobile Home	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Residential - Multi-Family	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Transient Lodging – Motel, Hotel	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Schools, Libraries, Churches, Hospitals, Nursing Homes	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Auditorium, Concert Hall, Amphitheaters	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Sports Arena, Outdoor Spectator Sports	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Playgrounds, Neighborhood Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Office Buildings, Business Commercial and Professional	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Industrial, Manufacturing, Utilities, Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
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).

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). 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: ¹OG 2009a, AFC § 5.7.3.3.3

²Noise Table 2, above

The applicant has incorporated noise reduction measures into the design of the project to ensure that there will not be a substantial increase in noise levels at the nearest 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, a 7 dBA increase resulting in a cumulative level of greater than 45 dBA L₉₀ would be significant and mitigation would be required. For operational noise to be less than significant at receptor M2, the combined nighttime noise level (project operational plus ambient) would need to not increase the existing nighttime ambient noise by more than 5 dBA, or not be greater than 50 dBA, which would equate to a project operational noise of no greater than 49 dBA at location M2. The proposed Condition of Certification **NOISE-4** would ensure that this reduced project operational noise level at M2 is not 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.

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 49 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.

- A. When the project first achieves a sustained output of 85 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 85 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 construction 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

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.

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

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.

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.

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

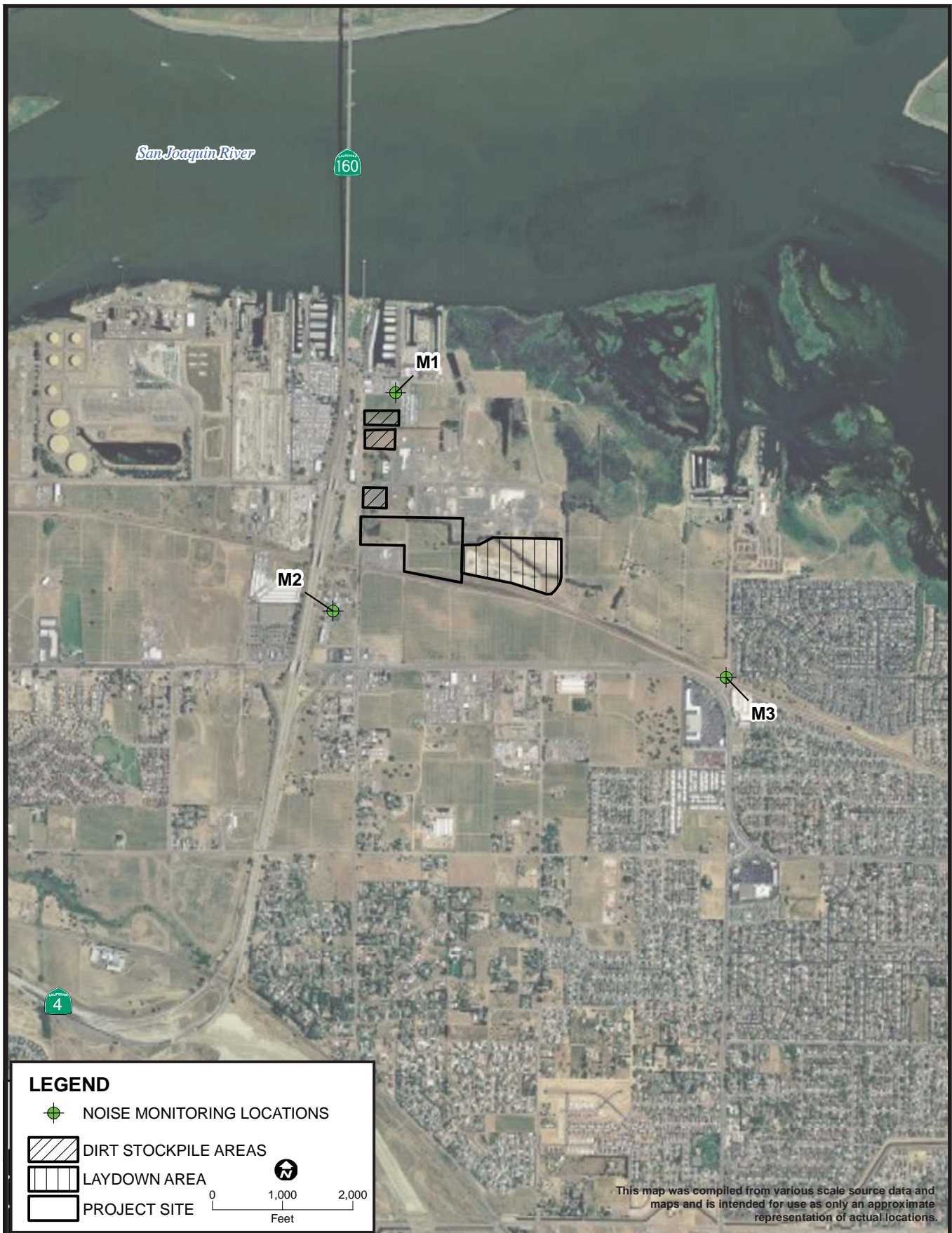
OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **NOISE Table A4**.

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

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 recirculating 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, 2, and 3.** 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 that is part of a larger 210-acre property owned by E.I. du Pont de Nemours and Company (DuPont). 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 Oakley Generating Station are at levels that do not require mitigation beyond the specific emission control measures noted above. Since the potential impacts would be at insignificant levels, there would be no environmental justice issues when the project is operating. 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

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TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam, 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.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	

Applicable LORS	Description
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, 2, and 3**). 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 that is part of a larger 210-acre property owned by E.I. du Pont de Nemours and Company (DuPont).

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 Atchison, Topeka and 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 the line would also pass near specific residential areas where it 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

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed OGS.

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 and 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.

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

Melissa Mourkas

SUMMARY OF CONCLUSIONS

Staff found that with mitigation, the construction and operation of the Oakley Generating Station (OGS), a natural gas-fired, combined-cycle nominal 624-megawatt (MW) plant to be constructed in Oakley, California, would not result in an adverse aesthetic impact according to the California Environmental Quality Act (CEQA) Guidelines. Staff has proposed appropriate Conditions of Certification to assure impacts under CEQA are less than significant and compliance with applicable laws, ordinances, regulations and standards (LORS).

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 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 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 laws, ordinances, regulations, and standards (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 in to 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

<p>Contra Costa Transportation Authority: Countywide Bicycle and Pedestrian Plan, June 14, 2010. Figure 4.</p>	<p>Plan includes proposed trails along Bridgehead Road and Big Break Shoreline in the project vicinity.</p>
<p>City of Antioch General Plan <u>5.4.2 Community Image and Design</u> Policy 5.4.2c</p>	<p>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.</p>
<p>City of Oakley 2020 General Plan /Contra Costa County Title 8 (Zoning) Chapter 84-62:H-I Heavy Industrial District</p>	<p>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).</p>
<p>City of Oakley Municipal Code Title 4, Chapter 31 Water Efficient Landscape Ordinance (WELO)</p>	<p>Municipal Code amended by Ordinance 03-10 establishing Water Efficient Landscape Requirements. Landscape areas exceeding 2,500 square feet must meet the regulations.</p>
<p>City of Oakley Municipal Code Title 9.1.604g Utility Energy Building Height</p>	<p><u>Building Height</u>. The maximum building height for the UE District shall be one hundred feet (100’).</p>
<p>City of Oakley Municipal Code Title 9.1.604 g & h Other Regulations.</p>	<ol style="list-style-type: none"> 1. <u>Architectural Design</u>. All developments within the UE zoning district shall be consistent with the <i>City of Oakley Commercial and Industrial Design Guidelines</i>, and shall be constructed with aesthetically pleasing, quality materials similar to those found in “upscale” commercial developments. 2. <u>Landscaping</u>. All developments within the UE district shall provide adequate, and well-maintained, tree and hedge landscaping along required side yards. 3. <u>Lighting</u>. Off-street lighting shall be installed which will provide adequate light for the on-site use without creating inappropriate glare to adjacent business park or light industrial uses, and shall be approved by the Community Development Director.

