

Final Staff Assessment

HUMBOLDT BAY REPOWERING PROJECT

Application For Certification (06-AFC-7)
Humboldt County



**CALIFORNIA
ENERGY
COMMISSION**

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STAFF REPORT

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**HUMBOLDT BAY REPOWERING PROJECT
(06-AFC-7)
FINAL STAFF ASSESSMENT**

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EXECUTIVE SUMMARY

John S. Kessler

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the Humboldt Bay Repowering Project (HBRP) Application for Certification (06-AFC-7). The FSA examines engineering, environmental, public health and safety aspects of the HBRP, based on the information provided by the applicant, Pacific Gas and Electric Company (PG&E), and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

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

This FSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The FSA serves as staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners who are hearing this case. After evidentiary hearings, the Committee will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The full Energy Commission will make the final decision, including findings, after publication of the Presiding Member's proposed decision.

PROJECT LOCATION AND DESCRIPTION

The proposed HBRP site would be located at 1000 King Salmon Avenue, Eureka, California. This project would be located on 5.4 acres within a 143-acre parcel currently occupied by the existing PG&E Humboldt Bay Power Plant (HBPP). The HBRP would be a load following power plant consisting of ten (10) natural gas-fired Wärtsilä 18V50DF 16.3 megawatt (MW) reciprocating engine-generator sets and associated equipment with a combined nominal generating capacity of 163 MW. The HBRP would also be capable of running on California Air Resources Board (CARB)-certified diesel fuel in order to ensure local area reliability during instances of natural gas curtailment in the region as required by the California Public Utilities Commission (CPUC) and PG&E's CPUC Gas Tariff Rule 14. This project is a replacement of the existing 105 MW Units 1 and 2 and the two 15 MW Mobile Emergency Power Plants (MEPP) at PG&E's

HBPP site. **Project Description Figures 1 and 2** shows the regional and local settings for the proposed project respectively.

The power plant site is currently zoned coastal dependent industrial with combining district designations for coastal resource dependent, flood hazard and coastal wetland. The site is within the jurisdiction of the California Coastal Commission and Humboldt County. Land uses and natural features on the project parcel include industrial land, power plant cooling water intake and discharge canals, wetlands, and Buhne Slough. The property is bounded on the north by Humboldt Bay, on the west by the King Salmon community, on the east by Northwestern Pacific Railroad tracks, and on the south by King Salmon Avenue. Land uses surrounding the site include Highway 101, some rural residential, commercial development, wetland areas, the Humboldt Hill residential development, the community of Fields Landing, Humboldt Bay, a sand spit (South Spit) and the Pacific Ocean. An existing public trail that is part of the California Coastal Trail system is on the north side of the Humboldt Bay Power Plant site along Humboldt Bay.

Buhne Slough is a local fishing area, and follows the south-eastern boundary of developments within the HBPP site. The Elk River Wildlife Area is approximately 2,000 feet to the northeast of the HBRP site. Within a one-mile radius of the HBRP site are South Bay Elementary School and a senior home, Sun Bridge Seaview Care Center, and two churches, the Redwood Christian Center and the Calvary Community Church.

Air emissions from the proposed facility would be controlled using best available control technology applied to each engine's exhaust. Each system would consist of a selective catalytic reduction unit for oxides of nitrogen (NO_x) control and an oxidation catalyst unit for carbon monoxide (CO) and volatile organic compounds (VOC) control. In order to be considered for licensing by the Energy Commission, the project would be required to conform with rules and regulations of the North Coast Unified Air Quality Management District (NCUAQMD) and be issued a Determination of Compliance from NCUAQMD.

The HBRP proposes using approximately 2,400 gallons of water per day (2.7 acre-feet/year) on average for cooling or other industrial purposes, which is a fraction of the water required for traditional combined-cycle turbine design. The generators will use an air radiator cooling system in a closed loop system (similar to automobiles). Raw water for industrial processes and site landscape irrigation will be supplied from PG&E's existing ground water well via a direct connection to an onsite 6-inch-diameter water pipeline. Domestic water required for non-process uses (i.e., sinks, toilets, showers, drinking fountains, eye wash/safety showers, etc.) will be provided from a new 4- to 6-inch-diameter on-site pipeline running 1200 feet to a connection with the existing HCSD line that runs along King Salmon Avenue. The HBRP will discharge industrial and sanitary wastewater into the Humboldt Community Services District (HCSD) sanitary sewer system at an average rate of about 860 gallons per day.

The project would be connected from the generators to the existing switchyard via two 60 kilovolt (kV) tie lines and one 115-kV tie line. No new transmission lines will be required. Natural gas would be supplied to the HBRP via an onsite 10-inch-diameter, high-pressure, natural gas pipeline owned and operated by PG&E.

PUBLIC AND AGENCY COORDINATION

On October 12, 2006, the Energy Commission staff provided the HBRP project description to a comprehensive list of libraries, agencies, organizations and residences/business within 1,000 feet of the proposed project and 500 feet of the linear facilities. The Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

On December 18, 2006, an Information Hearing and a Site Visit for the HBRP were conducted at the HBPP near the city of Eureka. Staff conducted two publicly noticed Data Response and Issue Resolution workshops at the HBPP. The first of these was held on February 1, 2007, and discussed the topics of Air Quality, Biology, Cultural Resources, Geology, Hazardous Materials, Public Health, Soil and Water Resources, Transmission System Engineering, Waste Management and Worker Safety/Fire Protection. Participating agencies in the first workshop included the applicant (i.e. PG&E), Humboldt County, North Coast Unified Air Quality Management District (NCUAQMD) and the California Air Resources Board (CARB). The second workshop was conducted on March 12, 2007, and discussed the topics of Air Quality and Public Health. Participating agencies in the second workshop included the applicant, PG&E, Humboldt County, NCUAQMD and CARB. In addition to this workshop, extensive coordination has also occurred with numerous other local, state and federal agencies that have an interest in the project including the city of Eureka, Humboldt County, California Coastal Commission (Coastal Commission), California Department of Fish and Game (CDFG), U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service (USFWS) and the U.S. Environmental Protection Agency (USEPA). Staff has also considered the comments of community groups and individual members of the public.

Following these workshops and receipt of the NCUAQMD's Preliminary Determination of Compliance, Energy Commission staff published the Preliminary Staff Assessment (PSA) on November 29, 2007. Two PSA workshops were subsequently held at the HBPP to obtain comments from the public, agencies and interested parties, and to resolve outstanding issues with the applicant. The workshop held on December 14, 2007 focused on air quality and public health issues and included discussion in most technical areas of the PSA. Staff also provided responses to PG&E's initial comments on the PSA as transmitted by PG&E on December 7, 2008 (PG&E 2007b). Staff's Summary of the December 14, 2007 PSA Workshop was docketed on January 15, 2008 (CEC 2008a) and distributed to attending members of the public during the second workshop. On January 16, 2008, staff and the NCUAQMD facilitated a second PSA/Preliminary Determination of Compliance (PDOC) Workshop at the HBPP during one morning and one evening session, starting at 11:00 AM and 5:00 PM. The focus of the second workshop was again on air quality and public health issues including discussion of various conditions of the PDOC. PG&E, NCUAQMD, USEPA and staff developed approaches for resolving outstanding air quality and public health issues, which were followed in subsequent filings by PG&E, independent modeling by NCUAQMD and analysis by staff.

In addition, Cultural Resources, Land Use, Transmission System Engineering and Visual Resources were discussed, with consideration of options for developing a public use area under Land Use also being a primary topic. Staff received input on options for

developing a public use area from representatives of the Redwood Community Action Agency and Humboldt County, which ultimately led to staff's recommendation that the Truesdale Point to Hilfiker Lane Trail element of the Elk River Access project was the best option for a public use area, as is discussed further in the Land Use section of this FSA.

ENVIRONMENTAL JUSTICE

The steps recommended by the U.S. EPA's guidance documents to assure compliance with Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis. Staff has followed each of the above steps for the following 11 sections in the FSA: Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management. Over the course of the analysis for each of the 11 areas, staff considered potential impacts and mitigation measures, significance, and whether there would be a disproportionate impact on an environmental justice population.

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

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

There is not a minority population greater than 50 percent that has been identified within a six-mile radius of the HBRP site. Staff has not identified any significant adverse impacts associated with the proposed project, and lacking a minority population greater than 50 percent, the construction and operation of the HBRP is not considered to have a disproportional impact on an environmental justice population. Staff has worked closely with PG&E and the residents of the area to identify local 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 facilitated by the Energy Commission's Public Advisor's Office. This activity is summarized in the **Introduction** to the FSA.

STAFF'S ASSESSMENT

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

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

COASTAL ACT CONFORMANCE

Under normal circumstances, the California Coastal Commission would make its own determination as to the project's conformance with the California Coastal Act (Coastal Act). Although the Coastal Commission was able to participate in review of the project during earlier activities of the Energy Commission's licensing process, due to its workload, it had to withdraw from participating in several projects undergoing licensing before the Energy Commission, including the HBRP. The Coastal Commission's position was expressed in a letter dated October 16, 2007 from Peter M. Douglas, Executive Director of the Coastal Commission to B.B. Blevins, then Executive Director of the Energy Commission. Considering these circumstances, the Coastal Commission requested, that Energy Commission staff review HBRP's conformance with the Coastal Act. Staff recommends that the Energy Commission determine HBRP would conform to the Coastal Act as discussed further in the several technical areas of this FSA where applicable sections of the Coastal Act are pertinent to the HBRP. These FSA sections include Alternatives, Biology, Geology, Land Use, Soil and Water and Visual Resources.

SUMMARY OF PROJECT RELATED IMPACTS

In its evaluation of Cultural Resources, staff believes the project as proposed would cause a significant indirect impact on a significant historical resource, the Humboldt Bay Power Plant Historic District (HBPPHD), except for the nuclear Unit 3 and associated

structures which PG&E has already determined to be historically significant and is not affected by HBRP. Staff considers the HBPPHD consisting of the existing operating Units 1 and 2, Unit 3 which is being decommissioned, and associated facilities of the HBPP to be historically significant as it is the first and only combined conventional and nuclear power plant in California. However, staff believes that the indirect impact would be fully mitigated with implementation of staff's proposed mitigation measures and conditions of certification that would require PG&E, before demolishing Units 1 and 2 and appurtenant structures, to perform a historical recordation of the existing HBPP, and to maintain these records in perpetuity.

Because of Public Health concerns identified by staff regarding the potential cancer risk associated with diesel use by the project as originally proposed, the applicant proposed several project modifications that reduced the health risks to below levels of significance. These modifications included raising the exhaust stack heights from 75 to 100 feet to improve air dispersion characteristics and reducing the hours of operation when using only diesel fuel from 1,000 to 510 hours per year combined for all engines. The applicant also found that its assumptions regarding operation in diesel mode for performing annual emission testing could be less than originally proposed and reduced the testing requirements. In addition, the applicant provided evidence that diesel particulate matter - the major contributor to health risks - would be reduced 30% by the proposed oxidation catalyst treatment of exhaust from the engines. Staff has proposed conditions of certification that would establish an initial operational limitation of 510 hours on diesel fuel, would require PG&E to conduct emission source testing following commercial operation, and to update its Health Risk Assessment based on the project-specific emission data. The results of the Health Risk Assessment could alter the permitted hours of diesel operation either upward or downward subject to the project not exceeding the threshold of significance for causing a significant human health hazard resulting from either an acute (short-term), chronic (long-term) non-cancer health impacts and the risk of cancer.

Staff concludes that with the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the HBRP would not cause a significant adverse environmental or public health impact and would conform with all applicable laws, ordinances, regulations, and standards (LORS) including the Coastal Act. For a more detailed review of potential impacts, see staff's technical analyses in the FSA. The status of each technical area is summarized in the table below.

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

ALTERNATIVES SUMMARY

The “Guidelines for Implementation of the California Environmental Quality Act,” Title 14, California Code of Regulation, Section 15126.6(a), provides direction by requiring an evaluation of the comparative merits of “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.” In addition, the analysis must address the “no project” alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

Staff’s analysis included examining additional post-combustion emission controls, alternative fuels, alternative energy producing technologies, and eight alternative project sites. Lacking a significant environmental impact associated with the proposed project, these alternatives would not result in an environmentally superior project. Further, the addition of more post-combustion emission controls to those already proposed are not necessary because the proposed project would not result in a significant environmental impact and would conform to air quality rules and standards. Staff also believes that the “No Project Alternative” is not superior to the proposed project. The No Project scenario would likely delay replacement of the existing HBPP with more energy efficient electrical resources required for the Humboldt load pocket, and could impact electrical supply reliability in northern California.

NOTEWORTHY PUBLIC BENEFITS

The HBRP would offer the following public benefits:

1. Replace the existing Humboldt Bay Power Plant Units 1 and 2, which are about 50 years old and nearing the end of their useful lives, with a 30% more efficient generation technology.
2. Locate the HBRP at the existing HBPP near existing infrastructure which avoids potential environmental impacts from new linear facilities. HBRP would be located adjacent to an existing substation, providing key interconnections to both the existing 60-kilovolt (kV) and 115-kV transmission lines, and infrastructure for natural gas, water supply, and wastewater disposal.
3. Provide a public use area in the form of the Truesdale Point to Hilfiker Lane Trail element of the Elk River Access Project. The new 2,265 foot long waterfront trail would follow along the Humboldt Bay shoreline in the city of Eureka and would link public access from two primary parking locations at Truesdale Point and Hilfiker Lane, as well as contribute to larger plans for development of the California Coastal Trail.
4. Provide a reliable source of generation within the Humboldt Load Pocket (greater Humboldt County area), where imported power is normally constrained to supply only about half of the existing 196-MW peak load.
5. Be capable of rapid-response loading in order to maintain service during transmission interruptions and natural gas curtailments.
6. Reduce and ultimately eliminate the quantity of water withdrawn from Humboldt Bay as is currently used for once-through cooling of the existing Units 1 and 2, and for the fuel rod storage of the nuclear Unit 3 which is undergoing decommissioning. At such time as HBRP would be in operation and Unit 3 decommissioned, all bay water diversions would cease and eliminate loss of aquatic marine life from entrainment and impingement in the HBPP cooling water system.
7. Reduce exhaust emissions for most air contaminants compared to the existing HBPP, particularly oxides of nitrogen (NO_x), which is a precursor to ozone formation.

CONCLUSIONS AND RECOMMENDATIONS

The FSA is a document of the Energy Commission staff, and thus the conclusions and recommendations presented herein are considered staff's analysis and testimony. In summary, assuming staff's proposed conditions of certification are adopted by the Energy Commission in its Final Decision, staff's conclusions and recommendations are as follows:

- The project's environmental impacts related to construction and operation can be mitigated to a less than significant level.

- The project is in conformance with all Laws, Ordinances, Regulations and Standards (LORS), including conformance with the Coastal Act.
- The North Coast Unified Air Quality Management District has determined that the project complies with the appropriate rules and requirements of the district and will not contribute to the degradation of air quality. The applicant has identified all required emission reductions credits needed for operation of the proposed project.
- Transmission system impacts and appropriate mitigation have been fully identified, and the California Independent System Operator has issued its preliminary approval.
- Lacking a minority population greater than 50 percent and a significant environmental impact, the construction and operation of the HBRP is not considered to have a disproportional impact on an environmental justice population.
- In conclusion, if staff's proposed conditions of certification are adopted in the Energy Commission's Final Decision, staff would recommend certification of the HBRP.

REFERENCES

CEC 2008a – California Energy Commission/J.Kessler (tn: 44333). Staff's Summary of the December 14, 2007 PSA Workshop. Rec'd 1/15/2008.

PG&E 2007b – Humboldt Bay Repowering Project (tn: 43660). PG&E's Initial Comments on the PSA for the HBRP as transmitted by Galati/Blek LLP, counsel for PG&E. 12/7/2007. Rec'd 12/7/2007.

INTRODUCTION

John S. Kessler

PURPOSE OF THIS REPORT

The Final Staff Assessment (FSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Humboldt Bay Repowering Project (HBRP) Application for Certification (AFC). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

- the existing environmental setting;
- the proposed project;
- 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;
- cumulative analysis of the potential impacts of the project, along with potential impacts from other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies and intervenors that may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified;
- project alternatives; and
- project closure requirements.

The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. 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." The verification is not part of the proposed condition, but is the owner's and Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted conditions of certification.

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

ORGANIZATION OF THE STAFF ASSESSMENT

The FSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety and nuisance, hazardous material 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;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

ENERGY COMMISSION SITING PROCESS

The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, §25500). The Energy Commission must review power plant AFCs to assess potential environmental and public health and safety impacts, potential measures to mitigate those impacts (Pub. Resources Code, §25519), and compliance with applicable governmental laws and standards (Pub. Resources Code, §25523 (d)).

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

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

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission is the CEQA lead agency and is subject to all portions of CEQA applicable to certified regulatory activities.

Staff typically prepares both a preliminary and final staff assessment. The Preliminary Staff Assessment (PSA) presents for the applicant, intervenors, agencies, other interested parties and members of the public, the staff's preliminary analysis, conclusions, and recommendations.

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the Final Staff Assessment (FSA), staff will conduct one or more workshops to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine their analysis, correct errors, and finalize conditions of certification to reflect areas where staff has reached agreement with the parties. This refined analysis, along with responses to comments on the PSA, will be published in the FSA. The FSA serves as staff's testimony.

This staff assessment 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 Member's Proposed Decision (PMPD). Following publication, the PMPD is circulated in order to receive public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD will be circulated for a comment period to be determined by the Committee. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any intervenor 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.

Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission. Staff's proposed description of the contents of the Compliance Monitoring Plan and proposed General Conditions are included in the **General Conditions** section of this FSA.

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Coastal Commission, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, and the California Air Resources Board.

PROJECT DESCRIPTION

John S. Kessler

INTRODUCTION

On September 29, 2006, Pacific Gas and Electric Company (PG&E) filed an Application for Certification (AFC) for the Humboldt Bay Repowering Project (HBRP), seeking approval from the California Energy Commission to construct and operate a nominal 163-megawatt (MW) power plant consisting of 10 dual-fueled (natural gas with a diesel pilot or diesel) reciprocating engine-generator units rated at 16.3 MW each. On November 3, 2006, PG&E filed a Supplement to the AFC, and on November 8, 2006, the Energy Commission accepted the AFC (06-AFC-7) with supplemental information as complete. This determination initiated Energy Commission staff's independent analysis of the proposed project.

PURPOSE OF PROJECT

The 163-MW nominal capacity HBRP is designed as a load-following and daily cycling facility to meet electric generation load and reliability requirements in PG&E's Humboldt Service Area. The project is a replacement of existing Units 1 and 2 (105-MW combined capacity) consisting of natural gas- and oil-fired steam turbine-generating units and of the two diesel-fired Mobile Emergency Power Plants (MEPPs) rated at 15 MW each for HBPP (HBPP). Units 1 and 2 are about 50 years old and operate less efficiently than modern power plant technologies. The HBRP would provide a 30 percent increase in efficiency compared to existing Units 1 and 2. HBRP would be capable of running on California Air Resources Board (ARB)-certified diesel fuel in order to ensure local area reliability during instances of natural gas curtailment in the region, which can occur frequently during winter. Humboldt Bay Service Area relies extensively on local generation resources due to power import constraints and service interruptions in the 115-kilovolt (kV) transmission system.

Due to its age and outdated technology, PG&E seeks to replace its generation capacity of the existing HBPP. The review of generation alternatives is a process subject to California Public Utilities Commission (CPUC) regulations specifying a competitive and public program as to how PG&E may procure power on behalf of its customers. The HBRP, as initially proposed by an independent developer, Ramco, is one of a number of projects submitted by participants in PG&E's 2004 Long-Term Request for Offers for new generation resources. HBRP was ultimately selected, and PG&E subsequently acquired the rights for HBRP development in consideration of the need for close coordination with existing fossil and nuclear operations at the site.

PROJECT LOCATION

The proposed HBRP site is located at 1000 King Salmon Avenue, approximately three miles south of the city of Eureka in an unincorporated area of Humboldt County. The project is within the sphere of influence of the city of Eureka and would be located on 5.4 acres within a 143-acre parcel currently occupied by the existing PG&E HBPP. The

site is zoned Coastal-Dependent Industrial and is within the jurisdiction of the California Coastal Commission, as well as city of Eureka and Humboldt County.

The HBRP site is located on Buhne Point, a small peninsula along Humboldt Bay, and currently contains industrial land, wetlands, Buhne Slough, and cooling water intake and discharge canals associated with the existing HBPP. The property is bounded on the north by Humboldt Bay, on the west by the King Salmon community, on the east by the Northwestern Pacific Railroad tracks, and on the south by King Salmon Avenue. East of the railroad property are Highway 101, some rural parcels, and commercial development. South of King Salmon Avenue are wetland areas and the Humboldt Hill residential development. Southwest of Humboldt Hill is the community of Fields Landing. West of the King Salmon community are Humboldt Bay, a sand spit known as South Spit, and beyond the spit, the Pacific Ocean. Within a one-mile radius of the project is the South Bay Elementary School and a senior home, the Sun Bridge Seaview Care Center (PG&E 2006a, pp. 8.6-1 and 8.6-2).

A shoreline trail maintained by PG&E and the Humboldt Bay Harbor Recreation and Conservation District runs along the shoreline on the perimeter of the HBPP property to the northwest. This portion of the trail extends from the King Salmon community south to the wetlands along the bay. This trail represents part of a planned coastal trail system that the California Coastal Conservancy envisions would eventually extend from Oregon to Mexico (PG&E 2006a, p. 8.13-6)

Project Description Figure 1 shows the regional setting, and **Project Description Figure 2** provides the local setting for the proposed project.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

In order to construct the HBRP, it would be necessary to remove several structures associated with the existing HBPP, including the painting and sandblasting building, two storage sheds, one 115-kV transmission tower, diesel fuel tanks, and related underground piping and infrastructure (PG&E 2006a, p. 2-1). The HBRP would consist of 10 dual-fuel Wärtsilä 18V50DF 16.3-MW reciprocating engine-generator sets and associated equipment with a combined nominal generating capacity of 163 MW. The reciprocating engine is very similar to a conventional automobile engine, containing 18 cylinders in a V-formation. During normal operation, the engines use natural gas as fuel, with a very small amount of diesel fuel injected through a micro-pilot system to ignite the natural gas in the cylinders. During times of natural gas disruption or curtailment, the engines use diesel fuel supplied through a separate, conventional injection system. The dual-fuel technology is capable of operating at up to 48 percent efficiency (PG&E 2006a, p. 2-18). Auxiliary equipment would include inlet air filters, oxidation filters, gas exhaust silencer stacks, air radiator cooling array, generator step-up and auxiliary transformers and emergency diesel fuel storage tanks.

Air emissions from the proposed facility would be controlled using best available control technology applied to each engine's exhaust. Each system would consist of a selective catalytic reduction unit for oxides of nitrogen (NO_x) control and an oxidation catalyst unit for carbon monoxide (CO) and volatile organic compounds (VOC) control. The tallest components of the project would be the 100-foot high exhaust stacks. **Project**

Description Figure 3 shows the general arrangement of the proposed HBRP in relation to the existing HBPP. **Project Description Figure 4** provides an architectural rendering of the proposed project.

ELECTRIC TRANSMISSION

The HBRP would be connected to PG&E's existing HBPP switchyard via 13.8-kV cables and bus work from the generator circuit breakers to new step-up transformers and then via two 60-kV tie lines and one 115-kV tie line into the switchyard. Normally, four of the units would feed into the 115-kV line, and the remaining 6 units would feed into the 60-kV lines. Switchyard improvements would include replacement of the existing 60-kV and 115-kV circuit breakers and replacement of a 115-kV steel lattice tower with three steel poles. No new transmission facilities would be necessary beyond the switchyard (PG&E 2006a, p. 2-19 and Figure 5.2-1).

NATURAL GAS SUPPLY

Natural gas would be supplied to the HBRP via an onsite 10-inch-diameter, high-pressure, natural gas pipeline owned and operated by PG&E. The natural gas would flow through gas scrubber/filter equipment, a gas pressure control station, and a flow-regulating station prior to entering the reciprocating engines (PG&E 2006a, p. 2-20).

WATER SUPPLY

The HBRP proposes using approximately 2,400 gallons of water per day (2.7 acre-feet/year) on average for cooling or other industrial purposes. The engines would use an air radiator cooling system in a closed loop system (similar to automobiles). Raw water for industrial processes and site landscape irrigation would be supplied from PG&E's existing ground water well via a direct connection to an onsite 6-inch-diameter water pipeline.

Potable water demands would average about 160 gallons per day (0.2 acre-feet/year) as required for non-process uses (i.e., sinks, toilets, showers, drinking fountains, eye wash/safety showers, etc.). Potable water would be supplied from a new 4- to 6-inch-diameter on-site pipeline running 1,200 feet to a connection with the existing Humboldt Community Services District (HCSD) line that runs along King Salmon Avenue (PG&E 2006a, pp. 2-20 and 7-1).

WASTEWATER DISCHARGE

The HBRP would discharge process and sanitary wastewater into the HCSD sanitary sewer system at an average rate of about 860 gallons per day. Process wastewater would collect from area washdown, sample drains, and drainage from facility equipment areas. Sanitary wastewater would collect from sinks, toilets, showers, and other sanitary facilities. Both process and sanitary wastewater would be conveyed to HBPP's existing 4-inch-diameter wastewater pipeline, which already interconnects to the HCSD sewer system. The new storm water collection system and outfall would route non-contaminated storm water to the southeast corner of the HBRP site, discharging over land that ultimately would drain into Buhne Slough (PG&E 2006a, Section 2.5.9.1 and Appendix 7B).

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, PG&E proposes to initiate construction of the HBRP in Fall 2008. The project is expected to take about 18 months for construction and startup testing and could begin commercial operation as early as the second quarter of 2010, if there are no delays. The construction workforce would average 101 workers per month and would peak during the sixth through ninth months, with up to 236 workers onsite. Construction costs are estimated to be \$250 million.

Primary construction access would be from King Salmon Avenue via a new temporary construction access road south of the existing HBPP cooling water intake channel. Storage of construction materials and equipment would occur within the project site boundaries north of the HBRP site adjacent to Humboldt Bay and east of the cooling water discharge channel. Construction worker parking would occur in two locations. Within the project site boundaries, parking would occur south of the existing HBPP cooling water intake channel and west of the adjacent HBRP site. Additional parking would occur adjacent to the northwest corner of the HBPP boundaries in a currently abandoned parking lot offsite along King Salmon Avenue (PG&E 2006a, p. 2-26 and Figure 2.3-1).

The Wärtsilä 18V50DF engine generator sets and associated auxiliary equipment would be ocean freighted to the Humboldt area and then transferred from freighter to barges at one of the docks in the Eureka/Arcata area. The barges would then be floated to the Fields Landing Terminal, where the engine-generators would be off-loaded to heavy haul tractors and trucked to the HBRP site via Highway 101 and King Salmon Avenue (PG&E 2006a, p. 8.12-7).

The HBRP would be operated by a full-time staff of 17 employees of PG&E. The power plant would be capable of operating both in Load Following mode to meet local system demand and reliability requirements and in Daily Cycling mode, where the plant could operate up to maximum capacity during the day and totally shut down at night or on weekends. The planned life of the generating facility is 30 years, but it could be operated longer if it is still economically viable (PG&E 2006a, p. 2-27).

FORESEEABLE SITE ACTIVITIES NOT PART OF THE HBRP

The construction of the HBRP would take place within the boundaries of an active power plant (Units 1 and 2 and the MEPPs) and concurrent with decommissioning activities associated with the 63-MW Unit 3 nuclear reactor. Several other activities associated with ongoing operations and nuclear decommissioning actions at the HBPP site include the following:

- Construction of the Independent Spent Fuel Storage Installation (ISFSI) Project which began construction in 2007 and is substantially complete. The ISFSI will store spent fuel rods from Unit 3 on site in an underground dry-cask storage facility beginning in late 2008 for an indefinite period;
- Decommissioning of Unit 3 and associated environmental studies necessary to define the scope of decommissioning, leading to the ultimate removal of the nuclear unit that has been shutdown since 1976; and

- Demolition of the currently operating HBPP Units 1 and 2 and the MEPPs sometime following commercial operation of the HBRP (PG&E 2006a, p. 2-2 through 2-4).
- Removal of the fuel oil supply pipeline from Olson's Wharf to HBPP consisting of 4,200-feet of retired fuel oil pipeline. The pipeline removal project site is along the east margin of Humboldt Bay at King Salmon Slough near the HBPP. The removal of the retired fuel oil pipeline would be conducted in July through September 2008 and last for approximately ten weeks (PG&E 2007).
- Removal of one of the two oil storage tanks at the HBPP during 2008/2009;

The Energy Commission has no permitting authority related to the nuclear decommissioning activities, as construction of the ISFSI and decommissioning of Unit 3 are under the jurisdiction of the Nuclear Regulatory Commission, and its licensing preceded the Energy Commission. Similarly, demolition of Units 1 and 2, the MEPPs and other associated facilities of the HBPP such as the fuel oil pipeline and storage tank, is not subject to Energy Commission permitting, as their licensing and commercial operation also preceded the Energy Commission. However, demolition of Units 1 and 2 is a reasonably foreseeable indirect impact resulting from the construction of HBRP, as these units will no longer be necessary once HBRP is operational. Additionally, staff, in its Cumulative Impacts analysis, is considering the combined effects of the proposed HBRP with the individual activities noted above as well as the continued operation of HBPP during the construction and commissioning of HBRP.

FACILITY CLOSURE

The HBRP would be designed for an operating life of 30 years. At an appropriate point beyond that, the project would cease operation and close down. At that time, it would 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.

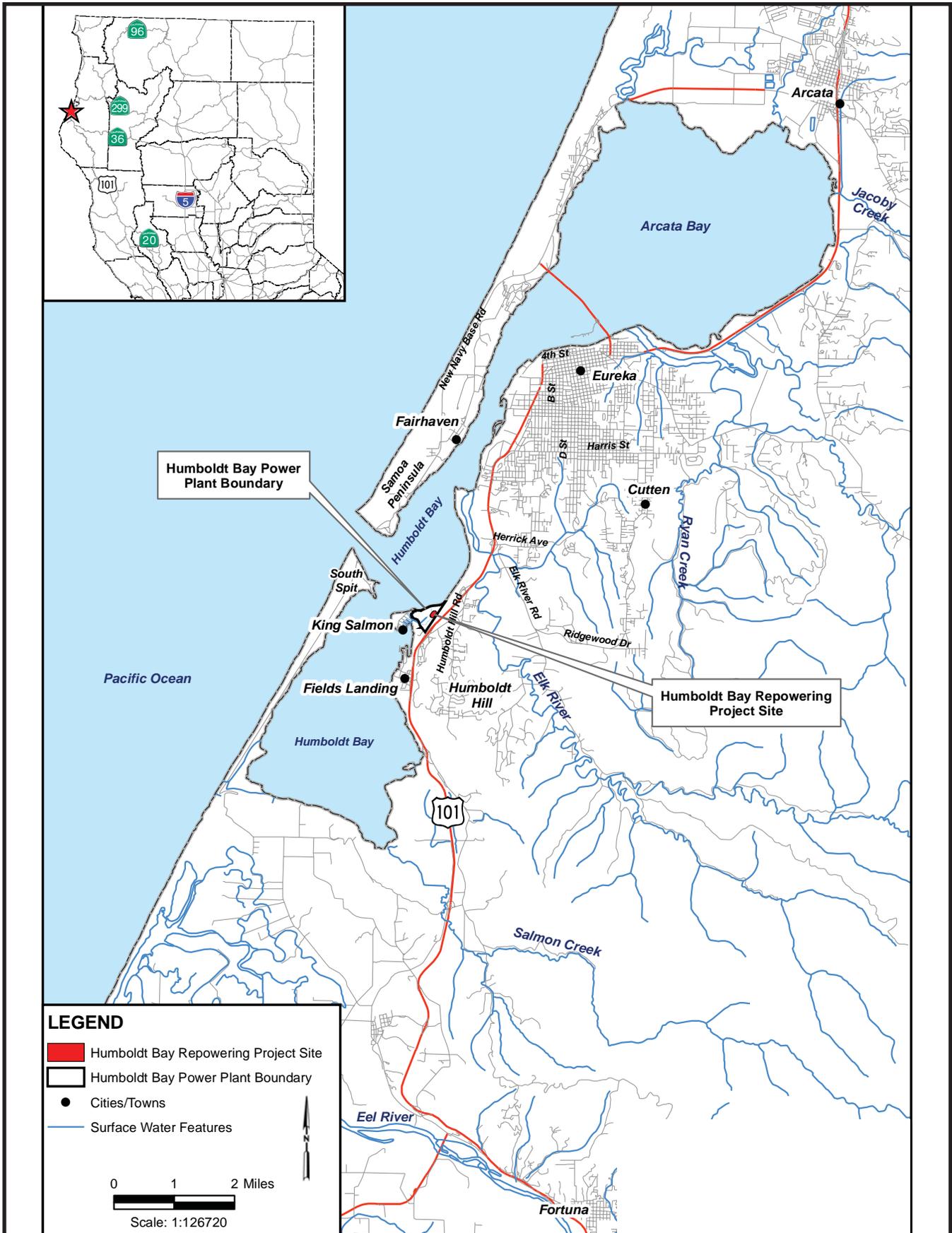
Although the setting for this project does not appear to present any special or unusual closure problems, it is impossible to foresee what the situation would be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting at the time of closure. Facility closure would be consistent with laws, ordinances, regulations and standards in effect at the time of closure.

REFERENCES

PG&E 2006a – PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC Vol. 1 & 2, 1 AFC CD and 1 Air Modeling CD. 9/29/2006. Rec'd 9/29/2006.

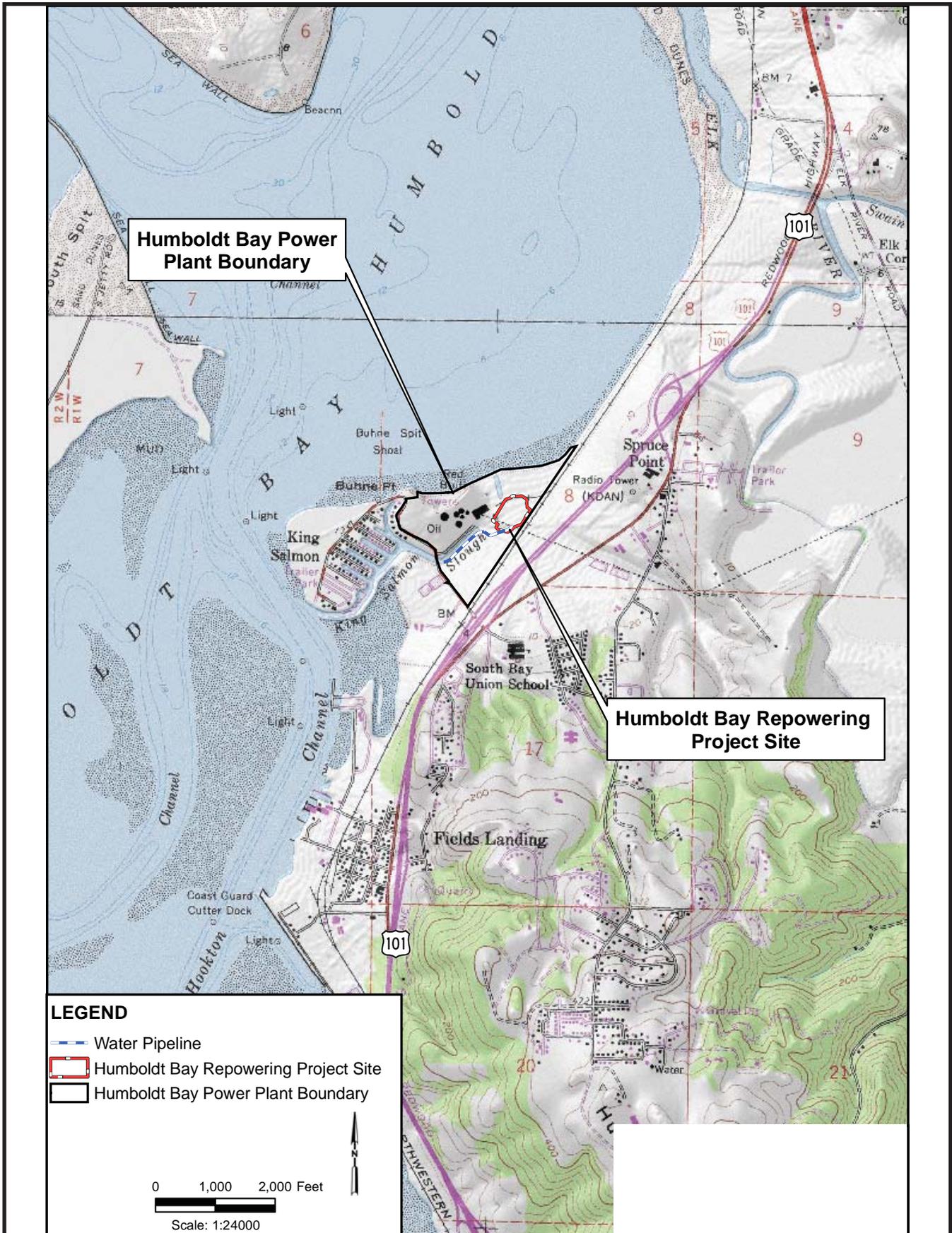
PG&E 2007. Letter from PG&E to Humboldt Bay Harbor, Recreation and Conservation District in regards to pipeline removal from Olson's Wharf to HBPP. Dated December 4, 2007.

PROJECT DESCRIPTION - FIGURE 1
Humboldt Bay Repowering Project - Regional Setting



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2008
 SOURCE: AFC Figure 1.1-1

PROJECT DESCRIPTION - FIGURE 2
Humboldt Bay Repowering Project - Local Setting



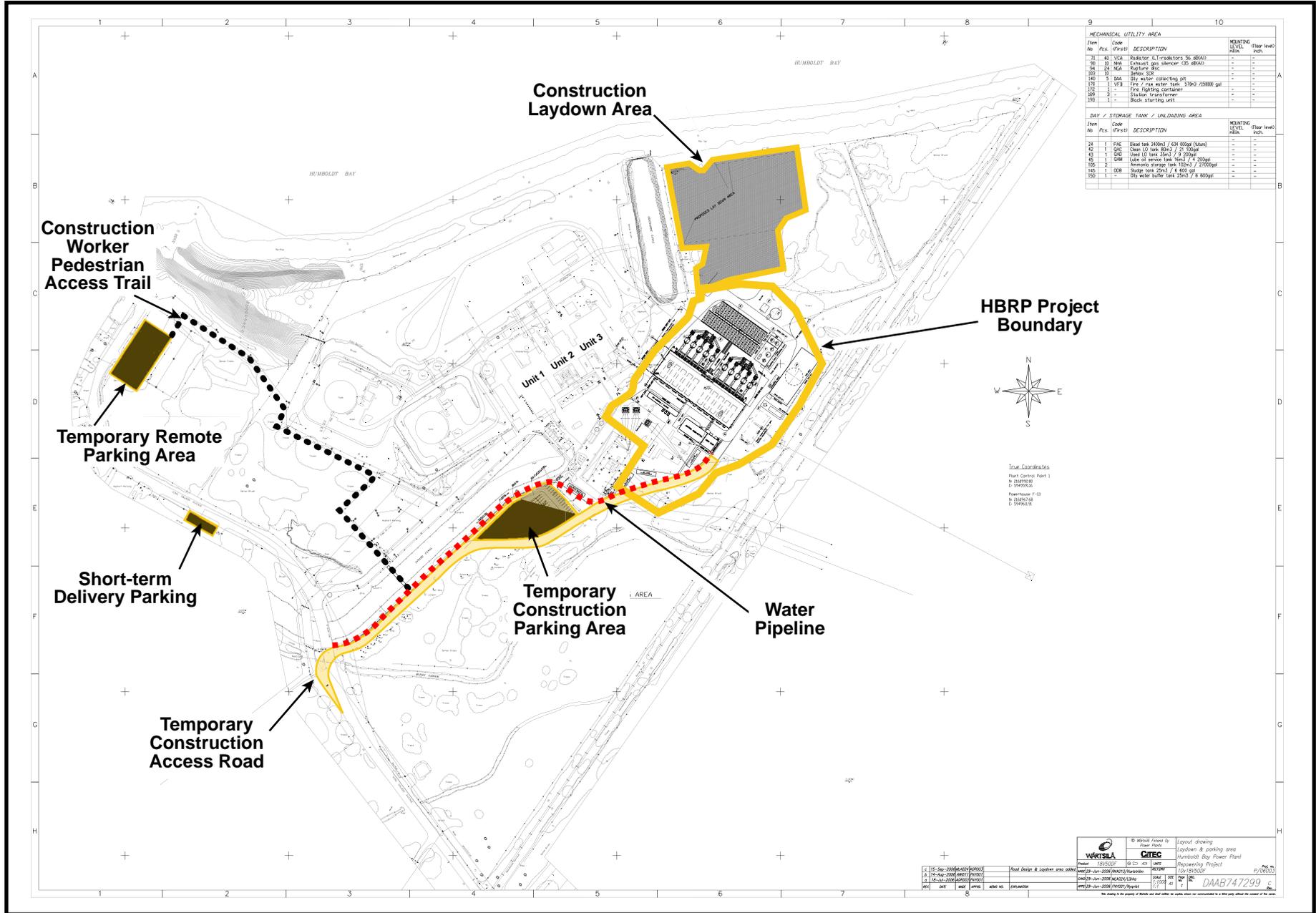
CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2008
 SOURCE: AFC Figure 1.1-3

PROJECT DESCRIPTION - FIGURE 3

Humboldt Bay Repowering Project - General Arrangement of Project & Existing Humboldt Bay Power Plant

MAY 2008

PROJECT DESCRIPTION



PROJECT DESCRIPTION - FIGURE 4

Humboldt Bay Repowering Project - Architectural Rendering of Proposed Project

MAY 2008



PROJECT DESCRIPTION

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Brewster Birdsall, P.E., QEP and Matthew Layton, P.E.

SUMMARY OF CONCLUSIONS

Staff concludes that PG&E's proposed Humboldt Bay Repowering Project (HBRP) would be likely to conform with applicable federal, state and North Coast Unified Air Quality Management District (NCUAQMD) air quality laws, ordinances, regulations and standards (LORS), and that adequate measures would be taken to ensure that the HBRP would not result in significant air quality-related impacts.

Staff concludes the following:

- PG&E originally proposed no annual limit on the number of hours of operation of the proposed Wärtsilä 18V50DF engines in diesel mode, except for 50 hours per year per engine for maintenance and testing. PG&E considers a natural gas supply curtailment to be an "emergency." However, Energy Commission staff and the NCUAQMD both seek to limit the hours of operation in diesel mode because the potential emissions of the project need to be clearly defined. The NCUAQMD has determined that the project should be limited to 1,000 engine-hours per year in the diesel mode (**AQ-138**); Energy Commission staff, in the **Public Health** section (**PUBLIC HEALTH-1**), recommends limiting the hours of diesel firing to no greater than 510 engine hours per year for all ten engines. Once a health risk assessment has been completed based on actual HBRP emission data, this limit may change, but would in no event exceed the 1,000 hour limit identified by the Air District (See the Public Health section for further discussion).
- PG&E seeks the flexibility to operate the HBRP during natural gas curtailments, which are determined by gas supply constraints while the transmission grid operators may dictate when the plant must operate. However, HBRP would need to remain within fuel use and emission limits established by NCUAQMD. There remains a potential for the power plant to violate NCUAQMD limits if actual fuel use or emissions occur at or near the maximum anticipated levels or if HBRP is forced by grid operators to be online during lengthy or severe natural gas curtailments.

Recommended conditions of certification would confirm compliance with the operating limits established by the NCUAQMD. With staff's recommended conditions of certification and NCUAQMD conditions shown in this assessment, the HBRP would be likely to comply with LORS and adequate measures would be taken to lessen the potential adverse impacts to the environment to a level of insignificance.

Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed. The HBRP would replace a less efficient existing facility with lower emissions of CO₂/megawatt-hour and likely lower net emissions. The project will comply with the requirements of SB1368 and the Emission Performance Standard. Staff recommends reporting of the GHG emissions as the Air Resources Board develops greenhouse gas regulations and/or trading markets. The project may be subject to additional reporting requirements and GHG reductions as these regulations become more fully developed and implemented.

INTRODUCTION

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of HBRP. Criteria air pollutants are defined as air contaminants for which the state and/or federal government has established an ambient air quality standard to protect public health. Exposure to the criteria pollutants, especially diesel particulate matter (DPM), a toxic air contaminant, can exacerbate public health impacts that are also described in the **Public Health** section of the FSA.

The criteria pollutants analyzed are nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), and particulate matter (PM). Two subsets of particulate matter are inhalable particulate matter less than 10 microns in diameter (PM₁₀) and fine particulate matter less than 2.5 microns in diameter (PM_{2.5}). Nitrogen oxides (NO_x), consisting primarily of nitric oxide (NO) and NO₂ and reactive organic compounds (ROC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SO_x) readily react in the atmosphere to form particulate matter and are major contributors to acid rain.

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. The State has demonstrated a clear willingness to address global climate change through research, adaptation and inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity consumption, and describes the applicable GHG standards and requirements.

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

- whether the HBRP is likely to conform with applicable federal, state, and NCUAQMD air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- whether the HBRP is likely to cause new violations of ambient air quality standards or contribute substantially to existing violations of those standards (Title 20, California Code of Regulations, section 1743); and
- whether mitigation measures proposed for the project are adequate to lessen potential impacts to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)).