City of Oakley Commercial and Industrial Design Guidelines	The City of Oakley Commercial and Industrial Design Guidelines represents standards and minimums for achieving quality. Applicable sections: Section III Industrial Guidelines, Section IV Utility Energy and Section V Streetscapes. Bridgehead Road and Wilbur Avenue are not identified as identity streets in the guidelines.
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 Oakley Generating Station (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 a 21.95-acre portion of a larger, nearly 500-acre property owned by the DuPont Company. The 21.95 acres are 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 bulk of the 500-acre 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

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.

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.

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 140-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 230-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 AT&SF 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. Seventeen existing transmission towers are proposed to be replaced with the same number of poles in the same locations in the existing transmission corridor. The existing lattice tower located in the wetland easement area would not be replaced. A net new pole, for a total of 19 poles or towers, is proposed to be located adjacent to the Comfort Suites Hotel, off Bridgehead Road in the City of Oakley, and within the existing corridor. 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. Therefore, construction of the poles and transmission lines would not significantly degrade the 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.

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 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)⁶. 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 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.

⁶ 09-AFC-04, Traffic & Transportation Table 5.12-4, page 5.12-8.

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 Oakley on the east and Antioch on the west. The abutting 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) and is composed of mostly industrial and energy facilities. 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 day⁷. 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.

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

⁷ CalTrans, 2008 Traffic Volumes, <http://trafficcounts.dot.ca.gov/2008all/r134161i.htm>

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 Street⁸. 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

⁸ River Oaks Crossing FEIR, Appendix B, Fehr & Peers, February 2008

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.

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. Eighteen new poles would be constructed, including one net new location behind the Comfort Suites Hotel, west of Bridgehead Road in Oakley. 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 140-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 230-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 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>	Scenic views observable from scenic routes shall be conserved, enhanced and protected to the	Yes	The OGS location does not block scenic views from the scenic route (SR 160).

<p><u>Element-Scenic Routes 5.9</u></p> <p>Policy 5-45</p>	<p>extent possible.</p>		
<p>Contra Costa County General Plan, adopted in 2005. <u>Transportation and Circulation 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. <u>Transportation and Circulation 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>Policy 9-20</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 Oakley and Antioch City limits.</p>
<p>Draft Eastern Contra Costa County Trails Master Plan, July 2009</p>	<p>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.</p>	<p>Yes</p>	<p>No policy considerations associated with the Trails Master Plan.</p>
<p>East Bay Regional Parks District, Existing and Potential Parklands and Trails, Master Plan amended 11/06/2007.</p>	<p>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.</p>	<p>Yes</p>	<p>The Regional Shoreline parks are outside the project boundaries. The Master Plan has no policy considerations for visual resources.</p>

<p>Contra Costa Transportation Authority: Countywide Bicycle and Pedestrian Plan, June 14, 2010. Section 4, Goals & Objectives; Map, Figure 4.</p>	<p>Plan includes proposed trails along Bridgehead Road and Big Break Shoreline in the project vicinity.</p>	<p>Yes</p>	<p>The plan contains no policy considerations regarding visual resources.</p>
<p>City of Antioch General Plan <u>5.4.2 Community Image and Design</u> Policy 5.4.2c</p>	<p>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.</p>	<p>Yes</p>	<p>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.</p>
<p>City of Oakley 2020 General Plan /Contra Costa County Title 8 (Zoning) Chapter 84-62:H-I Heavy Industrial District</p>	<p>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).</p>	<p>Yes</p>	<p>Heavy Industry is aesthetically compatible with power plant development. The DuPont Bridgehead Road Specific Plan has not been adopted.</p>
<p>City of Oakley Municipal Code Title 4, Chapter 31 Water Efficient Landscape Ordinance (WELO)</p>	<p>Municipal Code amended by Ordinance 03-10 establishing Water Efficient Landscape Requirements. Landscape areas exceeding 2500 sf</p>	<p>Yes as conditioned</p>	<p>The OGS landscape plan is conditioned in VIS-2 to meet the City WELO requirements.</p>

	must meet the regulations.		
City of Oakley Municipal Code Title 9.1.604g Utility Energy Building Height	<u>Building Height</u> . The maximum building height for the UE District shall be one hundred feet (100').	Yes	All buildings, as defined in Title 9, proposed for the OGS, are less than 100' tall.
City of Oakley Municipal Code Utility Energy Title 9.1.604 g & h Other Regulations.	1. <u>Architectural Design</u> . All developments within the UE zoning district shall be consistent with the <i>City of Oakley Commercial and Industrial Design Guidelines</i> , and shall be constructed with aesthetically pleasing, quality materials similar to those found in "upscale" commercial developments. 2. <u>Landscaping</u> . All developments within the UE district shall provide adequate, and well-maintained, tree and hedge landscaping along required side yards. 3. <u>Lighting</u> . Off-street lighting shall be installed which will provide adequate light for the on-site use without creating inappropriate glare to adjacent business park or light industrial uses, and shall be approved by	Yes with conditions	The structures, while utilitarian in nature, are to be treated with finishes of a high quality (VIS-1). OGS is conditioned in VIS-2 to provide a complete landscape plan with screening trees which conform to Oakley's design review requirements. VIS-3 conditions the project lighting and conforms with Oakley's off-street lighting code.

	the Community Development Director.		
City of Oakley Commercial and Industrial Design Guidelines	The City of Oakley Commercial and Industrial Design Guidelines represents standards and minimums for achieving quality. Applicable sections are: Section III Industrial Guidelines, Section IV Utility Energy and Section V Streetscapes. Bridgehead Road and Wilbur Avenue are not listed as identity streets in the guidelines.	Yes	Section III: OGS meets site planning requirements for Industrial development. Section IV: OGS meets the standard for Utility Energy compatibility with the community. Section V: OGS is not located on an "identity street", therefore Section V, 2.2 does not apply.
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 smaller retail and parking areas.	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 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**); and

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 PSA to acknowledge that the agreement exists and provides additional measures to address potential visual issues.