LAWS, ORDINANCES, REGULATION, AND STANDARDS

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

AIR QUALITY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

<u>Applicable Law</u>	<u>Description</u>
Federal	U.S. Environmental Protection Agency (U.S. EPA)
CAAA of 1990, 40 CFR 50	National Ambient Air Quality Standards (NAAQS).
CAA Sec. 171- 193, 42 USC 7501	New Source Review (NSR) requires permits for new stationary sources (see NCUAQMD Rule 110).
40 CFR 52.21	Prevention of Significant Deterioration (PSD) requires major sources to obtain permits for emissions of attainment pollutants. PSD review requires the new or modified source to achieve the Best Available Control Technology (BACT) and to demonstrate that significant deterioration of ambient air quality would not occur. NCUAQMD implements the PSD program with U.S. EPA oversight (also NCUAQMD Rule 110). The existing HBPP is a major source and PSD review applies to the HBRP, which would be a major modification of the source.
40 CFR 60, Subpart III	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (also NCUAQMD Rule 104.11). Requires reduction compression ignition engine emissions to less than 1.2 grams of NOx per brake-horsepower-hour (g/bhp-hr) and 0.11 g/bhp-hr of diesel PM (DPM, according to U.S. EPA Method 5). Requires the emergency standby generator engine and fire water pump engine to meet U.S. EPA Tier 3 requirements.
40 CFR 70, CAA Sec 401, 42 USC 7651	Title V Operating Permit program requires filing of an application within one year after start of operation of modified or new sources (also NCUAQMD Regulation V).
40 CFR 72, CAA Sec 401 42 USC 7651	Title IV Acid Rain program requires federal Title IV permit and compliance with acid rain provisions. Applicable only to electrical generating units greater than 25 MW; not applicable to individual generating units at HBRP.

State	California Air Resources Board and Energy Commission
Health and Safety Code (HSC) Section 40910- 40930	Permitting of source needs to be consistent with approved Clean Air Plan. The 1984 NCUAQMD New Source Review program of Rule 1-200(c) and 1-220 is consistent with the applicable air quality management plan, the State Implementation Plan (SIP).
California Health & Safety Code Section 41700	Public Nuisance Provisions – outlaws discharge of air contaminants causing nuisance, injury, detriment or annoyance
Title 17 CCR 93115	Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) Engines. Establishes operating requirements and emission standards for emergency standby diesel-fueled CI engines [17 CCR 93115.6] and emission standards for stationary prime diesel-fueled CI engines [17 CCR 93115.7]. The emission standard is 0.15 g/bhp-hr DPM for emergency engines used fewer than 50 hours per year for maintenance and

	engine testing. This standard applies to the Wärtsilä 18V50DF engines in emergency use (as defined in the ATCM). The emission standard of 0.01 g/bhp-hr DPM for prime engines does not apply to the Wärtsilä 18V50DF engines when operating in natural gas/ diesel pilot mode. All compression ignition engines proposed for HBRP are subject to the ATCM.
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Local	North Coast Unified Air Quality Management District
NCUAQMD Rule 102	Required Permits. Requires an Authority to Construction (ATC) and Permit to Operate (PTO) be issued by the Air Pollution Control Officer (APCO).
NCUAQMD Rule 104	Prohibitions. Prohibits excessive visible emissions (Rule 104.2), particulate matter from combustion (Rule 104.3.4.1), and sulfur dioxide emissions (Rule 104.5).
NCUAQMD Rule 110	NSR and PSD. Requires implementation of BACT that is technologically feasible and determined by the Air Pollution Control Officer to be cost-effective (Rule 110.5.1). Requires offsets be provided so new or modified sources cause no net increase (Rule 110.1.2). Requires air quality impact analysis that demonstrates that new or modified sources do not cause or worsen the violation of an ambient air quality standard (Rule 110.5.5 and 110.7). Requires power plants be subject to Preliminary and Final Determination of Compliance (PDOC and FDOC, respectively) by the NCUAQMD Air Pollution Control Officer with public notice and public comment. The NCUAQMD issued the PDOC on October 24, 2007 (NCUAQMD 2007) and the FDOC on April 15, 2008 (NCUAQMD 2008a). The FDOC serves as an ATC only after the Energy Commission certifies HBRP (Rule 110.9).
NCUAQMD Rule 1-200(c) and 1-220	1984 NSR requirements (approved as part of SIP), consistent with federal PSD review and current Rule 110.

SETTING

CLIMATE AND METEOROLOGY

The climate of the greater Humboldt Bay region, including Eureka and the immediate coastal strip where the project site is located, is characterized as Mediterranean. Summers with little or no rainfall and low overcast and fog are frequently observed. Winters are wet, with frequent passage of Pacific storms, and temperatures are mild. The overall climate at the project site is dominated by the semi-permanent eastern Pacific high pressure system centered off the coast of California. In the summer, the high pressure system results in strong northwesterly flows and negligible precipitation. In the winter, storms originating in the Gulf of Alaska reach northern California, bringing

wind and rain. As winter storms move in, the prefrontal winds are generally from the southeast to southwest. Over the Humboldt Bay area, the hills generally deflect these winds south to southeast. After frontal passage, the winds are generally from the north to northwest (PG&E 2006a).

Ambient temperatures in the project area are moderated because of its proximity to Humboldt Bay. During the summer months, average maximum temperatures are under 65°F. Average maximum winter temperatures are about 55°F. Average minimum temperatures are between 40 and 45°F in winter. During the rainy season, generally November through March, Eureka receives 75 percent of its average rainfall, with most of the rain falling during December and January. The average annual rainfall is 39 inches (WRCC 2007).

The terrain in the vicinity of the Humboldt Bay Power Plant (HBPP) rises rapidly from the bay on the north side to an elevation of less than 100 feet at Buhne Point peninsula. Terrain to the north and east of the site is generally flat. To the south and east, the terrain rises rapidly, forming Humboldt Hill, which reaches an elevation of over 500 feet within 2 miles of the project and is the site of several small neighborhoods. Humboldt County is mostly mountainous except for the level plain that surrounds Humboldt Bay (PG&E 2006a).

The climate affects the pollution potential of the area, especially during the late fall and winter, when particulate matter levels are highest. Colder, more stagnant conditions during this time of the year are conducive to the buildup of PM, including the formation of secondary ammonium nitrate. In addition, increased emissions from residential fireplaces and wood stoves during this time of year contribute to increased direct particulate emissions (PG&E 2006a).

AMBIENT AIR QUALITY STANDARDS

The United States Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (ARB) have both established allowable maximum ambient concentrations of criteria air pollutants, based upon public health impacts called ambient air quality standards. The California Ambient Air Quality Standards (CAAQS), established by ARB, are typically lower (more stringent) than the federally established National Ambient Air Quality Standards (NAAQS). The federal Clean Air Act requires the periodic review of the science upon which the standards are based and the standards themselves.

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

Current state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of

material per unit volume of air, in milligrams (mg or 10^{-3} g) or micrograms (μg or 10^{-6} g) of pollutant in a cubic meter (m^3) of ambient air, drawn over the applicable averaging period.

AIR QUALITY Table 2
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm ($180 \mu\text{g}/\text{m}^3$)	None
	8 Hour	0.070 ppm ($137 \mu\text{g}/\text{m}^3$)	0.075 ppm ($147 \mu\text{g}/\text{m}^3$)
Respirable Particulate Matter (PM10)	24 Hour	$50 \mu\text{g}/\text{m}^3$	$150 \mu\text{g}/\text{m}^3$
	Annual	$20 \mu\text{g}/\text{m}^3$	None
Fine Particulate Matter (PM2.5)	24 Hour	None	$35 \mu\text{g}/\text{m}^3$
	Annual	$12 \mu\text{g}/\text{m}^3$	$15 \mu\text{g}/\text{m}^3$
Carbon Monoxide (CO)	1 Hour	20 ppm ($23 \text{mg}/\text{m}^3$)	35 ppm ($40 \text{mg}/\text{m}^3$)
	8 Hour	9 ppm ($10 \text{mg}/\text{m}^3$)	9 ppm ($10 \text{mg}/\text{m}^3$)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm ($338 \mu\text{g}/\text{m}^3$)	None
	Annual	0.030 ppm ($56 \mu\text{g}/\text{m}^3$)	0.053 ppm ($100 \mu\text{g}/\text{m}^3$)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm ($655 \mu\text{g}/\text{m}^3$)	None
	3 Hour	None	0.5 ppm ($1300 \mu\text{g}/\text{m}^3$)
	24 Hour	0.04 ppm ($105 \mu\text{g}/\text{m}^3$)	0.14 ppm ($365 \mu\text{g}/\text{m}^3$)
	Annual	None	0.03 ppm ($80 \mu\text{g}/\text{m}^3$)

Source: ARB, April 2008.

The California Air Resources Board and the U.S. EPA designate regions where ambient air quality standards are not met as “nonattainment areas.” Where a pollutant exceeds standards, the federal and state Clean Air Acts both require air quality management plans that demonstrate how the standards will be achieved. These laws also provide the basis for implementing agencies to develop mobile and stationary source performance standards.

EXISTING AMBIENT AIR QUALITY

Air Quality Table 3 summarizes the attainment status of the air quality in the NCUAQMD. Violations of federal and state ambient air quality standards generally do not occur, except for particulate matter, which violates the state standards in almost every part of California.

AIR QUALITY Table 3
Attainment Status of North Coast Unified Air Quality Management District

Pollutants	Federal Classification	State Classification
Ozone	Attainment/Unclassified	Attainment
PM10	Attainment	Nonattainment
PM2.5	Attainment	Attainment/Unclassified
CO	Attainment	Attainment
NO₂	Attainment	Attainment
SO₂	Attainment	Attainment

Source: ARB 2007 (<http://www.arb.ca.gov/degis/degis.htm>).

Nonattainment Pollutants

The criteria pollutant of primary concern in the NCUAQMD is particulate matter, which occurs at levels above the state PM10 standard. **Air Quality Table 4** summarizes the existing ambient monitoring data for particulate matter (PM10 and PM2.5) collected by ARB and NCUAQMD from monitoring stations closest to the project site. Data marked in **bold** indicates that the most-stringent current standard was exceeded. Note that an exceedance is not necessarily a violation of the standard, and that only persistent exceedances lead to designation of an area as nonattainment.

AIR QUALITY Table 4
Highest Existing Ambient Concentrations (µg/m³) for the 'I' Street, Eureka Monitoring Station

Pollutant	Averaging Time	2002	2003	2004	2005	2006
PM10	24 hour	38.0	71.1	63.9	71.0	72.2
PM10	Annual	22	21	20.7	13.6	21.1
PM2.5	24 hour	23.7	36.1	25.6	31.8	35.0
PM2.5	Annual	7.9	---	8.2	---	7.6

Source: ARB, Air Quality Data Statistics; (<http://www.arb.ca.gov/adam/welcome.html>). Accessed April 23, 2008.

Note: PM10 based on California monitoring methods.

Respirable Particulate Matter (PM10)

PM10 is a mixture of particles and droplets that vary in size and chemical composition, depending upon the origin of the pollution. An extremely wide range of sources, including natural causes, most mobile sources, and many stationary sources, causes emissions that directly and indirectly lead to increased ambient particulate matter. This makes it an extremely difficult pollutant to manage. Particulate matter caused by any combustion process can be generated directly by burning the fuel, but it can also be formed downwind when various precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulate matter since the contaminants are not directly emitted, but are rather indirectly formed as a result of precursor emissions.

Gaseous contaminants such as NO_x, SO₂, organic compounds, and ammonia (NH₃) from natural or man-made sources can form secondary particulate nitrates, sulfates, and organic solids. Secondary particulate matter is mostly finer PM₁₀, whereas particles from dust sources tend to be the coarser fraction of PM₁₀.

Pollutants that Attain the Ambient Air Quality Standards

Fine Particulate Matter (PM_{2.5})

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

PM_{2.5} is mainly a product of combustion and includes nitrates, sulfates, organic carbon (ultra-fine dust), and elemental carbon (ultra-fine soot). Almost all combustion-related particles, including those from wood smoke and cooking, are smaller than 2.5 microns. Nitrate and sulfate particles are formed through complex chemical reactions in the atmosphere. Particulate nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NO_x emissions from combustion sources. The nitrate ion concentrations during the winter make up a large portion of the total PM_{2.5}. Ammonium sulfate is also a concern because of the ready availability of ammonia in the atmosphere. The ambient PM_{2.5} data collected at Eureka (**Air Quality Table 4**) indicates that existing conditions occasionally approach the new 35 µg/m³ daily NAAQS and exceeded it in 2003.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NO_x and VOC, which interact in the presence of sunlight and warm air temperatures to form ozone. Locations in coastal Humboldt County do not provide the sunlight and warm temperatures to cause abundant ozone concentrations. Humboldt County generally shows higher ozone concentrations in the winter months, rather than the summer months. Because the higher ozone concentrations occur in the absence of conditions that would cause the formation of photochemical ozone, this indicates that the ozone in the Eureka area is not primarily photochemical but is mostly natural background or, under certain conditions, is related to stratospheric ozone intrusion (PG&E 2006a).

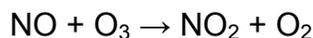
Carbon Monoxide

Carbon monoxide (CO) is a by-product of incomplete combustion common to any fuel-burning source. Ambient concentrations of CO vary substantially depending upon the proximity of the source since the pollutant disperses quickly and oxidizes in the air. Mobile sources are the principal sources of CO emissions, and they have historically been the focus of regional and statewide strategies to attain and maintain CO ambient air quality standards. Ambient CO concentrations attain the standards due to two statewide programs for all mobile sources: the 1992 wintertime oxygenated gasoline program, and Phases I and II of the reformulated gasoline program. New vehicles with

oxygen sensors and fuel injection systems have also helped reduce CO emissions. Because ARB has not conducted CO monitoring in Humboldt County since 1991 (ARB 2006a), the nearest local data comes from Mendocino County (Willits and Ukiah).

Nitrogen Dioxide

Approximately 90 percent of the NO_x emitted from combustion sources is in the form of nitric oxide, while the balance is NO₂. Nitric oxide (NO) is oxidized in the presence of ozone to form NO₂, but some level of photochemical activity is needed for this conversion. High concentrations of NO₂ tend to occur during the fall (not in the winter) when atmospheric conditions tend to trap ground-level releases but lack significant photochemical activity (less sunlight). In the summer, the conversion rates of NO to NO₂ are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) tend to engage the NO in reactions with ROC to create ozone and also disperse the NO₂. The formation of NO₂ in the summer, with the help of the ozone, is according to the following reaction:



Urban areas typically have high daytime ozone concentrations that drop substantially at night as the above reaction takes place when ozone scavenges the available NO. If ozone is unavailable to oxidize the NO, less NO₂ will form because the reaction is “ozone-limited.” This reaction explains why, in urban areas, ground-level ozone concentrations drop at night, while aloft and in downwind rural areas (without sources of fresh NO emissions), ozone concentrations can remain relatively high.

New state one hour and annual average ambient air quality standards for NO₂ became law in February 2008. Attainment designations have yet to be established for the new, more stringent standards, but violations of the new NO₂ standards are not likely to occur in any California air basin (except possibly South Coast and areas bordering Mexico). Background airborne conditions of NO₂ in the project area (Willits and Ukiah) have been approximately 0.009 ppm annually, or 17 µg/m³ over the past three years, compared to the new annual standard of 0.030 ppm (56 µg/m³); and highest hourly NO₂ concentrations of 0.05 ppm are less than one-third of the new 0.18 ppm standard (ARB 2008). As such, NCUAQMD appears likely to attain the new standards.

Sulfur Dioxide

Sulfur dioxide is typically emitted as a result of the combustion of fuels containing sulfur. When high levels are present in ambient air, SO₂ leads to sulfite particulate formation and acid rain. Natural gas and California diesel fuel contain very little sulfur and so therefore result in very little SO₂ emissions when burned. By contrast, high sulfur fuels like coal emit large amounts of SO₂ when burned. Sources of SO₂ emissions come from every economic sector and include a wide variety of gaseous, liquid, and solid fuels. The entire state is designated attainment for all SO₂ ambient air quality standards. The nearest recent monitoring station for SO₂ is in the San Francisco Bay Area air basin.

Summary of Existing Ambient Air Quality

The local and recent ambient air quality data show existing violations of ambient air quality standards for PM₁₀ in the baseline conditions. Staff uses the highest local

background ambient air concentrations over the past three years as the baseline for staff's analysis of potential ambient air quality impacts for the proposed HBRP. The highest concentrations are shown in **Air Quality Table 5**.

AIR QUALITY Table 5
Highest Local Background Concentrations ($\mu\text{g}/\text{m}^3$)

Pollutant	Location	Averaging Time	Background	Limiting Standard	Percent of Standard
PM10	Eureka	24 hour	72.2	50	144
		Annual	21.1	20	106
PM2.5	Eureka	24 hour	35.0	35	100
		Annual	8.2	12	68
CO	Ukiah	1 hour	3,250	23,000	14
		8 hour	1,978	10,000	20
NO₂	Ukiah	1 hour	75.2	338	22
		Annual	17.0	56	30
SO₂	San Francisco	1 hour	114.4	655	17
		24 hour	21.0	105	20
		Annual	5.8	80	7

Source: AFC Table 8.1-25 (PG&E, September 2007), updated with ARB 2008.

REGIONAL SETTING

The existing HBPP consists of two electric utility steam boilers (Units 1 and 2, 105 MW combined) and two peaking combustion turbines (Mobile Emergency Power Plants (MEPPs 2 and 3), 30 MW combined). The existing steam boilers operate on either natural gas or #6 fuel oil while the MEPPs operate only on distillate fuel. Annual generation at the existing HBPP historically has not exceeded 700,000 megawatt-hours (MWh), which represents an annual average capacity factor of less than 60 percent for the 135 MW existing HBPP (Response to DR8).

The boilers at HBPP are dual-fuel fired to use liquid fuel at times of natural gas curtailments. The liquid fuel supply is brought to the region via barge or tanker truck from refiners in the San Francisco Bay Area and stored onsite. During storms, tanker trucks are normally the only way of delivery.

Natural gas supply curtailments, rare in most parts of California, occur commonly in the Humboldt area during cold weather conditions, characterized by average daily temperatures of less than 50°F (AFC Section 6.1). The HBPP is a "noncore" customer of natural gas, which means that the natural gas supply to the existing HBPP and the proposed HBRP is "interruptible." PG&E's gas operations that are governed by and approved by the California Public Utilities Commission (CPUC) dictate that the natural gas supply to "noncore" customers be curtailed when natural gas is needed by "core" (i.e., residential) customers. The determination as to whether gas supplies need to be curtailed (and whether gas supplies to HBRP would need to be curtailed in the future) on any single day depends on the forecast for electrical demand and dispatch issued by the California Independent System Operator (CAISO) and a forecast for natural gas consumption by other noncore and core customers prepared by PG&E's gas

operations. These forecasts are made daily, and are dependent on weather conditions as well as other factors (Responses to DR 4 and 5, Jan 12, 2007).

Natural gas and oil fuel switching historically has occurred at HBPP due to economic reasons and to manage the inventory of oil stored onsite (Response to WSQ-4, Feb 13, 2007). PG&E examined the effects of historic natural gas supply interruptions in the region, testing, and maintenance and found that on average during 1994 to 2006, oil had been burned in the boilers and MEPPs to generate about 7,500 MWh per year (or 46 full-load hours per year of the proposed HBRP as in Table WSQ4-2, Feb 13, 2007).

Air Quality Table 6 shows the rate of distillate fuel and fuel oil consumption for the existing HBPP.

AIR QUALITY Table 6
Historic Liquid Fuel Consumption at HBPP (MMBtu/year)

Year	HBPP Boilers	HBPP MEPPs	Total
2006	91,940	191,126	283,065
2005	0	175,583	175,583
2004	0	192,472	192,472
2003	5,496	230,932	236,428
2002	4,475	117,539	122,014
2001	2,665,729	281,249	2,946,978
2000	147,495	489,771	637,267
1999	0	134,482	134,482
1998	8,297	73,479	81,777
1997	0	16,306	16,306
1996	130,325	53,665	183,990
1995	398,104	27,944	426,048
1994	11,225	24,978	36,203
1993	137,725	9,694	147,419

Source: Response to Data Request 7, Table DR7-1 and Workshop Data Request Table WSQ4-1 (Feb 13, 2007), liquid fuel consumption for all reasons including natural gas curtailments, emergencies, maintenance, and economic fuel switching.

The historic actual emissions from HBPP from 2004 through the application filing date in September 2006 are documented by PG&E (AFC Table 8.1A-1) and summarized in **Air Quality Table 7**.

AIR QUALITY Table 7
Existing HBPP Annual Average Emissions (tons per year)

Emission Source	NOx	ROC	PM10	PM2.5	CO	SOx
HBPP Unit 1 (HB 1)	464.2	11.6	10.1	10.1	53.4	0.8
HBPP Unit 2 (HB 2) *	432.8	11.9	12.3	12.3	55.0	28.0
HBPP Turbine 2 (MEPP 2)	19.3	0.5	2.5	2.5	2.0	0.6
HBPP Turbine 3 (MEPP 3)	20.4	0.5	2.4	2.4	1.9	0.6
Total Existing HBPP* (September 29, 2004 to September 28, 2006)	936.8	24.5	27.4	27.4	112.3	30.0
Total Existing HBPP (January 1, 2004 to December 31, 2005)	892.5	23.4	24.9	24.9	112.3	3.8

Source: AFC Table 8.1-9 and Table 8.1A-1, average from September 29, 2004 to September 28, 2006, (*) includes natural gas curtailments for all units and emergency use of HBPP Unit 2 on fuel oil in August and September 2006. Existing emission for baseline purposes from January 1, 2004 to December 31, 2005 do not include emergency use of fuel oil (PG&E 2008a).

Ambient Air Quality Effects of Existing HBPP

PG&E examined the ambient air quality effects of existing HBPP operations using a dispersion modeling analysis. The analysis was conducted using a methodology similar to the applicant's methodology for determining HBRP impacts (see **Modeling Methodology for HBRP**). The maximum modeled concentrations due to HBPP operations are not additive to the background concentrations because the background concentrations include HBPP along with the effects of all other existing sources, and the concentration data are taken from different times.

Air Quality Table 8 shows the effects of existing HBPP operations in comparison with the standards and relevant background conditions. The existing HBPP does not cause any localized violations of ambient air quality standards, but according to modeling results, high levels of NO₂ may be caused by the existing power plant.

AIR QUALITY Table 8
Existing HBPP Ambient Air Quality Effects (µg/m³)

Pollutant	Averaging Time	Maximum Modeled Concentration	Limiting Standard	Background
PM10	24 hour	7.8	50	72.2
	Annual	0.3	20	21.1
PM2.5	24 hour	7.8	35	35.0
	Annual	0.3	12	8.2
CO	1 hour	110	23,000	3,250
	8 hour	55	10,000	1,978
NO₂	1 hour	267.3	338	75.2
	Annual	9.1	56	17.0
SO₂	1 hour	10	655	114.4
	24 hour	2.6	105	21.0
	Annual	0.04	80	5.8

Source: Response to Data Request 12, Table DR12-1, (PG&E Jan 12, 2007).

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The HBRP would include the following new stationary sources of emissions:

- Ten dual fuel-fired reciprocating internal combustion engine-generator sets, each 16.3 MW (gross), 22,931 bhp, Wärtsilä model 18V50DF, with each engine abated by a selective catalytic reduction (SCR) system and an oxidation catalyst. Natural gas/diesel pilot use would be limited to an equivalent of 6,447 operating hours per year, and proposed operation in diesel mode would be limited to no more than 1,000 engine-hours per year (NCUAQMD 2008a);
- one nominal 350 kilowatt (kW) Caterpillar model DM8149, diesel fuel-fired emergency engine-generator set (i.e., “black start” engine), 469 bhp; and
- one diesel fuel-fired emergency engine to power a fire water pump nominally rated at 210 bhp.

Under normal operations, each of the ten Wärtsilä engines would fire natural gas with a diesel fuel pilot. The maximum heat input for each Wärtsilä engine would be 143.6 million British thermal units (Btu) per hour (MMBtu/hr) of natural gas at the higher heating value (HHV) with a 0.8 MMBtu/hr diesel fuel pilot.

As described in the AFC (Section 2.7.3), there are circumstances when the project would be subject to natural gas curtailment as required by PG&E’s California Public Utility Commission Gas Tariff Rule 14. During cold winter circumstances, the priority for natural gas consumption would be residential customers in the Humboldt County region. The requirements of Rule 14 (C)(1)(b) outlines the steps PG&E would take due to local constraints such as in the Humboldt County area that affect Noncore End-Use Customers. Staff understands that the existing HBPP and the proposed HBRP are Noncore End-Use Customers, and thus their natural gas supply could be constrained. Staff treats the natural gas supply constraint as a foreseeable circumstance and evaluates the project under the assumption that curtailments could occur at any time and could be lengthy. Yet, staff also recognizes that temporary loss of the natural gas supply is not within reasonable control of the applicant or power plant operator. The NCUAQMD maintains a position that operation under the CPUC Gas Tariff Rule is not a contractual obligation (NCUAQMD 2008c), implying that it is a regulatory obligation. When forced to operate in diesel mode due to a natural gas curtailment, the engines would go into “emergency use” as defined in the statewide Airborne Toxic Control Measure [17 CCR Section 93115.4(30)].

During natural gas curtailments and emergencies,¹ any number of the Wärtsilä engines could be fired exclusively on diesel fuel. All engines would use ARB ultra-low-sulfur (0.0015 percent or 15 ppm sulfur by weight) diesel fuel. The emergency generator and fire pump engines would be U.S. EPA Tier 3 certified.

¹ NCUAQMD has determined that natural gas curtailments may trigger “emergency use” of the dual-fuel engines under the ATCM [17 CCR Section 93115.4(30)] (NCUAQMD 2008c). Diesel fuel firing could occur under other circumstances that also qualify under the broader definition of “emergency” (NCUAQMD 2008a): *operation arising from a sudden and reasonably unforeseeable event beyond the control of the permittee (e.g., an act of God) which causes the excess of a limitation under this permit and requires immediate and corrective action. An “emergency” does not include noncompliance as a result of improperly designed or installed equipment, lack of preventative maintenance, careless or improper*

The HBRP would also require shutdown of the existing HBPP Units 1 and 2 and MEPPs following commissioning of the new HBRP, to obtain emission reduction credits. Demolition of HBPP and other activities on the site related to decommissioning Unit 3 are not part of the proposed HBRP (see **Project Description**) but demolition of Units 1 & 2 is a reasonably foreseeable result from construction of HBRP. Emissions caused during the construction phase for HBRP, initial commissioning, and operation are described here.

Proposed Construction Emissions

Construction of HBRP is expected to take about 18 months preceded by one additional month of road construction and two months of site clearing (AFC Appendix 8.1D). During the construction period, air emissions would be generated from the exhaust of heavy equipment and fugitive dust from removing existing structures on the site and from activity on unpaved surfaces. Site development would require minimal grading or earthmoving activities because both the site and the temporary construction parking areas along King Salmon Avenue are essentially flat. Construction activities would occur in the following main phases:

- Road construction (the new access road and potable water pipeline along the east side of the Intake Canal);
- Site preparation (demolition of the painting and sandblasting building, storage building and diesel tank basin from the HBRP project site; installation of drainage systems, underground utilities, and conduits; grading and backfilling; and installation of pilings);
- Foundation work;
- Installation of major mechanical and electrical equipment; and
- Construction/installation of major structures.

The types of activities that cause construction emissions would include heavy equipment use and fugitive dust activities, along with ocean freighter and heavy haul tractor transport of the engines and generators (AFC Appendix 8.1D).

Fugitive dust emissions from the construction of the project will result from:

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

Combustion emissions during construction will result from:

- Exhaust from the diesel construction equipment used for site preparation, grading, excavation, trenching, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;

operation, or operator error.

- Exhaust from portable welding machines;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site;
- Exhaust from automobiles used by workers to commute to the construction site; and
- Exhaust from portable generators and light carts.

Estimates of the highest daily emissions and total annual emissions for the entire construction period are shown in **Air Quality Table 9** and **Table 10**, respectively.

AIR QUALITY Table 9
HBRP Estimated Maximum Daily Construction Emissions (lb/day)

Activity	NO _x	ROC	PM ₁₀	PM _{2.5}	CO	SO _x
On-site Fugitive Dust	---	---	12.5	1.6	---	---
On-site Equipment Exhaust	111.9	27.5	3.4	3.4	321.4	0.2
Off-site Truck and Worker Travel	240.6	47.0	5.5	5.5	411.4	0.4
Off-site Barge Transport	253.9	312.8	14.7	14.7	0.2	36.8
Off-site Heavy Haul Tractor	12.6	0.4	0.4	0.4	4.6	<0.1
Total On-site Daily Emissions	111.9	27.5	15.9	6.0	321.4	0.2

Source: AFC Appendix 8.1D, Tables 8.1D-3 and 8.1D-4.

AIR QUALITY Table 10
HBRP Estimated Annual Construction Emissions (tons/year, tpy)

Activity	NO _x	ROC	PM ₁₀	PM _{2.5}	CO	SO _x
On-site Fugitive Dust	---	---	1.1	0.1	---	---
On-site Equipment Exhaust	10.9	2.3	0.3	0.3	26.9	<0.1
Off-site Truck and Worker Travel	13.5	3.6	0.3	0.3	31.7	<0.1
Off-site Barge Transport	2.5	0.4	0.2	0.2	3.1	<0.1
Off-site Heavy Haul Tractor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Annual Emissions	27.0	6.3	1.9	0.9	61.7	<0.1

Source: AFC Appendix 8.1D, Table 8.1D-4, with total 20 one-day round-trips for barge and heavy haul tractor transport.

Proposed Initial Commissioning Emissions

New power generation facilities must go through initial firing and commissioning phases before becoming commercially available to generate electricity. During this period, emissions exceed those that occur during normal operations because of numerous start-ups and shutdowns, periods of low load operation, and other testing that is required before emission control systems are fine-tuned for optimum performance.

The NCUAQMD allows up to 100 hours of operation per engine without full emissions controls, limited to discrete commissioning activities that can only be properly executed without full operation of the SCR or oxidation catalyst systems (NCUAQMD 2007).

Air Quality Table 11 presents the maximum allowed short-term emissions of NO_x, CO, and ROC. PM₁₀, PM_{2.5}, and SO₂ emissions are not included here since they are proportional to fuel use, and fuel use during commissioning is equal to that during full load operations.

AIR QUALITY Table 11
HBRP Maximum Initial Commissioning Emissions

Source	NO_x	ROC	CO
Ten Internal Combustion Engines (lb/hr)	323.3	86.6	197.2
Ten Internal Combustion Engines (lb/day)	4,365	1,559	2,662

Source: FDOC Condition 119, Table 5.9, NCUAQMD 2008a.

Operation Emission Controls

NO_x Controls

Exhaust from each of the primary engines will be treated by an SCR system before being released into the atmosphere. SCR refers to a process that chemically reduces NO_x to elemental nitrogen and water vapor by injecting ammonia (NH₃) into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NO_x rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient conversion of NO_x to nitrogen and water vapor requires the uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

ROC and CO Controls

Engine emissions of CO and unburned hydrocarbons, including ROC, would be controlled with an oxidation catalyst installed in conjunction with the SCR catalyst. An oxidation catalyst system chemically reacts with organic compounds and CO with excess oxygen to form carbon dioxide (CO₂) and water. Unlike the SCR system for reducing NO_x, an oxidation catalyst does not require any additional chemicals.

PM₁₀/PM_{2.5} and SO_x Controls

Use of pipeline-quality natural gas, a clean-burning fuel that contains very little sulfur or noncombustible solid residue, and ARB ultra-low sulfur diesel fuel will limit the formation of SO_x and particulate matter. Natural gas does contain small amounts of a sulfur-based scenting compound known as mercaptan, which results in some SO_x emissions when burned. The applicant and the NCUAQMD both expect the annual average natural gas sulfur content to be less than 0.33 grains per 100 cubic feet at standard temperature and pressure (0.33 gr/100 scf). SO_x emissions would be very low using these fuels.

Use of diesel fuel would cause relatively high levels of particulate matter when compared to exclusive use of natural gas.² PG&E expects to achieve a certain amount

² Exclusive firing of natural gas in internal combustion engines can achieve levels under 0.02 grams-per-brake horsepower-hour (g/bhp-hr) of PM₁₀/PM_{2.5}, which would be about one-tenth of what would be

(a reduction of 30%) of diesel particulate matter control with the oxidation catalysts (Response to Data Request 94, October 2007). This control effectiveness is made implicit by PG&E by proposing to achieve emissions below the manufacturer's guarantee. A limit on the hours of diesel mode operation (**AQ-104**) would ensure PG&E meets the lower emissions level, and initial and ongoing performance testing (required by **AQ-104**, **AQ-163**, and **AQ-164**) may be used to verify diesel particulate matter emissions below the manufacturer's guarantee.

Proposed Operation Emissions

Criteria pollutant emissions from each of the ten 22,931 bhp Wärtsilä 18V50DF reciprocating internal combustion engines are based upon the applicant's proposal of:

- dual-fuel firing capability in two modes: "natural gas/diesel pilot mode" with a small amount of diesel as a pilot injection fuel; and "diesel mode" firing exclusively liquid fuel;
- NO_x emissions in natural gas/diesel pilot mode controlled to 6 parts per million by volume, dry basis (ppmvd) corrected to 15 percent oxygen, averaged over any 3-hour period and 35 ppmvd in diesel mode;
- PM₁₀ emissions of 3.6 lb/hr per engine in natural gas/diesel pilot mode (equivalent to 0.072 grams per horsepower-hour) up to 10.8 lb/hr per engine (0.214 g/bhp-hr) in diesel mode;
- sulfur emissions limited by the average natural gas sulfur content of less than 0.33 grains per 100 cubic feet at standard temperature and pressure (0.33 gr/100 scf) and use of ARB ultra-low-sulfur (0.0015 percent or 15 ppm sulfur by weight) diesel fuel;
- ammonia slip (NH₃) controlled to 10 ppmvd at 15 percent O₂ for any 3-hour period;
- operations limited by fuel and emissions limits equivalent to 6,547 full-load hours annually for each engine, with no more than 1,000 engine-hours annually in diesel mode (**AQ-138**), which provides an annual capacity factor of 74.74 percent (NCUAQMD 2008a); and
- startups and shutdowns limited to no more than 365 hours in startup (0.5 hr per event) or shutdown (8.5 minutes per event) for each engine per year.

The ability of the proposed internal combustion engines to start quickly and reach operating capacity within 30 minutes minimizes the variability of emissions that can typically occur when operating in a peaking mode. The ability to incrementally dispatch each of the ten engines also minimizes the emissions that would occur during partial load operation.

Air Quality Table 12 summarizes basic fuel specifications and exhaust concentrations based on the maximum (worst-case) estimated emissions during operation, and **Air Quality Tables 13** through **15** summarize the maximum (worst-case) estimated emissions during operation.

emitted in diesel mode. The factor of 0.02 g/bhp-hr is from Table I-2 of the California Air Resources Board's (ARB) "*Guidance for the Permitting of Electrical Generation Technologies*" dated July 2002.

AIR QUALITY Table 12
HBRP Wärtsilä Fuel Specifications and Maximum Exhaust Concentrations

Parameter	Natural Gas/Diesel Pilot Mode	Diesel Mode
Fuel Higher Heating Value (HHV)	1,021 Btu/scf	136,903 Btu/gal
Nominal Heat Input Rate per Wärtsilä Engine	143.9 MMBtu/hr gas (plus 0.8 MMBtu/hr diesel pilot)	148.9 MMBtu/hr
Annual Heat Input Rate (Ten Wärtsilä Engines)	9,329,000 MMBtu/yr	148,900 MMBtu/yr *
NOx	6.0 ppmvd	35.0 ppmvd
ROC	28.0 ppmvd	40.0 ppmvd
PM10	3.6 lb/hr-engine (0.07 g/bhp-hr)	10.8 lb/hr-engine (0.21 g/bhp-hr)
Diesel Particulate Matter (DPM)	---	5.56 lb/hr-engine (0.11 g/bhp-hr)
CO	13.0 ppmvd	20.0 ppmvd
Sulfur Content	1 gr/100 scf (max) 0.33 gr/100 scf (avg)	15 ppmw
Ammonia Slip (NH ₃)	10 ppmvd	10 ppmvd

Source: AFC Tables 8.1-10 and Tables 8.1-11A and B, Table 8.1-14. Exhaust gas concentrations based on 15% O₂.
 Note: * Based on 1,000 engine-hours per year in diesel mode (FDOC Condition 138, NCUAQMD 2008a).

Emissions from the 469 bhp emergency standby generator engine are based upon:

- NOx emissions limited to 3.47 g/bhp-hr;
- PM10 emissions limited to 0.05 g/bhp-hr;
- exclusive use of ARB ultra-low-sulfur diesel fuel (15 ppmw);
- operation for maintenance and testing not permitted during times of Wärtsilä engine operation in diesel mode (**AQ-144**); and
- operation for maintenance and testing permitted up to 45 minutes in any 60 minute period and not more than 50 hours per year (**AQ-145**).

Emissions from the 210 bhp emergency fire water pump engine are based upon:

- NOx emissions limited to 4.9 g/bhp-hr;
- PM10 emissions limited to 0.14 g/bhp-hr;
- exclusive use of ARB ultra-low-sulfur diesel fuel (15 ppmw);
- operation for maintenance and testing not permitted during times of Wärtsilä engine operation in diesel mode (**AQ-144**) or during same 24-hour period as testing of emergency standby generator (**AQ-143**); and
- operation permitted up to one hour per day and not more than 50 hours per year for maintenance and testing purposes.

Air Quality Table 13 lists the maximum 1-hour emissions from each piece of **proposed** equipment from manufacturer estimates (AFC Table 8.1-15 and 8.1-16, September 2007).

AIR QUALITY Table 13
HBRP Maximum Short-Term Emissions Rates (pounds per hour [lb/hr])

Source	NOx	ROC	PM10/ PM2.5	CO	SO ₂
Natural Gas/Diesel Pilot Mode, Each Wärtsilä Engine (lb per hour with 30-minute startup event)	23.6	17.9	---	24.1	---
Natural Gas/Diesel Pilot Mode, Each Wärtsilä Engine (maximum lb per normal hour)	3.1	5.1	3.6	4.1	0.4
Diesel Mode, Each Wärtsilä Engine (lb per hour with 30-minute startup event)	164	17.2	---	25.5	---
Diesel Mode, Each Wärtsilä Engine (maximum lb per normal hour)	19.9	7.9	10.8	6.9	0.2
Ten Wärtsilä Engines (maximum lb/hr) *	487.2	179.0	108.0	254.6	4.0
Emergency Fire Pump Engine (lb/hr)	2.27	0.23	0.06	0.27	<0.01
Emergency Standby Generator (lb/hr)	3.59	0.41	0.05	0.65	<0.01
Maximum Hourly Limit in PDOC (Applicable to Ten Wärtsilä Engines)	392	---	---	---	---

Source: AFC Table 8.1-15 and 8.1-16, FDOC Condition 92 (NCUAQMD 2008a).

Note: * Basis of maximum lb/hr is worst of either 10 engines in natural gas/diesel pilot startup mode or eight engines in diesel mode with simultaneous startup of two engines in diesel mode (AFC p.8.1-29).

Air Quality Table 14 lists the maximum emissions during any given day of operation from the proposed equipment. These emissions are based upon three startups of each Wärtsilä engine, with the remainder of the day with all ten units in full load operation. The emergency standby generator would only be tested for 45 minutes per day (AFC Table 8.1-17), and the fire pump engine would not operate on any day when the power plant is in diesel mode.

AIR QUALITY Table 14
HBRP Maximum Daily Emissions (lb/day)

Source	NOx	ROC	PM10/ PM2.5	CO	SO ₂
Natural Gas/Diesel Pilot Mode, Ten Wärtsilä Engines (maximum lb per day) *	1,360	1,608	864	1,589	97
Diesel Mode, Ten Wärtsilä Engines (maximum lb per day) *	9,103	2,183	2,592	2,219	52.8
Emergency Standby Generator (lb/day @ 45 min per day for testing)	2.69	0.31	0.04	0.49	0.01
Maximum Daily Limit in PDOC (Applicable to Ten Wärtsilä Engines)	---	---	1,542	---	---

Source: AFC Table 8.1-17 and NCUAQMD 2008a.

Note: * Basis of maximum lb/day is 24 hours of full load with three startups per day per engine (FDOC Conditions 101 and 134) and diesel mode limited to 142 engine-hours per day (FDOC Condition 104, NCUAQMD 2008a).

Air Quality Table 15 lists maximum annual emissions from each source with the federally enforceable total annual emission limits established by the NCUAQMD for the proposed project (**AQ-105**, NCUAQMD 2008a). The permit conditions make the limit on total annual emissions consistent with 6,547 hours of operation and 365 startups and shutdowns annually for each engine.

AIR QUALITY Table 15
HBRP Maximum Annual Emissions (tons per year)

Source	NOx	ROC	PM10/ PM2.5	CO	SO ₂
Ten Wärtsilä Engines (tpy limit)	179.1	190.8	119.8	172.7	4.3
Emergency Fire Pump Engine (tpy)	0.057	0.006	0.002	0.008	<0.01
Emergency Standby Generator (tpy)	0.087	0.010	0.001	0.016	<0.01
Total Maximum Annual Emissions	179.3	190.9	119.8	172.7	4.3

Source: FDOC Condition 105 (NCUAQMD 2008a) and Table 9 (NCUAQMD 2008b).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff characterizes air quality impacts as follows: All project emissions of any nonattainment criteria pollutants (PM10) and precursors (PM2.5, NOx, ROC, SOx, and NH₃) are considered significant and must be mitigated. For short-term construction activities that essentially cease before operation of the power plant, our assessment is qualitative and mitigation consists of controlling construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible. For operating emissions, mitigation includes both the Best Available Control Technology (BACT) and emission reduction credits (ERC) or other valid emission reductions to offset emissions of both nonattainment criteria pollutants and their precursors.

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

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

Dispersion models complete complex, repeated calculations that consider emissions in the context of various ambient meteorological conditions, local terrain, and the built environment. For HBRP, the meteorological data used as an input to the dispersion model includes five years (2001-2005) of hourly wind speeds and directions measured at the Woodley Island meteorological station, combined with upper-air meteorological data for coastal northern California from Oakland.

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

Modeling Methodology for HBRP

The dispersion modeling protocol developed by the applicant for HBRP involves three major U.S. EPA models used together (AFC Attachment 8.1B-1, September 2007). The applicant used the U.S. EPA's Industrial Source Complex Short Term Model (ISCST3, version 02035) as both a screening and refined model to estimate the direct impacts of NO_x, PM₁₀, CO, and SO_x emissions during HBRP construction. Staff accepts the ISCST3 model based on its reliability in predicting impacts, although since 2005, the U.S. EPA has not maintained ISCST3 as a "preferred" model (U.S. EPA 2005).

The applicant uses the American Meteorological Society/Environmental Protection Agency Regulatory Model known as AERMOD (version 06341) for a partial analysis of the operating-phase emissions. AERMOD is a "preferred" model, and the applicant uses it as a screening tool and as a foundation for all refined modeling. The applicant additionally uses a separate "complex terrain" screening model (CTSCREEN) instead of AERMOD for all terrain above the 100-foot stack top.

The U.S. EPA Guideline on Air Quality Models (40 CFR 51, Appendix W) defines AERMOD as the recommended model for refined analysis of stationary sources in all terrain. In promulgating the 2005 Guideline (70 FR 68220, November 9, 2005), the U.S. EPA establishes the scientific merits and adequacy of AERMOD:

“. . . the adequacy of AERMOD's complex terrain approach for regulatory applications is seen most directly in its performance. AERMOD's complex terrain

component has been evaluated extensively by comparing model-estimated regulatory design values and concentration frequency distributions with observations. These comparisons have demonstrated AERMOD's superiority to ISC3ST[sic] and CTDMPPLUS (Complex Terrain Dispersion Model PLUS unstable algorithms) in estimating those flat and complex terrain impacts of greatest regulatory importance. For incidental and unique situations involving a well-defined hill or ridge and where a detailed dispersion analysis of the spatial pattern of plume impacts is of interest, CTDMPPLUS in the Guideline's appendix A remains available." (U.S. EPA 2005)

This indicates that although AERMOD alone provides a refined model suitable for complex terrain, the U.S. EPA also allows CTDMPPLUS for cases involving a well defined hill or ridge and where a detailed dispersion analysis of the spatial pattern of plume impacts is of interest. The applicant believes that Humboldt Hill and the terrain to the south of HBRP presents a unique situation suitable for analysis with CTDMPPLUS. The applicant originally filed impact results using CTDMPPLUS and revised those results in 2008 using the CTSCREEN version of CTDMPPLUS to address concerns raised by U.S. EPA and Energy Commission staff regarding the acceptability of case-specific meteorological data with CTDMPPLUS. The applicant's use of CTSCREEN is allowed by the Guideline; however, staff continues to have concerns that using CTSCREEN with AERMOD is an unnecessary pairing of a screening-level technique with a refined technique, where the recommended model AERMOD would alone be adequate.