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 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. The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to the 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. 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 set⁹ used in the analysis categorizes sky cover in 10%

⁹ 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

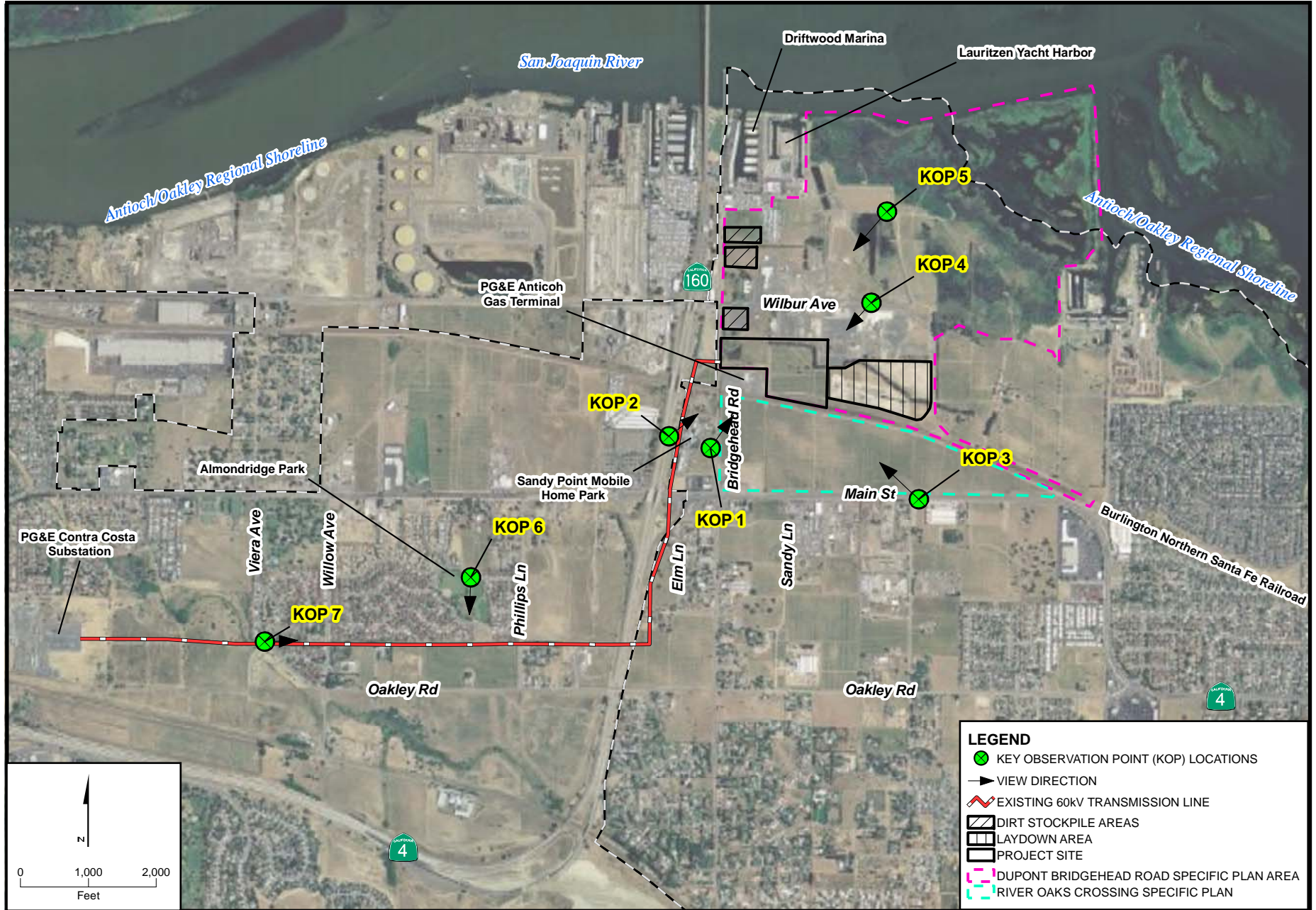
Visible water vapor plumes from the proposed OGS gas turbine/HRSG exhausts are predicted to occur less than 20 percent of seasonal daylight clear hours. Therefore, no further visual impact analysis of the predicted gas turbine/HRSG exhaust plume dimensions has been completed.

REFERENCES

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.

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 - 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



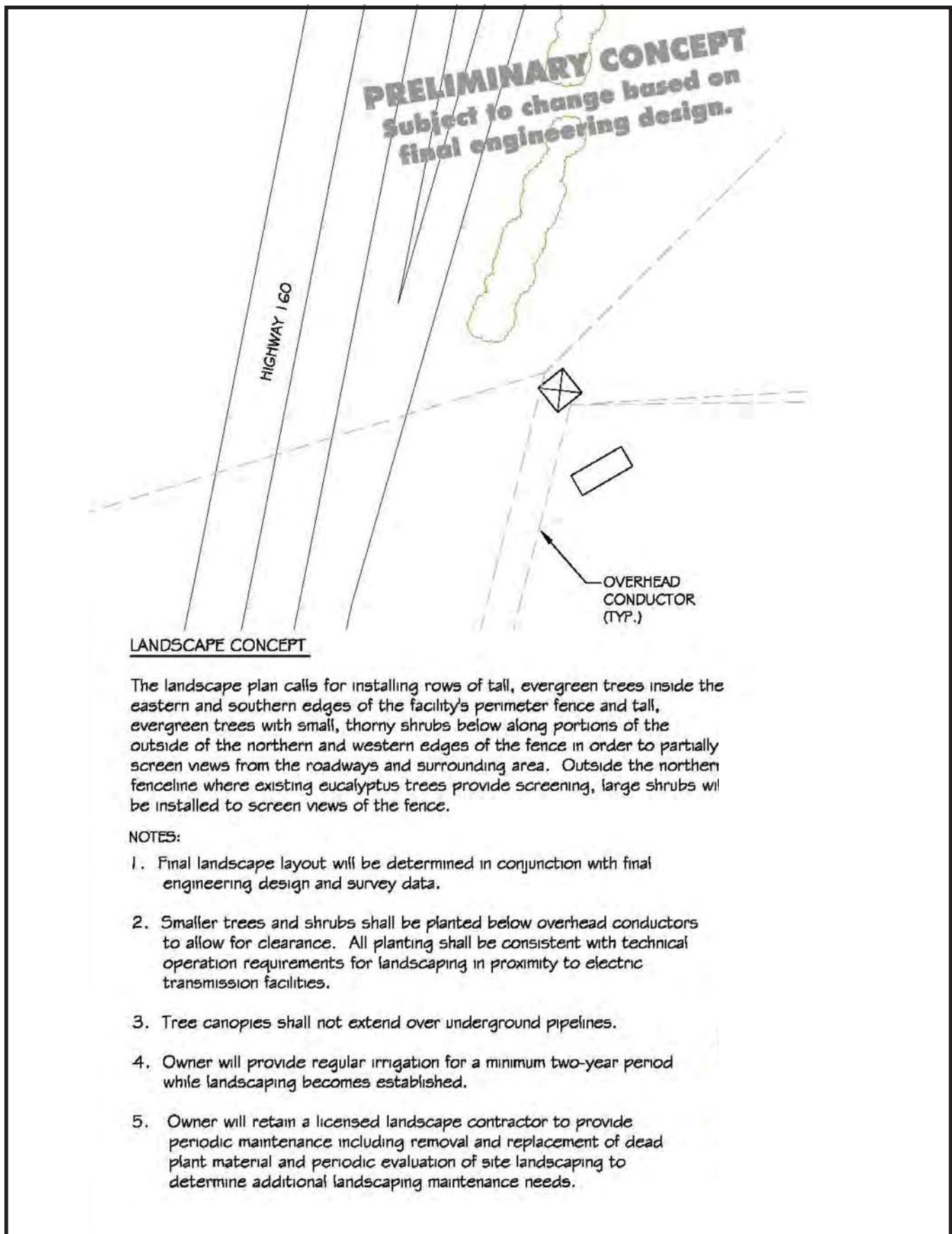
8a. View to the east from intersection of Viera Avenue and Oakley Road, in Antioch (KOP-7). This segment of the transmission corridor includes a pedestrian path, the entrance to which is visible in the center of this view.