Staff avoids this concern by implementing AERMOD alone. Staff believes that AERMOD alone provides a suitable analysis of HBRP impacts in all terrain. AERMOD is a newer model than CTSCREEN that does not involve labor intensive, case-specific, interpretation of data on terrain elevations or model output results. AERMOD, or its predecessor (ISCST3), has been normally used over the past dozen years or more by power plant developers and Energy Commission staff. As such, staff selects AERMOD without using CTSCREEN to create an assessment of impacts that is easily repeatable, transparent, and comparable to assessments of other power plant projects conducted by staff. The NCUAQMD relies upon the applicant's combined modeling with AERMOD and CTSCREEN in its engineering evaluation of HBRP (NCUAQMD 2008b).

Construction Impacts and Mitigation

This section discusses the project's short-term direct construction ambient air quality impacts assessed by the applicant and independently reviewed by Energy Commission staff. The applicant estimated the emissions of the main site construction activities and modeled the impacts using the ISCST3 model for all pollutants except NO₂, which was modeled with the Ozone Limited Method (ISC3-OLM) and the Ambient Ratio Method (ARM).³

³ The OLM is a screening technique that predicts NO₂ formation from NO_x emissions depending on whether sufficient ambient ozone is present. NO₂ formation is directly proportional to, but can also be limited by, ozone concentrations. Higher ambient ozone concentrations enables more conversion of NO_x to NO₂. The NO₂ modeling conducted by the HBRP applicant used maximum annual ozone concentrations from Ukiah, a location expected to have higher peak ozone concentrations than the project site. While Energy Commission staff does not endorse using such geographically disparate data, this approach should not under-estimate overall NO₂ impacts.

Air Quality Table 16 summarizes the results of the modeling analysis for construction activities. The total impact is the sum of the existing background condition plus the maximum impact predicted by the modeling analysis for project activity. The values in **bold** in the Impact and Background columns represent the values that either equal or exceed the relevant ambient air quality standard.

AIR QUALITY Table 16
HBRP Construction-Phase Maximum Impacts ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	27	72.2	99.2	50	198
	Annual	3	21.1	24.1	20	121
PM2.5	24 hour	8	35.0	43.0	35	123
	Annual	1	8.2	9.2	12	77
CO	1 hour	5,231	3,250	8,481	23,000	37
	8 hour	1,138	1,978	3,116	10,000	31
NO₂	1 hour	227	75.2	302.2	338	89
	Annual	20	17.0	37	56	66
SO₂	1 hour	3	114.4	117.4	655	18
	24 hour	0.3	21.0	21.3	105	20
	Annual	0.04	5.8	5.84	80	7

Source: AFC Table 8.1D-7, Sept 07.

The maximum modeled construction-phase impacts are predicted to occur at the eastern fence line between the project site and Highway 101. The concentrations decrease rapidly with distance, typically reduced by half before reaching the highway. At the South Bay Union School, the maximum daily PM10 impacts would be less than one-fifth of the maximum (or less than $5 \mu\text{g}/\text{m}^3$).

Staff believes that particulate matter emissions from construction would cause a significant impact that warrants additional mitigation because they will contribute to existing violations of PM10 ambient air quality standards and potentially cause new violations of the PM2.5 standards. Significant secondary impacts would also occur for PM10 and PM2.5 because construction-phase emissions of particulate matter precursors (including SO_x, NO_x, and ROC) would also contribute to violations of these standards.

The direct construction-phase impacts of NO₂, in conjunction with worst-case background conditions, would not cause new violations of the 1-hour or annual NO₂ ambient air quality standard.

The direct construction-phase impacts of CO and SO₂ would not be significant because construction of the project would neither cause nor contribute to a violation of these standards. Mitigation for construction emissions of PM10, PM2.5, SO_x, NO_x, and ROC would be appropriate for reducing construction-phase impacts to PM10 and PM2.5.

Construction Mitigation

The applicant proposes implementation of a number of control measures to reduce emissions of particulate matter, particulate matter precursors, and ozone precursors in a manner consistent with local air district recommendations, soil erosion control requirements, and nuisance prohibitions (AFC Section 8.1.2.4, PG&E, September 2007). Staff agrees that the applicant's proposed mitigation measures would be effective. The applicant's proposed measures for reducing exhaust emissions from heavy equipment include:

- limiting time spent with the engine idling by shutting down equipment when not in use;
- regular preventive maintenance to prevent emission increases due to engine problems;
- use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- use of low-emitting gas and diesel engines meeting state and federal emissions standards for construction equipment, including but not limited to catalytic converter systems and particulate filter systems.

The following mitigation measures are proposed by applicant to control fugitive dust emissions:

- use either water application or chemical dust suppressant application to control dust emissions from onsite unpaved road travel and unpaved parking areas;
- use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- limit traffic speeds on all unpaved site areas to 15 mph;
- install sandbags or other erosion control measures to prevent silt runoff to roadways;
- replant vegetation in disturbed areas as quickly as possible;
- use wheel washers or wash off tires of all trucks exiting construction site; and
- mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

Because of the predicted significant particulate matter impacts, staff recommends additional construction mitigation measures to reduce construction-phase impacts to a less than significant level. Staff believes that the short-term and variable nature of construction activities warrants a qualitative approach to mitigation. Construction emissions and the effectiveness of mitigation varies widely depending on variable levels of activity, the specific work taking place, the specific equipment, soil conditions,

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

Operation Impacts and Mitigation

The following section discusses ambient air quality impacts that were estimated by Energy Commission staff and the results of screening modeling conducted by the applicant using AERMOD. The applicant also performed a number of direct impact modeling analyses, including both fumigation modeling and modeling for impacts during commissioning that are reviewed here.

Routine Operation Impacts

A refined dispersion modeling analysis was performed to identify off-site criteria pollutant impacts that would occur from routine operational emissions throughout the life of the project. This impact analysis includes both maximum operating and start-up/shutdown scenarios to determine worst-case air quality impacts on both a short-term and an annual basis. The predicted maximum concentrations and impacts during natural gas/diesel pilot mode and diesel mode operating profiles are shown separately in **Air Quality Tables 17** and **18**, respectively.

AIR QUALITY Table 17
HBRP Routine Operation Maximum Impacts in Natural Gas/Diesel Pilot Mode
($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	36.0	72.2	108.2	50	216
	Annual	2.2	21.1	23.3	20	117
PM2.5	24 hour	18.2	35.0	53.2	35	152
	Annual	2.2	8.2	10.4	12	87
CO	1 hour	1,517.8	3,250	4,767.8	23,000	21
	8 hour	646.4	1,978	2,624.4	10,000	26
NO ₂	1 hour *	229.7	75.2	304.9	338	90
	Annual	3.4	17.0	20.4	56	36
SO ₂	1 hour	25.2	114.4	139.6	655	21
	24 hour	4.0	21.0	25.0	105	24
	Annual	0.1	5.8	5.9	80	7

Source: Staff independent analysis using AERMOD, full-receptor grid, and AFC Table 8.1B-4, Sep 2007, except NO₂.
 Note: * NO₂ basis is NO_x emission limit of 392 lb/hr for ten engines (FDOC Condition 92) and OLM modeling results as per AFC Table 8.1-17 and 8.1-22.

AIR QUALITY Table 18
HBRP Routine Operation Maximum Impacts in Diesel Mode ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour *	65.2	72.2	137.4	50	275
PM2.5	24 hour	32.6	35.0	67.6	35	193
CO	1 hour	658.2	3,250	3,908.2	23,000	17
	8 hour	277.5	1,978	2,255.5	10,000	23
NO ₂	1 hour *	261.8	75.2	337	338	100
SO ₂	1 hour	13.7	114.4	128.1	655	20
	24 hour	2.2	21.0	23.2	105	22

Source: Staff independent analysis, using AERMOD, full-receptor grid, and AFC Table 8.1B-4, Sep 2007, except NO₂.
 Note: * PM10 basis is PM10 emission rate of 1,542 lb/day and diesel mode for no more than 142 engine-hours per day (FDOC Condition 104); results assume worst-case mid-load (AFC Case 4D) although limits allow no more than 80 engine-hours per day at loads less than 12 MW (FDOC Condition 137). NO₂ basis is NO_x emission rate of 392 lb/hr for ten engines (FDOC Condition 92) and OLM modeling results as per AFC Table 8.1-27.

Maximum modeled impacts are predicted to occur in the elevated terrain approximately two kilometers directly south of the site. The highest PM10 impacts experienced at the South Bay Elementary School would be less than one-tenth of the overall maximum modeled impact (less than $3.6 \mu\text{g}/\text{m}^3$ daily average in natural gas/diesel pilot mode and less than $6.5 \mu\text{g}/\text{m}^3$ in diesel mode). Residential receptors are located near the point of the maximum modeled PM10 and PM2.5 concentrations on Humboldt Hill and would experience impacts similar to those shown in **Air Quality Tables 17 and 18**.

Staff believes that particulate matter emissions during natural gas/diesel pilot mode and diesel mode operation would cause a significant impact that warrants additional mitigation because they will contribute to existing violations of PM10 ambient air quality

standards and potentially cause new violations of the PM_{2.5} standards. Staff modeling using AERMOD shows that diesel mode operation would cause new violations of the daily PM₁₀ standard; however, the applicant and NCUAQMD modeling using AERMOD and CTSCREEN show that diesel mode operation would not cause daily PM₁₀ impacts over 50 µg/m³. Ambient air quality monitoring would be required (**AQ-176**) to verify the impacts predicted by the various modeling techniques. Significant secondary impacts would also occur for PM₁₀ and PM_{2.5} because emissions of particulate matter precursors (including SO_x, NO_x, and ROC) would also contribute to violations of these standards.

The direct impacts of NO₂, in conjunction with worst-case background conditions, would not cause new violations of the 1-hour or annual NO₂ ambient air quality standard provided that PG&E complies with the 392 lb/hr NO_x emission limit in **Air Quality Table 13 (AQ-92)** at all times.

The direct impacts of CO and SO₂ would not be significant because operation of the project would neither cause nor contribute to a violation of these standards. Mitigation for emissions of PM₁₀, PM_{2.5}, SO_x, NO_x, and ROC during routine operation would be appropriate for reducing impacts to the PM₁₀ and PM_{2.5} standards.

Mitigation for Routine Operation

Mitigation for PM₁₀/PM_{2.5}

HBRP is required by NCUAQMD rules to offset NO_x, ROC, and PM₁₀ emission increases that exceed 25 tons per year. The applicant proposes to use the actual emission reductions that would occur with shutdown of the existing HBPP and one certificate of Emission Reduction Credits (ERC) to offset project emissions of PM₁₀/PM_{2.5}. Staff and the District consider SO_x to be a PM₁₀/PM_{2.5} precursor. The District forecasts a net reduction in both NO_x and SO_x as a result of shutting down the existing HBPP, and staff calculates a slight increase in SO_x (0.5 tons per year), because staff does not count emergency use of fuel oil as part of normal operations in the baseline. Surplus NO_x reductions would offset ROC, PM₁₀, and SO_x emission increases. **Air Quality Table 19** summarizes the reductions that would occur with the applicant's proposed mitigation strategy.

AIR QUALITY Table 19
Summary of Mitigation for HBRP Annual Emissions (tpy)

Emission Reductions	NOx	ROC	PM10/ PM2.5	SOx
Reductions from HBPP Shutdown	892.5	23.4	24.9	3.8
Offsets Provided by HBPP Shutdown	154.3	23.4	24.9	---
Surplus Provided by HBPP Shutdown	738.2	---	---	3.8
Offsets Provided by ERC #07-098-12	---	1.6	6.4	---

Emission Mitigation Balance	NOx	ROC	PM10/ PM2.5	SOx
Proposed HBRP Emission Increases	179.3	190.9	119.8	4.3
Balance (Increases Minus Offsets)	25.0	165.9	88.6	4.3
Balance of NOx	25.0	---	---	---
Balance of ROC in NOx-Equivalent (1:1)	165.9	---	---	---
Balance of PM10 in NOx-Equivalent (3.58:1)	317.2	---	---	---
Total Balance	508.1	---	---	4.3
Do Surplus Reductions Mitigate Increases?	Yes	Yes	Yes	Yes

Source: Air Quality Table 15 and FDOC Engineering Evaluation Table 16 (NCUAQMD 2008b).
Emission Reduction Credits (#07-098-12) from Eel River Sawmills, Redcrest, CA.
NOx-Equivalent: Interpollutant trading ratios: 3.58-to-1.0 for NOx-to-PM10/PM2.5; 1-to-1 for NOx-to-ROC (NCUAQMD 2008b); and approximately 1-to-1 for NOx-to-SOx as PM10/PM2.5 precursors (PG&E 2008a).

The amount of offsets credited to the shutdown of the HBPP is partly driven by PG&E's CPUC Gas Tariff Rule 14. Firing of liquid fuels during natural gas curtailments in the HBPP occur as part of normal operation of the existing power plant. Staff is of the belief that because of the requirement to switch fuels in Gas Tariff Rule 14, the operation of HBPP with liquid fuels does constitute normal operation. Staff however excludes from the baseline certain historic emissions from emergency circumstances, such as fuel-oil firing in Humboldt Bay Power Plant Unit 2 (HB2). During August and September 2006 the supply of natural gas was not available due to a rupture in the natural gas pipeline.

The actual emission reductions of NOx achieved with shutdown of the existing HBPP would fully offset project NOx emissions (see **Air Quality Table 7**), with surplus NOx reductions (i.e., more reductions than increases) after considering the NOx emission increases caused by HBRP. The applicant proposes to use an "interpollutant trade" to exchange surplus NOx reductions for project-related increases of ROC, PM10/PM2.5, and SOx. Based on local meteorology, emission sources, and ambient air quality, the NCUAQMD and ARB developed an interpollutant trading ratio that allows exchange of 3.58 tons of NOx reductions for each ton of proposed PM10/PM2.5 increases (NCUAQMD 2007). Reductions of NOx would be exchanged for proposed ROC increases at a one-to-one ratio, and surplus NOx reductions would also mitigate a small quantity (0.5 tons per year) of SOx increases forecast by staff. With the emission reductions shown in **Air Quality Table 19** and required by proposed Condition of Certification **AQ-SC7**, the proposed PM10/PM2.5 and precursor emissions would be fully offset and project-related impacts to PM10/PM2.5 would be mitigated to a less than significant level.

Secondary Pollutant Impacts

The project's gaseous emissions of NO_x, SO₂, ROC, and ammonia (NH₃) are precursor pollutants that can contribute to the formation of secondary pollutants, ozone, PM₁₀, and PM_{2.5}. The process of gas-to-particulate conversion is complex and depends on many factors, including local humidity and the presence of other compounds. Currently, there are no agency-recommended models or procedures for estimating ozone or particulate nitrate or sulfate formation from a single project. However, because of the known relationships of NO_x and ROC to ozone and of NO_x, SO₂, and NH₃ emissions to secondary PM₁₀ and PM_{2.5} formation, it can be said that unmitigated emissions of these pollutants would contribute to higher ozone and PM₁₀/PM_{2.5} levels in the region. Impacts of NO_x and ROC to ozone concentrations would not be significant because the region does not experience existing violations of the ozone ambient standards, and the project is not likely to cause a new violation of ozone standards. Fully offsetting SO_x as a precursor to PM₁₀/PM_{2.5} as described above would similarly reduce the contribution of SO_x to secondary impacts to a less than significant level.

Ammonia is a particulate precursor but not a criteria pollutant. Reactive with sulfur and nitrogen compounds, ammonia is common in the atmosphere primarily from natural sources or as a byproduct of tailpipe controls on motor vehicles. Ammonia particulate forms more readily with sulfates than with nitrates. Fully offsetting NO_x and SO_x limits the formation of particulate nitrates and sulfates, and the secondary pollutant impacts would be reduced to a less than significant level because compliance with a 10 ppmvd ammonia slip limit would control NH₃ emissions to the extent feasible.

Fumigation Impacts

There is the potential that higher short-term concentrations of pollutants may occur during fumigation conditions. Fumigation conditions are generally short-term in nature and only compared to standards shorter than 24 hours. The applicant analyzed the air quality impacts of HBRP under shoreline fumigation conditions and thermal inversion breakup conditions.

Shoreline fumigation occurs when dense, cool air over water moves onshore and falls, displacing warmer, lighter air over land. The surface and the air over land both tend to heat and cool more rapidly than over water. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if a plume is likely to cross from the stable cooler air and cause elevated ground-level concentrations on the land. Shoreline fumigation was assumed to persist for up to three hours (PG&E CD-ROM, Sep 2007).

Thermal inversion breakup fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground, causing high ground-level pollutant concentrations. Inversion breakup fumigation was assumed to persist 90 minutes (PG&E CD-ROM, Sep 2007).

The analysis of fumigation impacts considers routine emissions of ten engines simultaneously under any mode of operation (except startups) using the SCREEN3

Model (version 96043) (AFC Table 8.1B-6 and Table 8.1B-7). The maximum impacts under shoreline fumigation conditions would occur approximately 0.5 km from the HBRP stacks, and the maximum impacts under inversion breakup fumigation conditions would occur approximately 7 to 9 km from the HBRP stacks. Although the location of maximum impact would change, the short-term project impacts would not exceed the impacts for routine operation shown in **Air Quality Tables 17 and 18**, above. Therefore, no additional mitigation is required for fumigation impacts.

Commissioning-Phase Impacts

The applicant expects initial commissioning to involve no more than five of the dual-fuel engines simultaneously at any one time, for between 30 and 60 days. Performance and emission testing would follow, requiring an additional 45 to 90 days (AFC Section 8.1.2.7.6). Short-term averaging periods are evaluated here because emissions would be limited by conducting most commissioning activities over the span of an 18-hour day with no other operations the remainder of the day (AFC Table 8.1B-10).

Up to 100 hours per engine of operation without full emission controls could occur during commissioning. Impacts due to maximum hourly emission rates of PM10, PM2.5, and SO₂ would occur under similar exhaust conditions as start-up modes, but PM10/PM2.5 impacts would be limited by the periods of non-operation that occur during the days of commissioning. The commissioning-phase impacts of CO and NO₂ would also be similar to those during routine operations. The impacts during commissioning of HBRP are provided in **Air Quality Table 20**.

AIR QUALITY Table 20
HBRP Commissioning-Phase Maximum Impacts (µg/m³)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	14.0	72.2	86.2	50	172
PM2.5	24 hour	7.0	35.0	42.0	35	120
CO	1 hour	1,242	3,250	4,492	23,000	20
	8 hour	529	1,978	2,507	10,000	25
NO₂	1 hour	233.3	75.2	308.5	338	91

Source: AFC Table 8.1-23, with independent staff assessment.

Commissioning activities at HBRP should not result in any significant operational or emission changes at the existing Humboldt Bay Power Plant, except for possible reduced output of HBPP and reduced emissions. For any power that is delivered to the grid by the HBRP units during commissioning, less power generation would be required from the existing plant with a corresponding decrease in emissions (Response to Data Request 13, Jan 12, 2007). **Air Quality Table 8** shows the existing effects of HBPP operations that would be somewhat offset during commissioning of HBRP.

Visibility Impacts

A visibility analysis of the project's gaseous emissions is required for federal PSD review. The Class I areas near HBRP are managed by either the U.S. Forest Service (USFS) or the National Park Service (NPS). The nearest Class I areas and the associated Federal Land Managers (FLM) and distances, are as follows:

- Redwood National Park, NPS, 26 miles (42 km)
- Marble Mountain Wilderness Area, USFS, 62 miles (100 km)
- Yolla Bolly Wilderness Area, USFS, 71 miles (114 km)

The applicant prepared a Class I Impacts Analysis that included a visibility analysis for the nearest Class I areas. The visibility analysis includes two components: (1) a regional haze analysis to determine the change in light extinction in the Class I areas, and (2) a coherent visible plume impact analysis. The NPS conducted an independent analysis (August 29, 2007). The USFS provided comments on the analysis (October 17, 2007) based on 50 hours per engine per year in diesel mode and found no perceptible plume impacts at the USFS wilderness areas. The NPS confirmed (November 16, 2007) that up to 100 hours of burning diesel fuel per engine each year would not constitute a major concern for increased air quality impacts at Redwood National Park. Considering the emission reductions with the HBPP shut-down, the regional haze analysis did not warrant independent re-analysis by the FLMs. Thus, the opinion from the FLMs is that HBRP would not cause significant visibility impacts.

CUMULATIVE IMPACTS AND MITIGATION

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

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

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

- a summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution;
- an analysis of the project's “localized cumulative impacts” when combined with other reasonably foreseeable local sources; and
- a discussion of greenhouse gas emissions and global climate change impacts.

Summary of Projections

The federal and California Clean Air Acts direct local air quality management agencies, in this case, ARB and NCUAQMD, to implement plans and programs that lead to attainment and maintenance of the ambient air quality standards. The NCUAQMD New Source Review program for permitting new and modified stationary sources, and other programs for reducing emissions from mobile sources or area-wide sources, are part of state-wide air quality management plans that apply to sources in the NCUAQMD (including the State Implementation Plan or SIP). Region-wide emission forecasts are routinely compiled by ARB, and they show that the trend of emission increases from electric utilities in Humboldt County should remain stable without substantially increasing from the current conditions to 2020 (ARB 2007).

The NCUAQMD adopted a PM10 Attainment Plan on May 11, 1995 that identified a need for substantial reductions in Eureka-area PM10 emissions from 1991 levels in order to eventually achieve attainment of the 50 $\mu\text{g}/\text{m}^3$ California ambient air quality standard. The plan identified control strategies for the sources that could be reduced most cost effectively, and they included reducing vehicle miles traveled with transportation and traffic control and reducing residential wood burning (NCUAQMD 1995). Although vehicle miles traveled have been generally increasing, total PM10 emissions in Humboldt County have remained stable since 1995. None of the control strategies in the PM10 Attainment Plan would apply to the proposed HBRP. Compliance of the HBRP with the NCUAQMD New Source Review rule would ensure that no net emission increase occurs after considering interpollutant trades, which would ensure that the project would be consistent with the air quality management plans.

Localized Cumulative Impacts

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

Reasonably foreseeable future projects in the area are those that are either currently under construction or in the process of being approved by a local air district or municipality. Projects that have not yet entered the approval process do not qualify as “foreseeable” because they lack the detailed information needed to conduct this analysis. Sources that are presently operational are included in the background concentrations. No foreseeable future projects that would emit more than 10 pounds per day within six miles of HBRP were identified by NCUAQMD when this information was requested (AFC Appendix 8.1F).

Greenhouse Gas Emissions

Global Climate Change and Electricity Production

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in temperature that may result in catastrophic consequences. Indeed, the California Legislature finds that “[g]lobal warming poses a

serious threat to the economic well-being, public health, natural resources, and the environment of California” (Cal. Health & Safety Code, Sec. 38500, Division 25.5, Part 1).

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gas (GHG) or global climate change⁴ emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). The Energy Commission’s 2007 Integrated Energy Policy Report (IEPR) addresses climate change within the electricity, natural gas, and transportation sectors. For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor’s stated goal of a 33% renewable portfolio standard.

In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.⁵ To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The Energy Commission and the Public Utilities Commission are providing recommendations to ARB for how it should reduce emissions in the electricity and natural gas sectors. The agencies recommend a three-pronged approach: (1) require all retail providers in California to achieve all cost-effective energy efficiency, (2) surpass the current 20% renewable portfolio standard requirement, and (3) develop a multi-sector cap and trade system to obtain the remaining reductions in the most cost-effective manner. To date, the agencies have issued two joint recommendation reports, the first involving the tracking and reporting of emissions and the second involving the point of regulation.

The ARB adopted early action GHG reduction measures in October 2007 and will establish statewide emissions caps by economic “sectors” in 2008. By January 1, 2009, ARB will adopt a scoping plan that will identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB staff will then draft regulatory language to implement its plan and will hold additional public workshops on each measure, including market mechanisms (ARB 2006b).

Strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, are identified in the California Climate Action Team’s Report to the

⁴ Global climate change is the result of greenhouse gases, or emissions with global warming potentials, affecting the energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

⁵ Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

Governor (CalEPA 2006). Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). It has not yet been determined by ARB how it will apportion the required reductions; however, it is possible that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the “most bang for the buck”).

SB 1368⁶, also enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit utilities from entering into long-term commitments with any baseload facilities that exceed the Emission Performance Standard of 0.500 metric tons CO₂ per megawatt-hour⁷ (1,100 pounds CO₂/MWh). Specifically, the Emission Performance Standard applies (EPS) to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.⁸ If a project, in-state or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project complies with the EPS.

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

Project Greenhouse Gas Emissions

The generation of electricity using fossil fuels can produce air emissions known as greenhouse gases in addition to the “criteria air pollutants” that have been traditionally regulated under the federal and state Clean Air Acts. Greenhouse gas emissions contribute to the warming of the earth’s atmosphere, leading to climate change. For fossil fuel-fired power plants, these include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N₂O, not NO or NO₂, which are commonly known as NOx or oxides of nitrogen), and methane (CH₄ - unburned natural gas). Also included are sulfur hexafluoride (SF₆) from high voltage equipment, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO₂ emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused/recycled, but are nevertheless documented here as some of the compounds have very large relative global warming potentials.

⁶ Public Utilities Code § 8340 et seq.

⁷ The Emission Performance Standard only applies to carbon dioxide, and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

⁸ See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

Construction

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Measures designed to reduce criteria air pollutant emissions from construction activities will also reduce greenhouse gas emissions. Staff recommended construction conditions include control measures such as limiting idling times and requiring, as appropriate, equipment that meet the latest emissions standards. Staff believes that newer equipment, while not only cleaner, will also be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from vehicle and equipment emission.

Operations

The proposed Humboldt Bay Replacement Project is expected to operate in a modular dispatch to meet local needs and possibly to firm intermittent renewable resources. The primary fuel is natural gas ignited by a small amount of diesel pilot fuel. The engines can switch for a limited number of hours to one hundred percent diesel fuel-firing during natural gas shortages or supply interruptions. Additionally, the onsite emergency fire pump and generator are diesel fired; the GHG emissions from testing these engines are not included in the totals at this time although they may be subject to reporting requirements.

Air Quality Table AQ-21 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO₂-equivalent and totaled. Electricity generation GHG emissions are dominated by CO₂ emissions from the carbon-based fuels; other sources of GHG are small and also are more likely to be easily controlled or reused/recycled, but are nevertheless documented here as some of the compounds have very large relative global warming potentials.

AIR QUALITY Table AQ-21
HPRP, Estimated Potential Greenhouse Gas Emissions

	Project Emissions (metric tons ¹ per year)	Global Warming Potential ²	CO ₂ Equivalent (metric tons per year)
Carbon Dioxide (CO ₂)	501,246	1	501,246
Methane (CH ₄)	127	21	2,665
Nitrous Oxide (N ₂ O)	1	310	310
Hexafluoride (SF ₆)	0	23,900	0
Hydrofluorocarbons (HFCs)	0	---	0
perfluorocarbons (PFCs)	0	7,850 ⁴	0
Total Project GHG emissions – metric tons CO ₂ Equivalent per year			504,223
Total Project MWh per year			1,042,385
Project CO ₂ Emissions Performance - mt CO ₂ /MWh			0.482
Project GHG Emissions Performance - mt CO ₂ -eq/MWh			0.484

1. One metric ton (mt) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

2. The global warming potential is a measure of the chemicals' warming properties and lifetime in the atmosphere relative to CO₂. The value shown is for 100-years. Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (SAR 1996). In 2001, the IPCC published its Third Assessment Report (TAR), which adjusted the GWPs to reflect new information on atmospheric lifetimes and an improved calculation of the radiative forcing of carbon dioxide. However, SAR GWPs are still used by international convention and the U.S. to maintain the value of the carbon dioxide "currency." To maintain consistency with international practice, the California Registry requires participants to use GWPs from the SAR for calculating their emissions inventory.

3. Can vary from 150 to 10,000, depending on the specific HFC.

4. This figure is an average GWP for the two PFCs, CF₄ and C₂F₆.

Source: Independent staff assessment assuming approximately 510 engine hours per year in diesel mode (see **Public Health**).

The proposed project could, on an annual basis, emit over a half a million metric tons of CO₂-eq per year if operated at its maximum permitted level, but this is unlikely. This is because the Humboldt region is somewhat geographically and electrically isolated and the new project, as a replacement of the existing one, will likely be operated similarly to the existing power plant. Currently the existing plant is operated to meet local demand and provide voltage support to allow electricity imports over the existing transmission line from the rest of the PG&E system. From 2002 to 2006, the existing plant produced an average of 391,162 MWh per year at an average rate of 0.694 mt CO₂/ MWh (**Air Quality Table 22**).

Since the project is permitted for more than 60 percent annual capacity factor, it must emit less than 0.500 mt CO₂/MWh to meet the EPS. The project is expected to emit 0.482 mt CO₂/MWh, (CO₂, not CO₂-equivalent), as shown in **Air Quality Table AQ-21**. In reality, the project is expected to operate much less than permit levels due to the relative isolation of the Humboldt region. **Air Quality Table AQ-22** shows the average energy production as 391,162 MWh per year from the existing units from 2003 to 2006. If the proposed project operates to match current demand, it will be well below the potential energy production, shown in **Air Quality Table AQ-21**, and well below a 60 percent capacity factor.

AIR QUALITY Table AQ-22
Existing Humboldt Bay Power Plant Operations and CO₂ Emissions

Year	MWh	GHG emissions (mt CO ₂)	GHG Rate (mt CO ₂ /MWh)
2003	244,810	182,027	0.744
2004	394,596	270,522	0.686
2005	462,274	308,021	0.666
2006	462,967	315,050	0.681
Averages	391,162	268,905	0.694

Source: Independent staff assessment based on Response WSQ4-1.

Air Quality Table AQ-23 compares greenhouse gases from the proposed project to the existing units on an annual average basis using past average electricity production to calculate what electricity the proposed project might reasonably generate and therefore, what amount of CO₂ it will produce. As **Air Quality Table AQ-23** shows, the HBRP is more efficient than the older and higher emitting electricity plant that it would replace. On average, the proposed project would emit 30 percent less CO₂ per MWh and per year than the existing units. It would significantly reduce GHG emissions that currently result from generation at the existing facility.

AIR QUALITY Table AQ-23
Comparison of Existing HBPP and Proposed HBRP CO₂ Emissions

Year	MWh	Existing Units GHG emissions (mt CO ₂)	Proposed Project Comparative GHG emissions (mt CO ₂)	Potential decrease
2003	244,810	182,027	117,998	35.2%
2004	394,596	270,522	190,195	29.7%
2005	462,274	308,021	222,816	27.7%
2006	462,967	315,050	223,150	29.2%
Averages	391,162	268,905	188,540	29.9%

Source: Independent staff assessment based on Response WSQ4-1.

Given the baseline of the existing plant's emissions, replacing the existing plant and operating the more efficient new project at similar levels will result in substantially less GHG emissions at the site. Consequently, the new project would not cause a cumulatively considerable increase in GHG emissions and, thus, no significant cumulative impact.

Moreover, this result promotes the state's efforts to reduce the amount of natural gas used by electricity generation and, thus, greenhouse gas emissions. As the 2007 Integrated Energy Policy Report (CEC 2007a) noted:

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

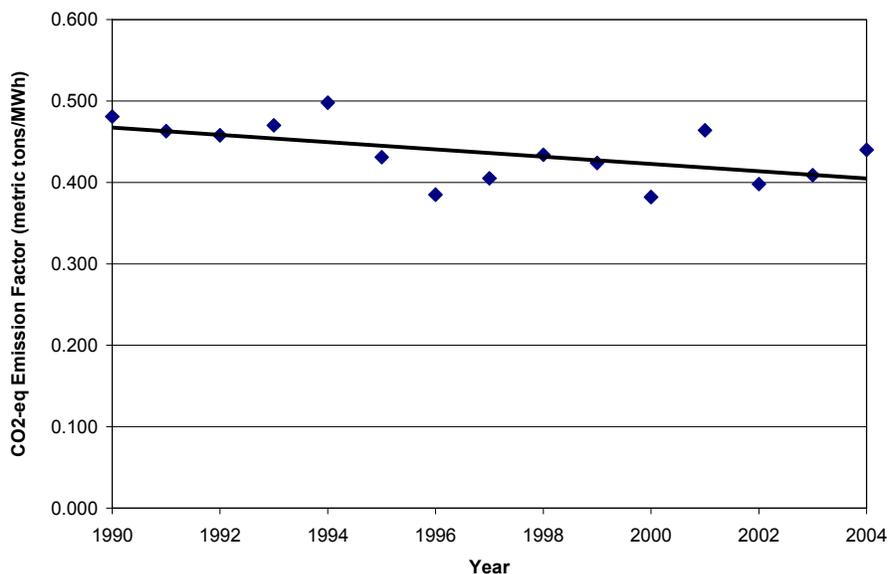
natural gas consumption for electric generation by taking steps to retire older, less efficient natural gas power plants and replace or repower them with new, more efficient power plants. (CEC 2007a, p. 184)

Thus, in both the context of the California Environmental Quality Act and Energy Commission's Integrated Energy Policy Report, the HBRP's replacement of the existing plant causes no significant cumulative impact and furthers the state's strategy to reduce fuel use and GHG emissions.

System Averages

Because most power plants are interconnected to a utility grid, and in turn to the Western Electricity Coordinating Council (WECC), it is also important to look at the proposed project in the context of all electricity systems delivering electricity to California consumers. **Air Quality Figure 1** shows the trends in GHG emission rates for each MWh consumed in California. From 1990 to 2004, California electricity became almost 20 percent "cleaner" on a GHG basis. This improvement was due in part to retirements of dirtier, less efficient plants, despite electricity demand growth of almost 20 percent from 1990 to 2004. Note that the trend line, a linear regression of the annual GHG emission rates, is a better representation of the statewide GHG emission rates than the actual number in any one year. GHG emissions and electricity consumption can vary from year to year due to variations in the availability of hydroelectric power, economic activity, and anomalous events such as the energy crisis of 2000-2001.

AIR QUALITY Figure 1
GHG Emissions per Megawatt-hour Consumed in California



Source: ARB 2008 and CEC 2007.

The proposed project, if it operates at its maximum permitted level, would have a GHG emission rate (0.484 mt CO₂-eq/MWh) that is greater than the system wide average (the trend line in 2004 is approximate 0.400 mt CO₂-eq/MWh). However, the project should not result in a net increase in global GHG emissions because it would operate to

replace energy from the existing HBPP. The new project's emissions are expected to be substantially less (by approximately 30%) than those of the existing power plant the project will replace and, thus, would contribute to improve the overall system average.

However, even if the project was not a direct replacement of a higher-emitting existing power plant, it would be difficult to conclusively determine whether the project would result in a net increase in GHG emissions, for several reasons. Because of the complex interchange among facilities that make up California's electricity system, it is possible that this project could displace electricity that may have otherwise been generated by more GHG intensive facilities, such as out-of-state coal plants. Additionally, facilities of this nature, with quick-start capabilities, are needed to support California's efforts to increase use of renewable resources.

Indeed, the 2007 Integrated Energy Policy Report identifies natural gas generation as a "complementary strategy to meet greenhouse gas emission reductions." It fills the gap that cannot be currently served by renewable generation, provides system stability to integrate new renewable generation, and may ultimately be necessary to displace imported coal generation, which has much higher GHG emissions. As stated in the 2007 IEPR:

Growth in natural gas used to generate electricity may exceed even these estimates under certain greenhouse gas reduction measures. For example, scenario analyses calculated that if a \$60 per ton price were attached to CO₂ emissions, projected levels of coal-generated electricity in the WECC would decline by about 30 to 40 percent in 2020. As a result, natural gas burned to generate electricity in California would increase by about 20 to 70 percent depending on the amount of preferred resources. ...

Reducing the amount of coal used to generate electricity with a combination of preferred resources and natural gas and in the context of \$60 per ton of carbon charge increases natural gas use in California and throughout the WECC.

Natural gas is and will remain the major fuel in California's supply portfolio and must be used prudently as a complementary strategy to reduce greenhouse gas emissions. Not only does the state have a mandate to cut greenhouse gas emissions, it also has a responsibility to provide a reliable and affordable fuel source for home and business use. (CEC 2007a, p. 186)

Therefore, even though we can identify how many gross GHG emissions are attributable to a project, it is difficult to determine whether this will result in a net increase of these emissions, and, if so, by how much. It would, thus, be speculative to conclude that any given project results in a cumulatively significant adverse impact resulting from greenhouse gas emissions.

Additionally, the quickly evolving GHG regulatory efforts currently being formulated may shortly establish the best *fora* for addressing GHG emissions from power plants rather

than attempting to do so on an ad hoc or plant-by-plant basis. The HBRP project would be operational no sooner than the second quarter of 2010. ARB will have set forth each sector's reduction requirements as of January of 2009, followed by the adoption of specific regulations soon thereafter in January of 2011.

Ultimately, ARB's AB 32 regulations will address both the degree of electricity generation emissions reductions, and the method by which those reductions will be achieved, through the programmatic approach currently under its development. That regulatory approach will presumably address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Commission, but also the older, higher-emitting facilities not subject to any GHG reduction standard that this agency could impose. This programmatic approach is necessary to have an effective GHG reduction program for the electricity sector rather than one that merely requires reliance on out-of-state coal plants ("leakage") or older "dirtier" facilities.

As ARB codifies accurate GHG inventories and methods, it may become apparent that relative contributions to the inventories may not correlate to relative ease and cost-effectiveness of the GHG emission reductions necessary to achieve the 1990 GHG level. Though it has not yet been determined, the electricity sector may have to provide less or more GHG reductions than it would have otherwise been responsible for on a pro-rata basis.

To facilitate ARB's future regulatory regime, staff recommends Condition of Certification **AQ-SC8**, which requires the project owner to report the quantities of relevant GHGs emitted as a result of electric power production until such time that AB32 is implemented and its reporting requirements are in force. Staff believes that **AQ-SC8**, with the reporting GHG emissions, will enable the project to be consistent with the policies described above and the potential regulations, and provide the information to demonstrate compliance with the EPS. The GHG emissions to be reported in **AQ-SC8**, are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs and PFCs emissions that are directly associated with the production and transmission of electric power.

Note that reporting GHG emissions under **AQ-SC8** does not imply that the project, as defined, will comply with the potential reporting and reduction regulations being formulated under AB32. The project may have to provide additional reports and GHG reductions not discussed here.

Conclusions Regarding Greenhouse Gas Emissions

The HBRP project would replace a less-efficient existing facility with lower emissions of CO₂/MWh and likely lower net emissions. Accordingly, it would not result in a significant cumulative GHG impact. Moreover, even if it were not replacing this existing facility, it would be speculative to conclude that the project would result in a cumulatively significant GHG impact. AB 32 emphasizes that GHG emissions reductions must be "big picture" reductions that do not lead to "leakage" of such reductions to other states or countries. If a gas-fired power plant is not built in California, electricity to serve the load will come from another generating source. That could be renewable generation like wind or solar, but it could also be from higher carbon emitting sources such as out-of-state coal imports that are still a significant part of the energy that serves California.

The project will comply with the requirements of SB1368 and the Emission Performance Standard. Since the project is permitted for more than 60 percent annual capacity factor, it must emit less than 0.500 mt CO₂/MWh. The project is expected to emit 0.482 mt CO₂/MWh (CO₂, not CO₂-equivalent). In reality, the project is expected to operate much less than permit levels due to the relative isolation of the Humboldt region.

COMPLIANCE WITH LORS

FEDERAL

40 CFR Part 52.21, PSD Increment. PG&E provided an analysis of PSD Class I and Class II increment consumption for the HBRP on November 2, 2007 with revisions dated February 6, 2008, in order to respond to U.S. EPA comments on the 2007 Preliminary Determination of Compliance. The analysis showed that HBRP would not adversely affect Class I increments (consumption of five percent of allowable increment). The NCUAQMD subsequently hired a contractor (Atmospheric Dynamics, Inc.) to prepare an independent Class II PM₁₀ increment analysis. The analysis demonstrates that with increment expanding sources since 1987 (mainly pulp mill and sawmill shutdowns), the proposed HBRP would not significantly consume the Class II PM₁₀ increment (NCUAQMD 2008b).

40 CFR Part 52.21, Class I Impact Analysis. The U.S. Forest Service (USFS) reviewed a Class I impact analysis prepared by the applicant and issued an opinion in a letter dated October 16, 2007, and the National Park Service conducted an independent analysis (August 29, 2007). The applicant's analysis and FLM review considers visibility and acid deposition. After reviewing the potential for coherent visible plume impacts, the NPS confirmed (November 16, 2007) that HBRP would not constitute a major concern for Class I impacts at Redwood National Park, and the NCUAQMD confirms this opinion in the FDOC (NCUAQMD 2008b).

40 CFR Part 60, Subpart IIII. Compliance with the federal New Source Performance Standard (NSPS) Subpart IIII threshold of 0.11 g/bhp-hr for diesel particulate matter must be demonstrated by using U.S. EPA Method 5 for testing, which obtains the filterable subset of PM₁₀. The vendor guarantee for the Wärtsilä 18V50DF engines in diesel mode is to comply with the 0.11 g/bhp-hr DPM limit in NSPS Subpart IIII (**AQ-93**).

STATE

Title 17 CCR 93115, Airborne Toxic Control Measure (ATCM). There are a number of provisions of Title 17 CCR 93115 that apply to the HBRP as it pertains to the exclusive firing of diesel fuel. First, what constitutes "Emergency Use" under Section 93115.4 (ATCM for Stationary CI Engines – Definitions) must be determined. Then the pertinent emission standards must be identified. Section 93115.4 (30) says "Emergency Use means providing electrical power or mechanical work during any of the following events and subject to the following conditions:

- (A) the failure or loss of all or part of normal electrical power service or normal natural gas supply to the facility:
1. which is caused by any reason other than the enforcement of a contractual obligation the owner or operator has with a third party or any other party; and

2. which is demonstrated by the owner or operator to the district APCO's satisfaction to have been beyond the reasonable control of the owner or operator; [. . .].”

Operation of HBRP under Gas Tariff Rule 14 subjects the power plant to occasional natural gas curtailments. After thorough consideration, the Air Pollution Control Officer of the NCUAQMD has determined that operating HBRP in compliance with Gas Tariff Rule 14 is not a contractual obligation (NCUAQMD 2008c), and that a natural gas curtailment is beyond the reasonable control of HBRP. This means that diesel mode operation during a curtailment would be considered “emergency use” for the purposes of compliance with the ATCM for Stationary CI Engines in Section 93115. Because the Wärtsilä 18V50DF engines would be installed and operated for the purpose of providing electrical power during such an “emergency use” as a natural gas curtailment, the engines are “Emergency Standby Engines” under Section 93115.4 (29).

Categorizing the Wärtsilä 18V50DF as “Emergency Standby Engines” at HBRP means that the emission standards of Section 93115.6, the ATCM for Stationary CI Engines – Emergency Standby Diesel-Fueled CI Engine (>50 bhp) Operating Requirements and Emission Standards, are applicable. Section 93115.6 (a)(3)(A) states, “New Engines: Diesel PM Standard and Hours of Operating Requirements.

1. General Requirements: New stationary emergency standby diesel-fueled engines (>50 bhp) shall:
 - A. emit diesel PM at a rate less than or equal to 0.15 g/bhp-hr; or
 - B. meet the diesel PM standard, as specified in the Off-Road Compression Ignition Engine Standards for off-road engines with the same maximum rated power [. . .] whichever is more stringent; and
 - C. not operate more than 50 hours per year for maintenance and testing purposes, except as provided in 93115.6(a)(3)(A)2. This section does not limit the engine operation for emergency use and for emission testing to show compliance with 93115.6 (a)(3).

The limitation in the ATCM is equivalent to the DPM standard for model year 2006 off-road engines (a standard of 0.20 grams per kilowatt-hour). Therefore, the applicable DPM emission standard for the Wärtsilä engines in diesel mode is 0.15 g/bhp-hr. Up to 50 hours per year are allowed per engine for maintenance and engine testing, and the ATCM does not limit the number of hours of operation for emission testing or for “emergency use” as defined in the ATCM.

The vendor guarantee for the Wärtsilä 18V50DF engines in diesel mode is to comply with the 0.11 g/bhp-hr DPM limit of the federal NSPS, which would satisfy the ATCM (**AQ-173**). To limit potential DPM emissions annually, the NCUAQMD is establishing a combined limit for all ten Wärtsilä engines in diesel mode of 1,000 engine hours per year (**AQ-138**). Staff has proposed a more stringent combined limit of 510 engine hours per year in the Public Health section in Condition of Certification **PUBLIC HEALTH-1** based on the results of the Health Risk Assessment. This limit would then be superseded by an annual limit derived from the completed health risk assessment.

LOCAL

The Final Determination of Compliance (NCUAQMD 2008a) summarizes how the proposed HBRP would comply with NCUAQMD requirements. See the discussion for **Response to Agency and Public Comments** for information on the major issues that Energy Commission staff identified upon review of the 2007 Preliminary Determination of Compliance and how the issues have been resolved.

NCUAQMD, Fuel Use and Emission Limits. The HBRP may have difficulty demonstrating compliance with limits on diesel mode operation or limits on emissions of hourly NO_x or daily PM₁₀. The impacts identified in this staff assessment are based on the following:

- NO_x emissions not exceeding 392 lb/hr for the ten dual-fuel engines (**AQ-92**).
- PM₁₀/PM_{2.5} emissions not exceeding 1,542 lb/day for the ten dual-fuel engines at any time (**AQ-104**).
- Diesel fuel firing limitation in diesel mode, including natural gas curtailments, of 1,087,630 gallons per year, which is equivalent to 148,900 MMBtu/yr (**AQ-96** and **AQ-98**).
- Diesel mode operation limited to no more than 1,000 engine-hr per year for any purpose, including natural gas curtailments (**AQ-138**).