KOP 7- Simulated Condition



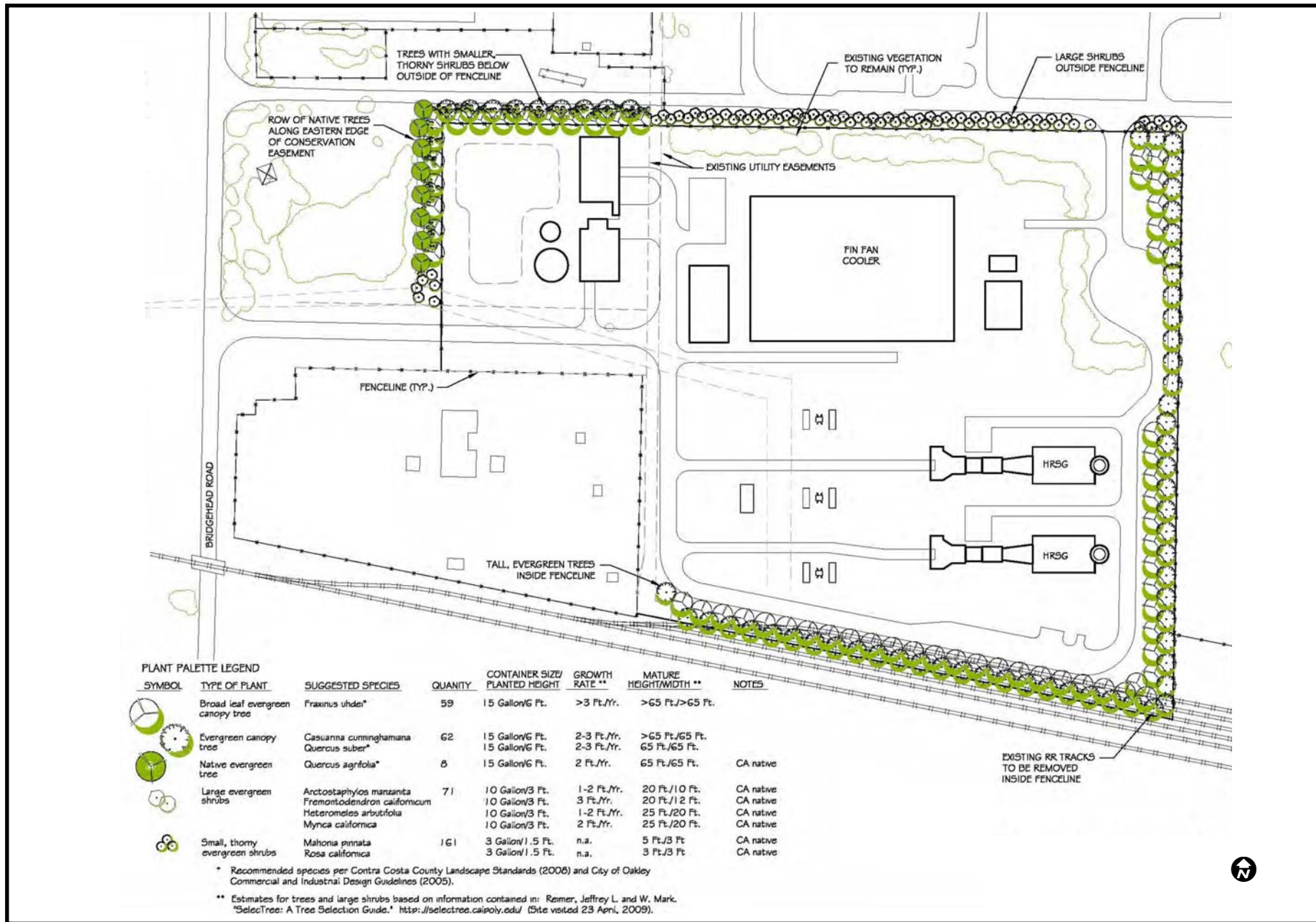
8b. View from KOP-7 with transmission corridor replacement simulated.

VISUAL RESOURCES - FIGURE 9a
Oakley Generating Station - Conceptual Landscape Plan



VISUAL RESOURCES - FIGURE 9b

Oakley Generating Station - Conceptual Landscape Plan



PLANT PALETTE LEGEND

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES	QUANTITY	CONTAINER SIZE/ PLANTED HEIGHT	GROWTH RATE **	MATURE HEIGHT/MIDTH **	NOTES
	Broad leaf evergreen canopy tree	<i>Fraxinus uhden*</i>	59	15 Gallon/6 Ft.	>3 Ft./Yr.	>65 Ft./>65 Ft.	
	Evergreen canopy tree	<i>Casuarina cunninghamiana</i> <i>Quercus suber*</i>	62	15 Gallon/6 Ft. 15 Gallon/6 Ft.	2-3 Ft./Yr. 2-3 Ft./Yr.	>65 Ft./65 Ft. 65 Ft./65 Ft.	
	Native evergreen tree	<i>Quercus agrifolia*</i>	8	15 Gallon/6 Ft.	2 Ft./Yr.	65 Ft./65 Ft.	CA native
	Large evergreen shrubs	<i>Arctostaphylos manzanita</i> <i>Fremontodendron californicum</i> <i>Heteromeles arbutifolia</i> <i>Myrica californica</i>	71	10 Gallon/3 Ft. 10 Gallon/3 Ft. 10 Gallon/3 Ft. 10 Gallon/3 Ft.	1-2 Ft./Yr. 3 Ft./Yr. 1-2 Ft./Yr. 2 Ft./Yr.	20 Ft./10 Ft. 20 Ft./12 Ft. 25 Ft./20 Ft. 25 Ft./20 Ft.	CA native CA native CA native CA native
	Small, thorny evergreen shrubs	<i>Mahonia pinnata</i> <i>Rosa californica</i>	161	3 Gallon/1.5 Ft. 3 Gallon/1.5 Ft.	n.a. n.a.	5 Ft./3 Ft. 3 Ft./3 Ft.	CA native CA native

* Recommended species per Contra Costa County Landscape Standards (2006) and City of Oakley Commercial and Industrial Design Guidelines (2005).

** Estimates for trees and large shrubs based on information contained in: Reimer, Jeffrey L. and W. Mark. "SelectTree: A Tree Selection Guide." <http://selecttree.calpoly.edu/> (Site visited 23 April, 2009).

VISUAL RESOURCES

WASTE MANAGEMENT

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 Preliminary Staff Assessment (PSA) 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.

SETTING

Existing Site Conditions

The proposed OGS project site is part of a 210-acre parcel created from a 500-acre parcel (one-owner property with multiple Assessor Parcel Numbers) owned by E.I. du Pont de Nemours and Company (DuPont). The proposed OGS facility will be located at 6000 Bridgehead Road in Oakley California, on a 21.95-acre parcel in Contra Costa County, California (OG 2009a, page ES-1). 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 management of both non-hazardous and hazardous wastes. Absent any unusual

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.

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 fifty percent 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 will 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 PSA.

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 one percent of the available landfill capacity (OG

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>

2009a, 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 one percent 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 one percent 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.

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 one

percent 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 (including fuel tanks, aboveground tanks, empty drums, and other equipment and materials) and sample and analyze soils in areas where fuel tanks were removed, prior to initiation of construction of the Oakley Generating Station (OGS), to ensure proper identification and classification of any contaminated soils as hazardous or nonhazardous. In no event shall project construction commence in areas requiring characterization until the CPM has determined that all necessary testing and characterization has been accomplished.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall provide to the CPM a list of the types and amount of existing waste disposed of from the Oakley Generating Station (OGS) transmission route, and the results of the required soil sampling and analysis, for review and approval.

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 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; 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 percent of all soil, rock and gravel, and at least 50 percent 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.

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 precede until the city of Oakley issues an approval document, consistent with the county'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.

WASTE-7 The project owner 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 and 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;
- 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.

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.

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

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 fulfills the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff also concludes that the proposed project would not have significant impacts on local fire protection services. The proposed facility would be located in an area that is currently served by the local fire department. The fire risks at the proposed facility do not pose significant added demands on local fire protection services. Additionally, staff concludes that the Contra Costa County Hazmat Team located in Martinez is adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility with an adequate response time.

INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Preliminary Staff Assessment (PSA) is to assess the worker safety and fire protection measures proposed by the 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 21.95 acres located within the boundary of an existing 210-acre site owned by 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 Atchison, Topeka, and 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 5.10.1.6.2).

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 5.10.1.6.2).

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 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.

- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3**, which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve as an on-site reviewer to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team's findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed 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 and 900 feet east of the main entrance and which provides access to the OGS site 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.

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 fulfills the requirements of Condition of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant would not present a significant incremental or cumulative impact on the local fire department.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the 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 from the East Contra Costa Fire Protection District stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 3401—3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the 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 of a letter to the CPM from the East Contra Costa Fire Protection District stating the fire department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;
- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- assure that all the plans identified in Conditions of Certification **WORKER SAFETY-1** and **-2** are implemented.

Verification: At least 30 days prior to the start of 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

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

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

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

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates 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 2007 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 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **Transmission System Engineering** section of this document.

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

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

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 2007 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 2007 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 2007 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 2007 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 2007 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 2007 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 2007 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 2007 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 2007 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 110 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;
7. lighting energy calculations; and
8. 110 volt system design calculations and submittals showing feeder sizing, transformer and panel load confirmation, fixture schedules and layout plans.

- 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

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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 2007 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 (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The project site is not located within a designated Alquist-Priolo 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 (2007)	These codes address the excavation, grading, and earthwork construction, not limited to construction relating to earthquake safety and seismic activity hazards.

Applicable Law	Description
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 Atchison, Topeka and Santa Fe 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

¹All 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 (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard include evaluating each hazard's potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions.

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

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

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

Staff reviewed existing paleontologic information and requested records searches from the University of California Museum of Paleontology (at Berkeley) for the area surrounding the site. Site-specific information generated by the applicant for the 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 (2007). 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 (2007) 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 San 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 2007 CBC criteria (USGS 2009a).

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. The 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 (2007) 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 (2007) 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 (2007) 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 (2007) 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 (2007) 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.

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Cultural Trainer: _____ Signature: _____ Date: ___/___/___

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

Biological Trainer: _____ Signature: _____ Date: ___/___/___

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POWER PLANT EFFICIENCY

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-NOx 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, 140-foot-long gas line that will be connected to Pacific Gas and Electric Company (PG&E) Line 303 (OG 2009a, AFC §§ 2.0, 2.1.6, 2.5.3). A secondary line, a new 6- to 10-inch-diameter, 230-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, 140-foot-long gas line that will be connected to Pacific Gas and Electric Company (PG&E) Line 303 (OG 2009a, AFC §§ 2.0, 2.1.6, 2.5.3). A secondary line, a new 6- to 10-inch-diameter, 230-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

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POWER PLANT RELIABILITY

Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The applicant predicts an equivalent availability factor¹ of 92-98 %, 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 % 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 % (OG 2009a, AFC § 2.1.2). The project’s annual capacity factor is expected to be in the range of 60-80 % (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 140-foot-long gas line that would be connected to Pacific Gas and Electric Company (PG&E) Line 303 (OG 2009a, AFC §§ 2.0, 2.5.3). A secondary line, a new 230-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 120 feet above sea level to 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 %

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 % (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 %, 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.

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GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Jack W. Caswell

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:

**Jack W. Caswell, Senior 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: _____	<input type="checkbox"/> TELEPHONE <input type="checkbox"/> 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?	<input type="checkbox"/> YES <input type="checkbox"/> NO
DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS: _____	
DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION: _____ _____ _____	
DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION?	<input type="checkbox"/> YES <input type="checkbox"/> 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)

APPENDIX A

City of Oakley April 5, 2010 Letter – Recommended Conditions of Approval

City of Oakley Recommended Conditions of Approval General	Responsible Section for Compliance	Staff Response
1. All construction drawings submitted for plan check shall be in substantial compliance with the plans presented to and approved by the California Energy Commission on _____.	Facility Design	See Conditions of Certifications GEN-1 through GEN-8, CIVIL-1 through CIVIL-4, STRUC-1 through STRUC-4, MECH-1 through MECH-3, and ELEC-1.
2. All conditions of approval shall be satisfied by the owner/developer. All costs associated with compliance with the conditions shall be at the owner/developer's expense.	All Sections requiring Conditions of Certification	Addressed in all Conditions of Certification through the verification process. Chief Building Official (CBO) cost addressed in Condition of Certification GEN-3 and a Memorandum of Understanding (MOU) between the CBO and project owner.
3. Noise generating construction activities such as power generators, shall be limited to the hours of 6:30 a.m. to 6:30 p.m. Monday through Friday, and shall be prohibited on City, State, and Federal Holidays. The restrictions on allowed working days and times may be modified on prior written approval by the Community Development Director. City to defer to conditions imposed by CEC regarding neighborhood notification prior to construction and telephone number for public to report noise complaints.	Noise and Vibration	See Condition of Certification NOISE-1, NOISE-2, and NOISE-8.
4. City to defer to conditions imposed by CEC regarding archaeological resources.	Cultural Resources	See Condition of Certification CUL-1 through CUL-7.
5. All mitigation measures addressed in the environmental document shall be complied with and addressed as outlined in the Mitigation Monitoring Program approved for this project.	All sections requiring Conditions of Certification / Legal / General Conditions	All sections that recommend Conditions of Certification contain a "Verification" component that ensures ongoing compliance to the extent necessary.
6. The applicant shall indemnify, defend, and hold harmless the City of Oakley, the City Approving Authorities, and the officers, agents and employees of the City from any and all claims, damages and liability (including, but not limited to, damages,	Legal	Not applicable.

attorney fees, expenses of litigation, costs of court) relating to the Oakley Generating Station.		
Site Plan/Architecture	Responsible Section for Compliance	Staff Response
7. The project owner shall submit for the Community Development Director's review and approval a site plan with dimensions showing the locations of the proposed buildings and structures in compliance with the minimum setbacks from the property line as set forth in the Oakley Zoning Code.	Land Use	To be included in Part B PSA
8. The project shall comply with the parking standards established by the Oakley Zoning Code. All parking stall striping shall be double striped. Parking stalls shall be 9 feet wide by 19 feet deep and drive aisles shall be a minimum 24 feet in width as reviewed and approved by the Community Development Director.	Facility Design	City needs to communicate this with the CBO, no need for condition of certification. City has no licensing jurisdiction over the project
9. A lighting and photometric plan shall be submitted to the Community Development Director for review and approval prior to the issuance of building permits. City to defer to conditions imposed by CECs regarding minimizing backscatter to the nighttime sky, shielding to prevent light trespass, and motion detectors to light areas only when occupied, unless CEC does not impose and such conditions, in which event measures to minimize backscatter and shield light trespass shall be incorporated into the lighting and photometric plan for review and approval by the City.	Visual	See Condition of Certification VIS-3 .
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.	Waste Management	See Response to Agency Comments in WASTE MANAGEMENT section.
11. Storage shall be contained inside the buildings. Pallets, boxes, cardboard, etc. shall not be stored outside, except within trash enclosures.	Waste Management	See Response to Agency Comments in WASTE MANAGEMENT section.
Landscaping Requirements	Responsible Section for	Staff Response