These limits do not allow a full level of operational flexibility. Natural gas curtailments are dictated by the CPUC, and “local capacity” or “must-run” requirements from CAISO to meet electrical demands in the region could force HBRP to operate at times of natural gas curtailments. If lengthy or severe curtailments occur, emissions could exceed the NO_x and PM₁₀/PM_{2.5} limits identified above or diesel fuel use limits also identified above. Although the HBRP would provide improved efficiency compared to the existing HBPP, the existing power plant normally historically required more than 148,900 MMBtu/yr of liquid fuel (see **Air Quality Table 6**), which would not be allowed under the NCUAQMD limits or Energy Commission staff’s recommended conditions (**AQ-96** and **AQ-98**). Similarly, the applicant has no way of controlling whether natural gas curtailments dictate more than 1,000 engine-hours per year in diesel mode or the number of multiple simultaneous startups that may be needed in diesel mode. Operation for more than one day in full capacity in diesel mode may also be foreseeable. Because the NO_x and PM₁₀/PM_{2.5} emission limits are substantially lower than the emission rates guaranteed by the engine manufacturer, natural gas curtailments and “must-run” requirements could require the operators of HBRP to very closely monitor their CEMS and fuel consumption so that violations of the permit limits do not occur.

Staff explored options for reducing NOx and PM10/PM2.5 emissions and reducing the need for diesel mode operation with numerous Data Requests to the applicant, status report letters, and workshops in early 2007 and 2008. Staff encouraged PG&E to examine basic alternatives to the project design, including:

- establishing a more reliable natural gas supply by reinforcing the natural gas supply pipeline, using local gas fields for storage of natural gas, or providing on-site storage of natural gas using either compressed natural gas (CNG) or liquid states for its storage; and
- evaluating propane as an alternative to the proposed diesel backup fuel.

PG&E rejected these and other design options as infeasible or not cost-effective. Since staff is satisfied that the proposed project presents no significant unmitigated air quality impact and would likely be in compliance with LORS, staff sees no reason to further explore the alternative to diesel fuel issue.

NCUAQMD Rule 110, Offsets. Offset requirements are defined on the basis that certain quantities of emissions reductions would occur with the shutdown of the existing HBPP. The Engineering Evaluation for the FDOC (NCUAQMD 2008b) quantifies the reductions that occur from closure of the existing HBPP without including any periods of “emergency use” such as fuel-oil firing in Humboldt Bay Power Plant Unit 2 (HB2). This is consistent with the definition of Historic Actual Emissions, per NCUAQMD Rule 110, Section 6.2.2 that excludes emissions that are unrepresentative of normal operations.

Air Quality Table 19 shows the one ERC and quantifies the reductions from the shutdown of HBPP (**AQ-110**) that allow the project to comply with this rule. Staff recommends Condition of Certification **AQ-SC7** to ensure that offsets are fully provided.

NOTEWORTHY PUBLIC BENEFITS

The two existing electric utility steam generating units (105 MW) and the two peaking combustion turbines (30 MW) at Humboldt Bay Power Plant will be shut down following commissioning of the new units. All four units will need to be shut down once the new engines are operational in order for the new emissions of HBRP to be allowed by the NCUAQMD.

The proposed project would improve the overall thermal efficiency of the power plant from about 12,000 to 22,000 Btu/kWh for the steam boilers (Response to Data Request 5, Jan 12, 2007) to approximately 9,600 Btu/kWh for the ten new engines. This improvement leads to a reduction in emissions of most pollutants, including greenhouse gases, when compared to existing conditions. It also leads to a reduction in the need to fire liquid fuel at the facility because less natural gas fuel would be used to generate the same amount of power.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Energy Commission staff received no written agency and public comments on air quality following the release of the PSA in November 2007. Workshops held at the HBPP site in December 2007 and January 2008 provided public opportunity to comment on the

staff assessment and allowed agency coordination between U.S. EPA, NCUAQMD, and Energy Commission staff and the applicant in a public forum.

Energy Commission staff provided a public comment letter to the NCUAQMD and recommendations for the NCUAQMD in its review of the project (November 21, 2007). In April 2008, the NCUAQMD provided responses to staff's comments. The following is a summary of the general comments and their resolution.

- **Definition of Natural Gas Curtailment.** The FDOC includes a definition of “natural gas curtailment” along with limitations on the diesel fuel firing rates during gas curtailments. With comprehensive limitation of operation in diesel mode, as in the FDOC permit conditions, criteria pollutant emissions during diesel mode would be limited.
- **Definition of Emergency Use.** The FDOC includes a definition of “Diesel Particulate Matter ATCM Emergency Use” that applies to the two emergency engines. The NCUAQMD excludes the dual-fuel engines from this definition with the rationale that the FDOC includes DPM emission limits for all normal operations in diesel mode, including during natural gas curtailments (**AQ-104** and **AQ-138**).
- **ATCM Applicability.** The FDOC includes the NCUAQMD’s independent determination that the requirements of the “Stationary Diesel Engine ATCM for Emergency Standby Engines” do apply to the dual-fuel engines and that operation under the CPUC Gas Tariff Rule is not a contractual obligation; as such, operation in diesel mode and during natural gas curtailments would be considered emergency status for purposes of compliance with the ATCM. The FDOC clarifies that the applicable limit for the dual-fuel engines in diesel mode is 0.15 g/bhp-hr for DPM (**AQ-173**).
- **Best Available Control Technology (BACT).** The FDOC includes the NCUAQMD’s independent BACT determination that concludes that diesel particulate filter (DPF) technology would not be technically feasible for the proposed dual-fuel engines due to the backpressure that would inhibit proper operation of the engines.
- **Alternatives to Diesel Fuel.** Public comments at the workshops and comments from staff and NCUAQMD to the applicant urged consideration of compressed natural gas (CNG) or propane as an alternative to diesel as the HBRP backup fuel. The applicant filed responses (December 7, 2007 and January 2, 2008) demonstrating difficulties with providing non-diesel backup alternatives. In workshops, the applicant suggested a 30-year operating cap on the diesel fuel input rate, but this was rejected by staff in favor of limits on diesel mode operation in the NCUAQMD conditions (**AQ-104** and **AQ-138**). See also the analysis in **Public Health** concerning limiting the hours of firing diesel fuel
- **New Source Performance Standards (NSPS).** The applicable limitation in NSPS Subpart IIII is clarified in the FDOC as 0.11 g/bhp-hr for DPM (**AQ-93**).

- **Ambient Air Quality Impacts.** The federal PSD requirement for a complete Class II PM10 increment analysis is included in the FDOC and reflects the work of an independent air quality modeling specialist hired by the NCUAQMD in early 2008. Atmospheric Dynamics, Inc. released a protocol for the independent Class II PM10 increment analysis (February 26, 2008) and completed the analysis (March 18, 2008) in time for the results to be incorporated with the FDOC (NCUAQMD 2008b).

CONCLUSIONS

A major issue for this project is whether a natural gas curtailment under the requirements of PG&E's California Public Utilities Commission (CPUC) Gas Tariff Rule 14 constitutes an emergency through the enforcement of this obligation that PG&E has with the CPUC. The Air Pollution Control Officer of the NCUAQMD has determined that operating in compliance with Gas Tariff Rule 14 is not a contractual obligation (NCUAQMD 2008c), implying that it is a regulatory obligation. This means that a natural gas curtailment forcing operation of the proposed ten Wärtsilä engines in diesel mode would be considered an "emergency use" of the engines. This determination clarifies the applicable emission standards and operating requirements.

Following a high level of coordination with U.S. EPA, ARB, and the NCUAQMD for HBRP, this staff assessment results in the following major conclusions:

- PG&E did not originally propose any annual limit on the number of hours of operation in diesel mode, except for maintenance and testing, because PG&E states that a natural gas supply curtailment is an "emergency." However, Energy Commission staff and the NCUAQMD both seek to limit the hours of operation in diesel mode because the potential emissions of the project need to be clearly defined. The NCUAQMD has determined that the project should be limited to 1,000 engine-hours per year in the diesel mode. Staff has determined more stringent limits are necessary to mitigate impacts to public health (see the **Public Health** section of this staff assessment).
- PG&E seeks the flexibility to operate the HBRP during natural gas curtailments, which are determined by gas supply constraints and the transmission grid operators (the CAISO) that dictate when the plant must operate. However, HBRP would need to remain within operating, fuel use, and emission limits established by NCUAQMD and recommended by Energy Commission staff. There remains a potential for the power plant to violate NCUAQMD and staff limits if actual fuel use or emissions occur at or near the maximum anticipated levels or if HBRP is forced by grid operators to be online during lengthy or severe natural gas curtailments.

The operators of HBRP may face challenges in the operation of the facility to demonstrate compliance with limits in the FDOC on diesel mode operation or limits on emissions of hourly NOx or daily PM10. The limits do not allow a full level of operational flexibility, and natural gas curtailments or CAISO electrical demands could force HBRP to operate in a manner that could potentially exceed these limits. For example, HBRP may be forced by natural gas curtailments to operate more than 1,000 engine-hours per year (potentially exceeding **AQ-138**). Similarly, operating scenarios of multiple simultaneous startups in diesel mode (potentially exceeding **AQ-92**, or operation for

more than one day in full-capacity diesel mode (potentially exceeding **AQ-104**), may be foreseeable. Because the NO_x and PM₁₀ emission limits are substantially lower than the emission rates guaranteed by the engine manufacturer for these scenarios, the operators of HBRP will have to closely manage which engines will fire in the natural gas/diesel pilot mode and those that fire in diesel only mode, and the startup sequence of the ten engines so that violations of the air permit conditions do not occur. Recommended conditions of certification, such as Conditions **AQ-92** and **AQ-104** allow adjustments to the operating limits after successful emissions testing confirms compliance with the NO_x and PM₁₀ mass emission operating limits. With staff's recommended conditions of certification and NCUAQMD conditions shown here, the HBRP would likely comply with LORS and adequate measures would be taken to lessen the potential impacts to a level of insignificance.

It should be noted that in the **Public Health** section, Condition **PUBLIC HEALTH-1** currently limits the hours of diesel firing to no greater than 510 engine hours per year for all ten engines. This is more restrictive than the limit that is allowed under Condition **AQ-138** of up to 1,000 engine hours per year. Therefore, Condition of Certification **AQ-138** includes a modification to reflect that the limit on diesel firing is 1,000 hours or as specified in Condition **PUBLIC HEALTH-1**, whichever is less.

Staff evaluated the greenhouse gas (GHG) emissions from the proposed project and recommends reporting of the GHG emissions as the Air Resources Board develops greenhouse gas regulations and/or trading markets. The project may be subject to additional reporting requirements and GHG reductions not discussed here. The project will comply with the requirements of SB1368 and the Emission Performance Standard. Since the project is permitted for more than 60 percent annual capacity factor, it must emit less than 0.500 mt CO₂/MWh. The project is expected to emit 0.482 mt CO₂/MWh (CO₂, not CO₂-equivalent).

PROPOSED CONDITIONS OF CERTIFICATION

STAFF-RECOMMENDED CONDITIONS OF CERTIFICATION

If the issues identified above can be satisfactorily resolved, then staff proposes the following Conditions of Certification (identified as the **AQ-SCx** series of conditions) to provide mitigation during the construction phase of the project and to report greenhouse gas (GHG) emissions.

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

have other responsibilities in addition to those described in this condition. The AQCM shall not be terminated without written consent of the construction project manager (CPM).

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

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

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

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

- A. All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of **AQ-SC4**. The frequency of watering may be either reduced or eliminated during periods of precipitation.
- B. No vehicle shall exceed 15 miles per hour within the construction site.
- C. The construction site entrances shall be posted with visible speed limit signs.
- D. All construction equipment vehicle tires shall be inspected and washed as necessary to be free of dirt prior to entering paved roadways.
- E. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.
- F. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.
- G. All construction vehicles shall enter the construction site through the treated entrance roadways unless an alternative route has been submitted to and approved by the CPM.

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

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

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

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

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

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

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

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

- A. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.
- B. All construction diesel engines with a rating of 100 hp or higher shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless certified by the on-site AQCMM that such engine is not available for a particular item of equipment. In the event that a Tier 2 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a Tier 1 engine. In the event a Tier 1 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a catalyzed diesel particulate filter (soot filter) unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" for the following, as well as other, reasons.
 1. There is no available soot filter that has been certified by either the California Air Resources Board or U.S. Environmental Protection Agency for the engine in question; or
 2. The construction equipment is intended to be on site for 10 days or less.

3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not possible.
- C. The use of a soot filter may be terminated immediately if one of the following conditions exists, provided that the CPM is informed within 10 working days of the termination:
1. The use of the soot filter is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.
 2. The soot filter is causing or is reasonably expected to cause significant engine damage.
 3. The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.
 4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.
- D. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.
- E. All diesel heavy construction equipment shall not idle for more than five minutes, to the extent practical.

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

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

Verification: The project owner shall submit any proposed air permit modification to the CPM within five working days of its submittal either by: 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC7 The project owner shall provide emission reductions in the form of “actual emission reductions” (calculated per NCUAQMD Rule 110) or emission reduction credits (ERCs) to offset NOx, ROC, PM10, and SOx emissions. The project owner shall demonstrate that the reductions are provided in the form and amount required by the District.

The project owner shall surrender the ERCs from among those that are listed in the table below or a modified list, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit an updated table including the additional ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions to the listed credits.

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

Emission Reduction Certificate Number, Location	NOx (tpy)	ROC (tpy)	PM10 (tpy)	SOx (tpy)
ERC #07-098-12 Eel River Sawmills, Redcrest, CA	0	1.6	6.4	0
Proposed Offsets Provided by HBPP Shutdown	154.3	23.4	24.9	0
Surplus Reductions from HBPP Needed to Mitigate HBRP	508.1	0	0	4.3

Verification: The project owner shall submit to the CPM records showing that the project’s offset requirements have been met prior to initiating construction. If the CPM approves a substitution or modification to the list of ERCs, the CPM shall file a statement of the approval with the project owner and Commission docket. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 Until the ARB enacts a program to report and restrict GHG emissions from the electricity sector under the California Global Warming Solutions Act of 2006 (AB32), the project owner shall either participate in a climate action registry approved by the CPM or report on an annual basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production. When ARB’s GHG reporting regulations become effective, the project owner shall comply with the requirements of that GHG program, and the reporting requirements of this condition of certification shall cease, provided that the Energy Commission continues to receive the data required by the ARB program. Until then, the project owner shall do what is described in the following paragraphs.

The project owner shall maintain a record of fuel types and carbon content used on-site for the purpose of power production. These fuels shall include but are not limited to each fuel type burned: (1) in combustion turbines, (2)

HRSs (if applicable) or auxiliary boiler (if applicable), (3) internal combustion engines, (4) flares, and (5) for the purpose of startup, shutdown, operation or emission controls.

The project owner may perform annual source tests of CO₂ and CH₄ emissions from the exhaust stacks while firing the facility's primary fuel, using the following test methods or other test methods as approved by the CPM. The project owner shall produce fuel-based emission factors in units of lbs CO₂ equivalent per mmBtu of fuel burned from the annual source tests. If a secondary fuel is approved for the facility, the project owner may also perform these source tests while firing the secondary fuel.

Pollutant	Test Method
CO ₂	EPA Method 3A
CH ₄	EPA Method 18 (POC measured as CH ₄)

As an alternative to performing annual source tests, the project owner may use the Intergovernmental Panel on Climate Change (IPCC) Methodologies for Estimating Greenhouse Gas Emissions (MEGGE). If MEGGE is chosen, the project owner shall calculate the CO₂, CH₄ and N₂O emissions using the appropriate fuel-based carbon content coefficient (for CO₂) and the appropriate fuel-based emission factors (for CH₄ and N₂O).

The project owner shall convert the N₂O and CH₄ emissions into CO₂ equivalent emissions using the current IPCC Global Warming Potentials (GWP). The project owner shall maintain a record of all SF₆ that is used for replenishing on-site high voltage equipment. At the end of each reporting period, the project owner shall total the mass of SF₆ used and convert that to a CO₂ equivalent emission using the IPCC GWP for SF₆. The project owner shall maintain a record of all PFCs and HFCs that are used for replenishing on-site refrigeration and chillers directly related to electricity production. At the end of each reporting period, the project owner shall total the mass of PFCs and HFCs used and not recycled and convert that to a CO₂ equivalent emission using the IPCC GWP.

On an annual basis, the project owner shall report the CO₂ and CO₂ equivalent emissions from the described emissions of CO₂, N₂O, CH₄, SF₆, PFCs, and HFCs.

Verification: The project annual GHG emissions shall be reported as required by the ARB under the California Global Warming Solutions Act of 2006 (AB32) and, until such requirements are enacted, as a CO₂ equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM annually as part of the operational report required (**AQ-SC9**) or the annual Air Quality Report.

AQ-SC9 The project owner shall submit to the CPM semi-annual operation reports that include operational and emissions information as necessary to demonstrate compliance with the conditions of certification. The semi-annual operation report shall specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit semi-annual operation reports to the CPM and APCO no later than 30 days following December 31 and June 30 of each calendar year. The report for following December 31 can be an annual compliance summary for the preceding year. This information shall be maintained on site for a minimum of five years and shall be provided to the CPM and District personnel upon request.

DISTRICT-RECOMMENDED CONDITIONS OF CERTIFICATION

FEDERALLY ENFORCEABLE GENERAL REQUIREMENTS

Title V Permit Modifications and Renewal

AQ-1 This Permit shall serve as the Prevention of Significant Deterioration preconstruction permit for the sources identified herein, and is issued pursuant to 40 CFR Part 70 and Regulation V of the Rules and Regulations of the North Coast Unified Air Quality Management District. *[NCUAQMD Reg 5 Rule 405(b)] [NCUAQMD Reg V Rule 502 Section 2.2 (5/19/05)] [40 CFR 70.5(a)(1)(iii)]*

Verification: No verification needed.

AQ-2 This permit shall be valid for a period not to exceed 545 days from the date of issuance. Upon completion of the construction and the commissioning phase for the internal reciprocating engines, the Permittee shall submit a Title V Permit to Operate application to the Air Pollution Control Officer. *[NCUAQMD Reg 5 Rule 405(b)] [NCUAQMD Reg V Rule 502 Section 2.2 (5/19/05)] [40 CFR 70.5(a)(1)(iii)]*

Verification: The project owner shall submit to both the District and CPM the Title V Permit to Operate application upon completion of commissioning.

AQ-3 If modifications to the permit are necessary, the Permittee of the Title V source permitted herein shall submit to the Air Pollution Control Officer a complete Title V permit application for either an Administrative, Minor, or Significant Title V permit modification. The application shall not be submitted prior to receiving any required preconstruction permit from the NCUAQMD. *[NCUAQMD Reg 5 Rule 405(c)] [NCUAQMD Reg V Rule 502 Section 2.3 (5/19/05)] [40 CFR 70.5(a)(1)(ii)]*

Verification: The project owner shall submit to both the District and CPM the Title V modification application after receiving applicable preconstruction permit(s).

AQ-4 The Permittee shall submit to the Air Pollution Control Officer timely updates to the Title V application as new requirements become applicable to the source, and in no event less than quarterly (i.e., every three months). *[40 CFR 70.5(b)]*

Verification: The project owner shall submit to both the District and CPM the Title V application updates as needed.

AQ-5 A Permittee's responsible official shall promptly provide additional information in writing to the Air Pollution Control Officer upon discovery of submittal of any

inaccurate information as part of the application or as a supplement thereto; or of any additional relevant facts previously omitted which are needed for accurate analysis of the application; and including inaccurate information known, or which should have been known or should be known, by the Permittee(s). *[NCUAQMD Reg 5 Rule 420(c)] [NCUAQMD Reg V Rule 502 Sections 5.1, 5.3, 5.4 (5/19/05)] [40 CFR 70.5(a)(2) and (b)]*

Verification: The project owner shall submit to both the District and CPM the Title V information as needed.

AQ-6 Upon written request of the Air Pollution Control Officer, the Permittee's responsible official shall supplement any complete application with additional information within the time frame specified by the Air Pollution Control Officer. *[NCUAQMD Reg 5 Rule 420(b)] [NCUAQMD Reg V Rule 502 Section 5.2 (5/19/05)] [40 CFR 70.5(a)(2) and (b)]*

Verification: The project owner shall submit to both the District and CPM the Title V additional information as needed.

AQ-7 PSD preconstruction permit expiration terminates the Permittee's right to operate the stationary sources itemized in this permit unless a timely and complete Title V permit application has been submitted, in which case the existing PSD preconstruction permit will remain in effect until the Title V permit has been issued or denied. In order to be considered timely, a complete Title V permit application must be submitted prior to the expiration of the PSD preconstruction permit. *[NCUAQMD Reg 5 Rule 400(b)(c) and (d)] [NCUAQMD Reg V Rule 502 Sections 1.2, 1.3, and 1.4] [40 CFR 70.7(b) and (e)(2) (v)]*

Verification: The project owner shall submit to both the District and CPM the Title V application prior to expiration of the applicable PSD preconstruction permit.

AQ-8 When submitting an application for a permit pursuant to Regulation 5, the Permittee's responsible official shall include the following information: A certification by a responsible official of all reports and other documents submitted for permit application; compliance progress reports at least every 6 months for, and submitted no later than 30 days after, the periods January 1st through June 30th and July 1st through December 31st of each year; statements on compliance status with any applicable enhanced monitoring; and annual compliance plans, no later than January 30th of each year, which shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete. *[NCUAQMD Reg 5 Rule 415(m)] [NCUAQMD Reg V Rule 502 Section 4.13 (5/19/05)] [40 CFR 70.5(c)(9) and (d)]*

Verification: The project owner shall submit to both the District and CPM the Title V application as needed.

AQ-9 With the exception of acid rain units subject to Title IV of the Clean Air Act and solid waste incinerators subject to section 129(e) of the Clean Air Act, each permit issued pursuant to NCUAQMD Regulation 5 to operate for any source shall include a condition for a fixed term not to exceed five years from

the time of issuance. A permit to operate for an acid rain unit shall have a fixed permit term of five years. A permit to operate for a solid waste incinerator shall have a permit term of 12 years; however, the permit shall be reviewed at least every five years. *[NCUAQMD Reg 5 Rule 660] [NCUAQMD Reg V Rule 504 Section 11 (5/19/05)] [40 CFR 70.6(a)(2)]*

Verification: No verification needed.

COMPLIANCE

AQ-10 The Permittee shall comply with all conditions of the Title V permit. *[NCUAQMD Reg 5 Rule 610(g) (1)] [NCUAQMD Reg V Rule 504 Section 2.7 (5/19/05)]*

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

AQ-11 Compliance with the conditions of this Title V permit shall be deemed compliance with all applicable requirements identified in the Title V permit. *[40 CFR 70.6(f)]*

Verification: No verification needed.

AQ-12 The Permittee may not assert or use as a defense, expressly, impliedly, or by operation of law or past practice, in any enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Title V permit. *[NCUAQMD Reg 5 Rule 610(g) (4)] [NCUAQMD Reg V Rule 504 Section 2.7.4 (5/19/05)]*

Verification: No verification needed.