	Compliance	
12. A landscaping and irrigation plan for all areas shown on the site plan shall be submitted for review and approval of the Community Development Director prior to the issuance of building permits. The landscaping plan shall include the project's frontage, side and rear yards. Landscaping shall conform to the City's Water Efficient Landscaping Ordinance and shall be installed prior to Certificate of Occupancy. The plans shall be prepared by licensed landscape architect and shall be certified to be in compliance with the City's Water Efficient Landscape Ordinance.	Visual	See Condition of Certification VIS-2 .
13. California native drought tolerant plants shall be used to the extent feasible, and subject to the approval of the Community Development Director.	Visual	See Condition of Certification VIS-2 .
14. Prior to start of commercial operation, the applicant shall implement a Screening Trees Plan reviewed and approved by the City of Oakley. If site constraints prevent effective screening of the power plant facility on the subject site, the applicant shall identify and implement screening in offsite locations, as required and approved by the Community Development Director.	Visual	See Condition of Certification VIS-2 .
15. Prior to issuance of a certificate of occupancy, an on-site inspection shall be made of the entire project site by a licensed landscape architect to determine compliance with the approved landscape plan. A signed certification of completion shall be submitted to the Community Development Director for review and approval.	Visual	See Condition of Certification VIS-2 .
16. Landscaping shall be maintained as shown on the landscape plan in perpetuity.	Visual	See Condition of Certification VIS-2 .
Sound Walls	Responsible Section for Compliance	Staff Response
17. If sound walls are required to comply with applicable City and local standards, sound walls shall attenuate, not just deflect sound. Sound absorbing material should be used for the construction of sound walls, per the review and approval of the Community	Noise and Vibration	Not applicable, as the analysis in the NOISE and VIBRATION section does not conclude the need for sound walls to meet City and local standards.

Development Director. Anti-graffiti shall be used on sound walls.		
Signage	Responsible Section for Compliance	Staff Response
18. All signage shall meet the requirements of the City of Oakley's Sign Ordinance in the Zoning Code. All proposed signage shall be reviewed and approved by the Planning and Building Divisions.	Land Use	To be addressed in PSA Part B
19. All signs shall be on permanent structures and of design and material to compliment the proposed commercial building. No signs on the premises shall be animated, rotating or flashing. No flags, pennants, banners, pinwheels or similar items shall be permitted on the premises, with the exception of a United States flag, California state flag, and required safety devices, such as windsocks.	Land Use	To be addressed in PSA Part B
20. Temporary signage, for such things as special events and grand openings, shall require a Temporary Use Permit per the review and approval of the Community Development Director.	Land Use	To be addressed in PSA Part B
Lay Down/Staging Area	Responsible Section for Compliance	Staff Response
21. The project owner shall provide the Oakley Community Development Department for review and approval the description of the final lay down/staging areas identified for construction of the project. The description shall include: Assessor's Parcel numbers, addresses, land use designations, zoning, site plan showing dimensions, owner's name and addressed (if leased).	Land Use	To be addressed in PSA Part B
Construction Traffic	Responsible Section for Compliance	Staff Response
22. Following completion of project construction of the power plant and all related facilities, the project owner shall repair (insert affected roadways) that were affected by the installation of linear facilities, to at least their pre-construction condition. 1) The project owner shall photograph, videotape or digitally record images of portions of (insert affected roadways) in the area of the underground linear facility installations. 2) The project owner shall	Traffic & Transportation	To be addressed in PSA Part B

also notify the City of Oakley, Contra Costa County, and 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.		
23. Following construction of the power plant and all related facilities, the project owner shall meet with the CPM and City of Oakley to determine the actions necessary and schedule to complete the repair of all roadways to original or as near original condition as possible.	Traffic & Transportation	To be addressed in PSA Part B
Marking and/or Lighting of Stacks	Responsible Section for Compliance	Staff Response
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.	Traffic & Transportation	To be addressed in PSA Part B
Air Quality	Responsible Section for Compliance	Staff Response
25. City to defer to conditions by CEC and BAAQMD for air quality.	Air Quality	To be addressed in PSA Part B
Biological Resources	Responsible Section for Compliance	Staff Response
26. The project owner shall protect, preserve, and improve the 0.62-acre wetlands located on the Project Site by removing garbage and replacing non native species with native species.	Biological Resources	To be addressed in PSA Part B
27. The project shall be subject to compliance with East Contra Costa County Habitat Conservation Plan (HCP/NCCP).	Biological Resources	To be addressed in PSA Part B
28. City to defer to Conditions imposed by CEC regarding other biological resources.	Biological Resources	To be addressed in PSA Part B

Facility Closure	Responsible Section for Compliance	Staff Response
29. City to defer to conditions imposed by the CEC regarding facility closure, subject to the City's review and approval of the facility closure plan prepared by the project applicant.	Facility Design	See Condition of Certification GEN-1 .
Building Division Conditions	Responsible Section for Compliance	Staff Response
30. The Chief Building Official (CBO) shall be the City of Oakley Building Official as referenced in these conditions.	Facility Design	The decision will be made by compliance management before an MOU is in place. The CBO may be the City, County, or a 3 rd party CEC delegate CBO.
31. Plans shall meet the currently adopted Uniform Codes as well as the newest T-24 Energy Requirements per the State of California Energy Commission. To confirm the most recent adopted codes please contact the Building Division at (925) 625-7005.	Facility Design	Staff is aware of this, and the Facility Design conditions of certification addresses this.
32. City to defer to Conditions imposed by CEC regarding Automatic Life Safety Sprinkler System.	Worker Safety and Fire Protection	All CEC requirements are consistent with the California Fire Code (referenced), which will be enforced by the East Contra Costa Fire Protection District, which provides fire protection for the City of Oakley.
33. City to defer to Conditions imposed by CEC for detailed specifications regarding plan check and permit process for construction of power plant.	Facility Design	This has been addressed in the Facility Design conditions of certification. The CBO will work with the city of Oakley to ensure all city LORS are met.
34. Prior to requesting a Certificate of Occupancy from the Building Division all Conditions of Approval required to be completed prior to occupancy must be completed.	Facility Design	The certificate of occupancy will be issued by the CEC's CBO, but the CBO will ensure all City LORS are met before issuing it. The city of Oakley and CBO need to cooperate and communicate throughout the construction and commissioning stages.
Public Works and Engineering Conditions	Responsible Section for Compliance	Staff Response
35. Submit improvement plans prepared by a registered civil engineer to the City Engineer for review and approval and pay the appropriate processing costs in accordance with the Municipal	Facility Design	Only the CBO will approve these whether it's the city of Oakley, or another entity.

Code and these conditions of approval. The plans shall be consistent with the Stormwater Control Plan for the project, include the drawings and specifications necessary to implement the required stormwater control measures, and be accompanied by a Construction Plan C.3 Checklist as described in the Stormwater C.3 Guidebook.		
36. Submit grading plans including erosion control measures and revegetation plans prepared by a registered civil engineer to the City Engineer for review and approval and pay appropriate review and processing costs in accordance with the Code and these conditions of approval.	Facility Design	Same as for #35 above.
37. Submit landscaping plans for publicly maintained landscaping, including planting and irrigation details, as prepared by a licensed landscape architect to the City Engineer for review and approval and pay appropriate review and processing costs in accordance with the Code and these conditions of approval.	Visual	See Condition of Certification VIS-2 .
38. Execute any agreements required by the Stormwater Control Plan which pertain to the transfer of ownership and/or long term maintenance of stormwater treatment mechanisms required by the plan.	Soil and Water	To be addressed in PSA Part B
Roadway Improvements	Responsible Section for Compliance	Staff Response
39. Construct the frontage of Bridgehead Road to City public road standards for a four lane divided arterial, including curb, sidewalk, right of way landscaping, a sixteen foot wide landscaped median, necessary longitudinal and transverse drainage, pavement widening and conformance to existing improvements.	Traffic and Transportation	To be addressed in PSA Part B
40. Design all public pedestrian facilities in accordance with Title 24 (Handicap Access) and the Americans with Disabilities Act.	Traffic and Transportation	To be addressed in PSA Part B

Road Alignment/Sight Distance	Responsible Section for Compliance	Staff Response
41. Submit a preliminary plan and profile to the City Engineer for review and approval showing all required improvements to Bridgehead Road, and pay appropriate review and processing costs. The sketch plan shall be to scale, show horizontal and vertical alignments, transitions, curb lines, lane striping and cross sections and shall provide sight distance for a design speed of 55 miles per hour. The plan shall extend a minimum of 150 feet ± beyond the limits of the proposed work.	Traffic and Transportation	To be addressed in PSA Part B
42. Locate any project signs so as to not obstruct sight distance at the intersection of Bridgehead Road and the project driveways. The design speed for Bridgehead Road shall be 55 mph.	Traffic and Transportation	To be addressed in PSA Part B
Road Dedications	Responsible Section for Compliance	Staff Response
43. Convey to the City, by offer of dedication, the right of way for Bridgehead Road along the project frontage.	Traffic and Transportation	To be addressed in PSA Part B
44. Relinquish abutter's rights of access along Bridgehead Road except for the one approved driveway location.	Traffic and Transportation	To be addressed in PSA Part B
Access to Adjoining Property	Responsible Section for Compliance	Staff Response
45. Furnish necessary rights of way, rights of entry, permits and/or easements for the construction of off-site, temporary or permanent, public or private road and drainage improvements.	Traffic and Transportation	To be addressed in PSA Part B
46. Obtain an encroachment permit from Caltrans for construction of any improvements within the State right of way.	Traffic and Transportation	To be addressed in PSA Part B
47. Applicant shall only be allowed access to the project site at the one location shown on the approved site plan.	Traffic and Transportation	To be addressed in PSA Part B

Landscaping in the Public Right of Way	Responsible Section for Compliance	Staff Response
48. Enter into an agreement with the City that requires the right of way landscaping adjacent to the site to be maintained as part of the on-site landscaping at the property owner's expense to a standard acceptable to and agreed upon by the City.	Visual	CEC staff needs to consult with City of Oakley regarding appropriate LORS supporting recommended condition.
Street Lights	Responsible Section for Compliance	Staff Response
49. Install streetlights along the project Bridgehead Road frontage. The City Engineer shall determine the final number and location of the lights, and the lights shall be on an LS2-A rate service. The lights shall be General Electric spun aluminum "cobra head" style.	Visual	CEC staff needs to consult with City of Oakley regarding appropriate LORS supporting recommended condition.
Grading	Responsible Section for Compliance	Staff Response
50. Submit geotechnical report to the City Engineer for review and approval that substantiates the design features incorporated into the project, including but not limited to grading activities, compaction requirements, utility construction, slopes, retaining walls, and roadway and pavement sections, and pay all appropriate review and processing costs.	Facility Design	Same as for #35 above.
51. At least one week prior to commencement of grading, the applicant shall post on the site and mail to the owners of property within 300 feet of the exterior boundary of the project site notice that construction work will commence. The notice shall include a list of contact persons with name, title, phone number and area of responsibility. The person responsible for maintaining the list shall be included. The list shall be kept current at all times and shall consist of persons with authority to indicate and implement corrective action in their area of responsibility. The names of the individual responsible for noise and litter control shall be expressly identified in the notice. The notice shall be reissued with each phase of major grading activity. A copy of the notice shall be concurrently transmitted to the City Engineer. The notice shall be	Noise and Vibration	See Condition of Certification NOISE-1 .

accompanied by a list of the names and addresses of the property owners noticed, and a map identifying the area noticed.		
52. A list of all dust control measures to be implemented by the project shall be provided for the review and approval of the City Engineer, which measures shall supplement all measures imposed by the CEC.	Air Quality	To be included in Part B PSA
53. Grade any slopes with a vertical height of four feet or more at a slope of 3 to 1. Retaining walls that may be installed to reduce the slope must be masonry and comply with the City's building code.	Facility Design	We do not include this level of detail. The CBO typically meets with local building department to discuss such issues.
54. Submit a dust and litter control plan to the City Engineer for review and approval, and pay all appropriate review and processing costs, prior to beginning any construction activities. The City-approved plan shall supplement all dust and litter control conditions imposed by the CEC.	Air Quality	To be included in Part B PSA
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.	Traffic and Transportation	To be included in Part B PSA
56. Prior to commencement of any site work that will result in a land disturbance of one acre or more, the applicant shall provide evidence to the City Engineer that the requirements for obtaining a State General Construction Permit have been met. Such evidence may be a copy of the Notice of Intent letter sent by the State Water Resources Control Board. The WDID Number shall be shown on the grading plan prior to approval by the City Engineer.	Soil and Water	To be included in Part B PSA
57. Submit an updated erosion control plan reflecting current site	Soil and Water	To be included in Part B PSA

conditions to the City Engineer for review and approval no later than September 1 st of every year while the Notice of Intent is active, and pay all appropriate review and processing costs.		
58. Grade all pad elevations or install levees to satisfy Chapter 914-10 of the City's Municipal Code, including degree of protection provisions.	Facility Design	We do not include this level of detail. The CBO typically meets with local building department to discuss such issues.
59. The burying of any construction debris is prohibited on construction sites.	Waste Management	Condition of Certification WASTE-5 addresses comment by requiring project owner to prepare a Construction Waste Management Plan.
Utilities/Undergrounding	Responsible Section for Compliance	Staff Response
60. Underground all new and existing utility distribution facilities along the frontage of Bridgehead Road. The applicant shall provide joint trench composite plans for the underground electrical, gas, telephone, cable television and communication conduits and cables including size, location and details of all trenches, locations of building utility service stubs and meters and placements or arrangements of junction structures as part of the Improvement Plan submittals for the project. The composite drawings and/or utility improvement plans shall be signed by a licensed civil engineer.	Facility Design	See Conditions of Certifications GEN-1 through GEN-8, CIVIL-1 through CIVIL-4, STRUC-1 through STRUC-4, and MECH-1 through MECH-3.
61. All utility boxes with the public right of way shall be installed underground and all wires and cables must be installed in conduits. The determination of compliance with this condition shall be at the discretion of the City Engineer.	Facility Design	Same as #53 and Facility Design conditions of certification require all aspects of project to comply with engineering LORS.
62. Above ground utility boxes with the public right of way shall be screened per the review and approval of the City Engineer.	Facility Design	Same as #61.
Drainage Improvements	Responsible Section for Compliance	Staff Response
63. Collect and convey all stormwater entering and/or originating on this property, without diversion and within an adequate storm drainage facility, to an adequate natural watercourse having	Soil and Water	To be addressed in PSA Part B

definable bed and banks, or to an existing adequate public storm drainage facility that conveys the storm waters to an adequate water course. Alternatively, develop on-site retention and infiltration system of adequate size and capacity to accommodate the 100-year frequency event plus appropriate factors of safety to ensure that stormwater is kept on-site. The applicant shall submit plans and supporting calculations and documentation for the infiltration basin to the City Engineer for review and approval, and shall pay all appropriate review and processing costs.		
64. Submit a final hydraulic report including 10-year and 100-year frequency event calculations for the proposed drainage system and stormwater pond to the City Engineer for review and approval, and pay all appropriate review and processing costs.	Soil and Water	To be addressed in PSA Part B
65. Design and construct all storm drainage facilities in compliance with the Municipal Code and City design standards.	Soil and Water	To be addressed in PSA Part B
66. Prevent storm drainage from draining across the sidewalk(s) and driveway(s) in a concentrated manner.	Soil and Water	To be addressed in PSA Part B
67. Dedicate a public drainage easement over the drainage system that conveys storm water run-off from public streets.	Soil and Water	To be addressed in PSA Part B
National Pollutant Discharge Elimination System (NPDES)	Responsible Section for Compliance	Staff Response
68. Comply with all rules, regulations and procedures of the National Pollutant Discharge Elimination System (NPDES) for municipal, construction and industrial activities as promulgated by the California Water Resources Control Board, the Regional Water Quality Control Board (Central Valley – Region IV), including the Stormwater C.3 requirements as detailed in the Guidebook available at www.cccleanwater.org . Compliance shall include developing long-term best management practices (BMP's) for the reduction or elimination of storm water pollutants. The project design shall incorporate wherever feasible, the following long-term BMP's in accordance with the Contra Costa	Soil and Water	To be addressed in PSA Part B

<p>Clean Water Program for the site's storm water drainage:</p> <ul style="list-style-type: none"> • Utilize pavers or other pervious materials for driveways, walkways, and parking areas wherever feasible. • Minimize amount of directly connected impervious surface area. • Delineate all storm drains with "No Dumping, Drains to the Delta" permanent metal markers per City standards. • Construct concrete driveway weakened plane joints at angles to assist in directing run-off to landscape/pervious areas prior to entering the street curb and gutter. • Install filters in on-site storm drain inlets. • Sweeping the paved portion of the site at least once a month utilizing a vacuum types sweeper. • Use of the landscape areas, vegetated swales, pervious pavement, and other infiltration mechanisms to filter stormwater prior to entering the storm drain system. • Provide a sufficient amount of on-site trash receptacles. • Distribute public information items regarding the Clean Water Program to vendors and suppliers. • Other alternatives as approved by the City Engineer. 		
Fees/Assessments	Responsible Section for Compliance	Staff Response
<p>69. Comply with the requirements of the development impact fees listed below, in addition to those noticed by the City Council in Resolution 00-85 and 08-03. The applicant shall pay the fees in the amounts in effect at the time each building permit is issued.</p> <ul style="list-style-type: none"> A. Traffic Impact Fee (authorized by Ordinance No. 14-00, adopted by Resolution 49-03) B. Regional Transportation Development Impact Fee or any future alternative regional fee adopted by the City (authorized by Ordinance No. 14-00, adopted by Resolution No. 73-05) C. Park and Land Dedication In-Lieu Fee (adopted by Ordinance No. 03-03) D. Park Impact Fee (authorized by Ordinance No. 05-00, adopted by Resolution No. 19-03) E. Public Facilities Fee (authorized by Ordinance No. 05-00, adopted by Resolution No. 18-03) F. Fire Facilities Impact Fee, collected by the City (adopted by Resolution No. 18-03) G. General Plan Fee (adopted by Resolution No. 53-03) and 	<p>Traffic and Transportation</p> <p>Traffic and Transportation</p>	<p>To be addressed in PSA Part B</p> <p>To be addressed in PSA Part B</p>

<p>H. East Contra Costa County Habitat Conservation Plan Fee (adopted by Resolution No. 12-07) The applicant should contact the City Engineer prior to constructing any public improvements to determine if any of the required improvements are eligible for credits or reimbursements against the applicable traffic benefit fees or from future developments.</p>	<p>Socioeconomic</p> <p>Socioeconomic</p> <p>Socioeconomic</p> <p>Socioeconomic</p> <p>Land Use</p> <p>Biology</p>	<p>To be addressed in PSA Part B</p> <p>To be addressed in PSA Part B</p> <p>To be addressed in PSA Part B</p> <p>To be addressed in PSA Part B</p> <p>To be addressed in PSA Part B</p> <p>To be addressed in PSA Part B</p>
<p>70. The applicant shall be responsible for paying County Recorder's fees for the Notice of Determination as well as the State Department of Fish and Game's filing fee.</p>		<p>No COC is necessary.</p>
<p>71. Annex the property to the City of Oakley Landscape and Lighting District No. 1 for citywide landscaping and park maintenance, subject to an assessment for maintenance based on the assessment methodology described in the Engineer's Report. The assessment shall be the per parcel annual amount (with appropriate future cost of living adjustment) as established at the time of voting by the City Council. Any required election and/or</p>	<p>Land use</p>	<p>To be addressed in PSA Part B</p>

<p>ballot protest proceedings shall be completed prior to issuance of a certificate of occupancy. The Applicant shall apply for annexation and provide all information and documents required by the City to process annexation. All costs of annexation shall be paid by Applicant.</p>		
<p>72. Same as 71.</p>		
<p>73. Participate in the provision of funding to maintain police services by voting to approve a special tax for the parcels utilized by this project. The tax shall be the per parcel annual amount (with appropriate future cost of living adjustment) as established at the time of voting by the City Council. The election to provide the tax shall be completed prior to issuance of a certificate of occupancy. Should the building be occupied prior to the City receiving the first disbursement from the tax bill, the applicant shall be responsible for paying the pro-rata share for the remainder of the tax year prior to the City conducting a final inspection.</p>		<p>No COC is necessary.</p>
<p>74. Participate in the formation of a mechanism to fund the operation and maintenance of the storm drain system, including storm water quality monitoring and reporting. The appropriate funding mechanism shall be determined by the City and may include, but not be limited to, an assessment district, community services district, or community facilities district. The funding mechanism shall be formed prior to issuance of a certificate of occupancy, and the project proponent shall fund all costs of the formation.</p>	<p>Soil and Water</p>	<p>To be addressed in PSA Part B</p>

<p>75. Applicant shall comply with the drainage fee requirements as adopted by the County Board of Supervisors. The applicant shall pay the fee in effect at the time of building permit issuance. Certain improvements required by the Conditions of Approval for this development or the Code may be eligible for credit or reimbursement against the drainage area fee. The applicant should contact the City Engineer to determine the extent of any credit or reimbursement for which they might be eligible. Any credit or reimbursement shall be determined prior to building permit issuance or as approved by the Flood Control District.</p>	<p>Soil and Water</p>	<p>To be addressed in PSA Part B</p>
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PREPARATION TEAM

**OAKLEY GENERATING STATION
09-AFC-4
PREPARATION TEAM**

Executive Summary Pierre Martinez, AICP
Introduction Pierre Martinez, AICP
Project Description Pierre Martinez, AICP
Cultural Resources Kathleen Forrest
Hazardous Materials Management..... Geoff Lesh, P.E., Rick Tyler
Noise and Vibration Erin Bright
Public Health Obed Odoemelam, Ph.D.
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
General Conditions Jack W. Caswell
Project Assistant Maria Santourdjian



**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 8/13/2010)**

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DECLARATION OF SERVICE

I, Maria Santourdjian, declare that on December 20, 2010, I served and filed copies of the attached Preliminary Staff Assessment Part A. 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/contracosta/index.html>]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

For service to all other parties:

- 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