AQ-13 This Title V permit may be modified, revoked, reopened, and reissued or terminated for cause. *[NCUAQMD Reg 5 Rule 570(a) and (b)] [NCUAQMD Reg V Rule 503 Section 9 (5/19/05)]*

Verification: No verification needed.

AQ-14 The Permittee shall furnish to the Air Pollution Control Officer, within 10 (ten) days of the request, any information that the Air Pollution Control Officer may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit; or to determine compliance with this Title V permit. Upon request, the permittee shall also furnish to the Air Pollution Control Officer copies of records required to be kept by conditions of this permit. For information claimed to be confidential, the permittee may furnish such records directly to the EPA along with a claim of confidentiality. *[40 CFR 70.6(a)(6)(v)]*

Verification: The project owner shall submit to both the District and CPM the Title V permit compliance information within ten days of request by the Air Pollution Control Officer.

AQ-15 Noncompliance with any federally enforceable requirement in this Title V permit is grounds for Title V permit termination, revocation and reissuance, modification, enforcement action, or denial of the Title V permit renewal application.

[NCUAQMD Reg 5 Rule 610(g) (3)] [NCUAQMD Reg V Rule 504 Section 2.7.3 (5/19/05)]

Verification: No verification needed.

AQ-16 A pending Title V permit action (e.g. a proposed permit revision) or notification of anticipated noncompliance does not stay any permit condition.
[NCUAQMD Reg 5 Rule 610(g) (5)] [NCUAQMD Reg V Rule 504 Section 2.7.5 (5/19/05)]

Verification: No verification needed.

AQ-17 This Title V permit does not convey any property rights of any sort or any exclusive privilege. *[NCUAQMD Reg 5 Rule 610(g) (2)] [NCUAQMD Reg V Rule 504 Section 2.7.2 (5/19/05)]*

Verification: No verification needed.

AQ-18 Upon presentation of credentials and other documents as may be required by law, the Permittee shall allow the Air Pollution Control Officer or an authorized representative to perform all of the following:

- A. Enter upon the stationary source's premises where this source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Title V permit;
- C. Inspect at reasonable times, the stationary source, equipment (including monitoring and air pollution control equipment), practices and operations regulated or required under this Title V permit; and
- D. As authorized by the Federal Clean Air Act, sample or monitor at reasonable times substances or parameters for the purpose of ensuring compliance with the Title V permit conditions or applicable federal requirements.
[NCUAQMD Reg 5 Rule 610(e)] [NCUAQMD Reg V Rule 504 Section 2.5 (5/19/05)]

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

REPORTS AND RECORDKEEPING

AQ-19 Monitoring Reports

- A. The Permittee shall submit to the Air Pollution Control Officer at least once every six months, unless required more frequently by an applicable requirement, reports of all required monitoring set out in this Title V permit.
- B. The reporting periods for this permit shall be for the six month periods January 1st through June 30th and July 1st through December 31st. The reports shall be submitted by July 30th and January 30th of each year respectively.

- C. Any and all instances of deviations from Title V permit conditions must be clearly identified in such reports. All required reports must be certified by the responsible official and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete. *[NCUAQMD Reg 5 Rules 460 and 625] [NCUAQMD Reg V Rule 502 Section 11 and Rule 504 Section 5 and (5/19/05)] [40 CFR 70.6(a)(3)(ii) and (iii)]*

Verification: The project owner shall submit to the CPM and APCO the semi-annual operational reports that include monitoring results (**AQ-SC9**).

AQ-20 Compliance Reports

- A. The Permittee shall submit to the Air Pollution Control Officer and to U.S. EPA (Air-3, U.S. EPA, Region IX) on an annual basis, unless required more frequently by additional applicable federal requirements, a certification of compliance by the Permittee's responsible official with all terms and conditions contained in the Title V permit, including emission limitations, standards and work practices.
- B. The reporting period for this permit shall be January 1st through December 31st. The report shall be submitted by January 30th of each year. The initial report shall be for the period January 1st 2009 through December 31st 2009 and shall be submitted by March 1st 2010.
- C. All required reports must be certified by the responsible official and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.
- D. The compliance certification shall include the following:
1. The identification of each term or condition of the Title V permit that is the basis of the certification.
 2. The method(s) used for determining the compliance status of the source, currently and over the reporting period, and whether such method(s) provides continuous or intermittent data.
 3. The status of compliance with the terms and conditions of the Title V permit for the period covered by the certification, based on the method designated in Section D (ii) of this condition.
 4. Such other facts as the Air Pollution Control Officer may require in order to determine the compliance status of the source.
 5. A method for monitoring the compliance of the stationary source with its emissions limitations, standards and work practices. *[NCUAQMD Reg 5 Rule 650] [NCUAQMD Reg V Rule 504 Section 10 (5/19/05)] [40 CFR 70.6(b)(5)]*

Verification: The project owner shall submit to the CPM and APCO the annual operational reports that include compliance results (**AQ-SC9**).

AQ-21 The Permittee shall report within 24 hours of detection any deviation from a federally enforceable Title V permit condition not attributable to an emergency. In order to fulfill the reporting requirement of this condition, the permittee shall notify the Air Pollution Control Officer by telephone followed by a written statement describing the nature of the deviation from the federally enforceable permit condition. *[NCUAQMD Reg 5 Rule 625] [NCUAQMD Reg V Rule 504 Section 5 (5/19/05)] [40 CFR 70.6(a)(3)(iii)]*

Verification: The project owner shall submit to both the District and CPM the notification within 24 hours after determining any deviation from a federally enforceable Title V permit condition.

AQ-22 All monitoring data and support information required by a federally enforceable applicable requirement must be kept by the stationary source for a period of 5 years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the federally enforceable applicable requirement in the Title V permit. *[NCUAQMD Reg 5 Rules 455 and 615] [NCUAQMD Reg V Rule 502 Section 10 and Rule 504 Section 3 (5/19/05)] [40 CFR 70.6(a)(3)(ii)]*

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

PUBLIC NUISANCE

AQ-23 The Permittee(s) shall not discharge 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. *[NCUAQMD Reg 1 Rule 400(a)]*

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

VISIBLE EMISSIONS

AQ-24 The owner, operator or Permittee of this Title V source shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is:

- A. As dark or darker in shade as that designated No. 2 (6-minute average), on the Ringelmann Chart, as published by the United States Bureau of Mines, or
- B. Of such opacity as to obscure a human observer's view, or a certified calibrated in-stack opacity monitoring system to a degree equal to or greater than No. 2 on the Ringelmann Chart. *[NCUAQMD Rule 410] [NCUAQMD Reg I Rule 104 Section 2 (5/19/05)]*

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

PARTICULATE MATTER

AQ-25 A. General Combustion Sources

The Permittee of this Title V source shall not discharge particulate matter into the atmosphere from any combustion source in excess of 0.46 grams per standard cubic meter (0.20 grains per standard cubic foot) of exhaust gas, calculated to 12 percent carbon dioxide; or in excess of the limitations of NSPS Rule 490, as applicable.

B. Steam Generating Units

The Permittee of this Title V source shall not discharge particulate matter into the atmosphere from any steam generating unit, installed or modified after July 1, 1976, in excess of 0.23 grams per standard cubic meter (0.10 grains per standard cubic foot) of exhaust gas, calculated to 12 percent carbon dioxide; or in excess of the limitations of NSPS Rule 490.

C. Steam Generating Utility Power Plants

Notwithstanding the limitations set out above, no steam generating power plants which produce electric power for sale to any public utility shall discharge particulate matter into the atmosphere in excess of 0.10 pounds per million BTU heat input or any other specific applicable permit limitation, whichever is the more restrictive emission condition.

D. Non-Combustion Sources

The Permittee of this Title V source shall not discharge particulate matter into the atmosphere from any non-combustion source in excess of 0.46 grams per actual cubic meter (0.20 grains per cubic foot) of exhaust gas or in total quantities in excess of the maximum allowable process weight rate as follows:

TABLE I

ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE					
Process Weight Rate		Rate of Emission	Process Weight Rate		Rate of Emission
Lb/Hr	Kg/Hr	Lb/Hr	Lb/Hr	Kg/Hr	Lb/Hr
100	45	0.55	6,000	2,720	8.6
200	92	0.88	7,000	3,380	9.5
400	183	1.4	8,000	3,680	10.4
600	275	1.83	9,000	4,134	11.2
800	377	2.22	10,000	4,540	12.0
1,000	454	2.58	12,000	5,460	13.6
1,500	681	3.38	16,000	7,260	16.5
2,000	920	4.1	18,000	8,220	17.9
2,500	1,147	4.76	20,000	9,070	19.2
3,000	1,362	5.38	30,000	13,600	25.2
3,500	1,690	5.96	40,000	18,100	30.5
4,000	1,840	6.52	50,000	22,700	35.4
5,000	2,300	7.58	60,000	27,200	40.0

Where the process weight per hour is between two listed figures, such process weight and maximum allowable particulate emission per hour shall be interpolated linearly. The total process weight of all similar process operations located at a single plant or of similar multiple plants located on a single premise, shall be used for determining the maximum allowable particulate emission from the combination of such operations. *[NCUAQMD Rule 420] [NCUAQMD Reg I Rule 104 (5/19/05)]*

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-164**.

AQ-26 The Permittee of this Title V source shall not handle, transport or store or allow open storage of materials in such a manner which allows or has the potential to allow unnecessary amounts of particulate matter to become airborne. Reasonable precautions shall be taken to prevent particulate matter from becoming airborne, including, but not limited to, the following:

- A. Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.
- B. Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Containment methods can be employed during sandblasting and other similar operations.

- C. Conduct agricultural practices in such a manner as to minimize the creation of airborne dust.
- D. The use of water or approved dust surfactants for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land.
- E. The application of asphalt, oil, water or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts.
- F. The paving of roadways and their maintenance in a clean condition.
- G. The prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or other means. *[NCUAQMD Rule 430] [NCUAQMD Reg I Rule 104 Section 4 (5/19/05)]*

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

SULFUR COMPOUNDS

AQ-27 The owner(s), operator(s) or Permittee(s) of this Title V source shall not discharge into the atmosphere from any single source of emissions whatsoever sulfur oxides, calculated as sulfur dioxide (SO₂) in excess of 1,000 ppm; or in excess of the specific source emission limitations of Federal New Source Performance Standards, as applicable. *[NCUAQMD Rule 440] [NCUAQMD Reg I Rule 104 Section 5 (5/19/05)]*

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-164**.

OPEN BURNING

AQ-28 The Permittee of this Title V source shall not ignite or cause to be ignited or suffer, allow or maintain any open outdoor fire for the disposal of rubber, petroleum or plastic wastes, demolition debris, tires, tar paper, wood waste, asphalt shingles, linoleum, cloth, household garbage or other combustible refuse; or for metal salvage or burning of motor vehicle bodies. No other open burning shall occur without the owner, operator(s) or Permittee having first obtained a Coordinated Authorized Burn Permit from the Air Pollution Control Officer. *[NCUAQMD Reg 2 Rules 200 & 201]*

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

EQUIPMENT BREAKDOWNS

- AQ-29** The Permittee shall comply with the emergency provisions contained in all applicable federal requirements.
- A. Within two weeks of an emergency event, the owner(s), operator(s) or Permittee's responsible official shall submit to the Air Pollution Control Officer a signed contemporaneous log or other relevant evidence which demonstrates that:
1. An emergency occurred.
 2. Identification of the cause(s) of the emergency.
 3. The facility was being properly operated at the time of the emergency.
 4. Identification of each and every step taken to minimize the emissions resulting from the emergency.
 5. Within two working days of the emergency event, the permittee shall notify the Air Pollution Control Officer with a description of the emergency and any mitigating or corrective actions taken.
- B. The Permittee has the burden of proof to establish that an emergency occurred in any enforcement proceeding. *[NCUAQMD Reg 5 Rule 450]*

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

TITLE VI REQUIREMENTS (OZONE DEPLETING SUBSTANCES)

- AQ-30** The Permittee of this Title V source allowing or causing the opening of appliances containing CFCs for maintenance, service, repair, or disposal must comply with the required practices set out in and pursuant to 40 CFR 82.156. *[40 CFR 82 Subpart F]*

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

- AQ-31** Equipment used during the maintenance, service, repair, or disposal of appliances containing CFCs shall comply with the standards for recycling and recovery equipment set out in and pursuant to 40 CFR 82.158. *[40 CFR 82 Subpart F]*

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

- AQ-32** The Permittee and its contractors and agents performing maintenance, service, repair or disposal of appliances containing CFCs must be certified by an approved technician certification program set out in and pursuant to 40 CFR 82.161. *[40 CFR 82 Subpart F]*

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

ASBESTOS

AQ-33 The Permittee of this Title V source shall comply with the standards of 40 CFR 61 Subpart M which regulates demolition and renovation activities pertaining to asbestos materials.

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

PAYMENT OF FEES

AQ-34 The Permittee of this Title V source shall pay an annual permit fee and other fees as required in accordance with NCUAQMD Rule 300. Failure to pay these fees by the dates due will result in immediate suspension of this Title V Permit to Operate effective on the date the fees were due, and on notification by the Air Pollution Control Officer of such suspension. Operation without an effective Title V permit subjects the owner(s), operator(s) and Permittee(s) to potential enforcement action by the NCUAQMD and the U.S. EPA pursuant to Section 502(a) of the Clean Air Act as amended in 1990. *[NCUAQMD Reg 5 Rule 670]*

Verification: The project owner shall submit to the CPM and APCO the annual operational reports that include information on fees paid (**AQ-SC9** and **AQ-20**).

ACCIDENTAL RELEASES

AQ-35 If subject to Section 112(r) of the CAA and 40 CFR Part 68, the Permittee(s) of this Title V permit shall register and submit to the U.S. EPA the required data related to the risk management plan (RMP) for reducing the probability of accidental releases of any regulated substances listed pursuant to Section 112(r) (3) of the CAA as amended in 68.130. The list of substances, threshold quantities and accident prevention regulations promulgated under Part 68 do not limit in any way the general duty provisions under Section 112(r)(1). *[40 CFR Part 68]*

Verification: Refer to **Haz-2**.

AQ-36 If subject to Section 112(r) of the CAA and 40 CFR Part 68, the Permittee shall comply with the requirements of 40 CFR Part 68 no later than the latest of the following dates as provided in 40 CFR 68.10(a):

- A. June 21, 1999,
- B. Three years after the date on which a regulated substance is first listed under 68.130, or
- C. The date on which a regulated substance is first present above a threshold quantity in a process. *[40 CFR Part 68]*

Verification: The project owner shall submit to both the District and CPM the information required under this condition.

AQ-37 If subject to Section 112(r) of the CAA and 40 CFR Part 68, the Permittee(s) shall submit any additional relevant information requested by any regulatory

agency necessary to ensure compliance with the requirements of 40 CFR Part 68. *[40 CFR Part 68]*

Verification: The project owner shall submit to both the District and CPM the information required under this condition.

AQ-38 If subject to Section 112(r) of the CAA and 40 CFR Part 68, the Permittee(s) shall annually certify compliance with all applicable requirements of Section 112(r) as part of the annual compliance certification. This annual compliance certification shall be submitted and received no later than January 30th of each year. *[40 CFR Part 68]*

Verification: The project owner shall submit to the CPM and APCO the certification requirement as part of the annual compliance certification (**AQ-SC9**).

CONDITIONAL TRANSFER OF OWNERSHIP

AQ-39 In the event of any changes in control or ownership of these facilities, this permit together with its terms and conditions shall be binding on all subsequent owners and operators. The Permittee shall notify the succeeding owner and operator of the existence of this permit and its conditions by letter, a copy of which shall be forwarded to the NCUAQMD, and which shall identify the exact effective date of the transfer of ownership.

The new owner(s) and operator(s) of this Title V source shall notify the Air Pollution Control Officer within 30 (thirty) days of the transfer of ownership and which notification shall include a certification by the responsible party that the Title V facility operations are to be operated in the same operational parameters as set out herein, and as before the transfer of ownership.

Any permit or written authorization issued pursuant herein shall not be transferable, by operation of law or otherwise, from one location to another, or from one person to another, unless such transfer occurs as a condition of this permit or as a modification to the permit and with written notification to the Air Pollution Control Officer within 30 (thirty) days of transfer of ownership. *[NCUAQMD Rule 240]*

Verification: The project owner shall submit to both the District and CPM the notification within 30 days of the transfer of ownership (see also **AQ-59**).

SEVERABILITY

AQ-40 If any term or condition of this permit, for any reason, be adjudged by a court of competent jurisdiction to be invalid, such judgment shall not affect or invalidate the remainder of this permit. These permit conditions are enforceable individually and severally. *[NCUAQMD Reg 5 Rule 610(h)] [40 CFR 60.6(b)(5)]*

Verification: No verification needed.

LOCAL ENFORCEABLE ONLY, GENERAL REQUIREMENTS

APPLICABILITY

AQ-41 The requirements outlined in this section are non-federally enforceable local permit requirements. *[NCUAQMD Rule 102]*

Verification: No verification needed.

AQ-42 The Permittee of this Title V source shall not cause or permit the construction or modification of any new source of air contaminants or modifications to an existing source, either minor or major, without first having obtained an Authority to Construct (ATC) permit from the Air Pollution Control Officer.

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

AQ-43 This permit is effective only upon payment of the initial permit fees set out in NCUAQMD Rules and Regulations.

Verification: No verification needed.

ADMINISTRATION

AQ-44 This Permit is issued pursuant to California Health and Safety Code Section 42300. Commencement of any act or operation authorized by this Permit shall be conclusively deemed to be acceptance of all terms and conditions contained herein.

Verification: No verification needed.

AQ-45 The Permittee shall comply with all conditions of this permit. Any violation of any condition of this Permit is a violation of NCUAQMD Rules and Regulations, and California State Law. *[NCUAQMD Rule 105 §1.0]*

Verification: No verification needed.

AQ-46 The Permit Conditions shall be liberally construed for the protection of the health, safety and welfare of the people of the NCUAQMD. *[NCUAQMD Rule 100 §6.3; Rule 102 §5.0]*

Verification: No verification needed.

AQ-47 The NCUAQMD Rules and Regulations may be superseded or revised by the NCUAQMD Board with notice as required by state law. It is Permittee's responsibility to stay current with Rules and Regulations governing its business. The Permittee is therefore expected to comply with all applicable Rules and Regulations. *[NCUAQMD Rule 100 §6.0; Rule 105 §1.0]*

Verification: No verification needed.

AQ-48 Permit requirements apply to the facility owner and/or operator(s) and any contractor(s) or subcontractor(s) performing any activity authorized under this Permit. Any person(s) including contractor(s), subcontractor(s), not in compli-

ance with the applicable permit requirements are in violation of State and Local laws and subject to appropriate civil and criminal penalties. The facility owner and/operator, and all contractor(s) or subcontractor(s) are strictly liable for the actions and violations of their employee(s). A violation committed by a contractor(s) or subcontractor(s) shall be considered a violation by the facility owner(s) and/or operator(s), and is also a violation by the contractor(s) and/or any subcontractor(s). [NCUAQMD Rule 105 §5.0]

Verification: No verification needed.

AQ-49 Changes in plans, specifications, and other representations proposed in the application documents shall not be made if they will increase the discharge of emissions or cause a change in the method of control of emissions or in the character of emissions. Any proposed changes, regardless of emissions consequence, shall be submitted as a modification to this Permit. No modification shall be made prior to issuance of a permit revision for such modification. [NCUAQMD Rule 102]

Verification: The project owner shall submit to both the District and CPM the applications for permit modifications as needed.

AQ-50 Knowing and willful misrepresentation of a material fact in the application for the Permit, or failure to comply with any condition of the Permit, or of the NCUAQMD Rules and Regulations, or any state or federal law, shall be grounds for revocation of this Permit. [NCUAQMD Rule 102]

Verification: No verification needed.

AQ-51 Permittee shall not construct, erect, modify, operate, or use any equipment which conceals the emission of an air contaminant, which would otherwise constitute a violation of the limitations of this Permit. [NCUAQMD Rule 104 §1.2]

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

AQ-52 This Permit does not convey any property rights of any sort, or any exclusive privilege.

Verification: No verification needed.

AQ-53 The "Right of Entry", as delineated in NCUAQMD Rule 109 §1.0 and California Health and Safety Code Section 41510 of Division 26, shall apply at all times. Failure to grant immediate access to NCUAQMD, CARB, or other authorized personnel shall be grounds for permit suspension or revocation.

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

AQ-54 The APCO reserves the right to amend this Permit in order to ensure compliance with all applicable Federal, State and Local laws, Rules and Regulations or to mitigate or abate any public nuisance. Such amendments may include

requirements for additional operating conditions, testing, data collection, reporting and other conditions deemed necessary by the APCO.

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

AQ-55 In the event that two or more conditions may apply, and such conditions both cannot apply without conflict, the condition(s) most protective of the environment and the public health and safety shall prevail. In the event that a condition(s) of the Permit and a requirement of a Federal, State or Local law, rule or regulation may also apply, and both cannot apply without conflict, the requirements most protective of the environment and the public health and safety shall prevail. *[NCUAQMD Rule 100 §6.3; NCUAQMD Rule 102 §5.0]*

Verification: No verification needed.

AQ-56 If any provision or condition of this Permit is found invalid by a court of competent jurisdiction, such finding shall not affect the validity or enforcement of the remaining provisions. *[NCUAQMD Rule 102 §5.0]*

Verification: No verification needed.

AQ-57 This Permit shall be posted in a conspicuous location at the site and shall be made available to NCUAQMD representatives upon request. *[NCUAQMD Rule 102 §8.0]*

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

AQ-58 The Permittee shall pay an annual permit fee and other fees as required in accordance with NCUAQMD Regulation IV. Failure to pay these fees will result in the forfeiture of this Permit. Operation without a permit subjects the source to potential enforcement action by the NCUAQMD. In the event of facility closure or change of ownership or responsibility, the new owner or operator shall be assessed and shall pay any unpaid fees. *[NCUAQMD Regulation IV - Fees]*

Verification: The project owner shall submit to the CPM and APCO the annual operational reports that include information on fees paid (**AQ-SC9** and **AQ-20**).

AQ-59 This Permit is not transferable from either one location to another, from one piece of equipment to another, or from one person to another, except as provided herein. In the event of any change in control or ownership of the subject facility, the Permittee shall notify the succeeding owner of this Permit and its conditions; and shall notify the NCUAQMD of the change in control or ownership within fifteen (15) days of that change. *[NCUAQMD Rule 400 §5.0]*

Verification: The project owner shall submit to both the District and CPM the notification within 15 days of the change in control or ownership (see also **AQ-39**).

AQ-60 A request for Transfer of Ownership of this Permit shall be submitted to the APCO prior to commencing any operation of the subject equipment and/or operations by any owner(s) and/or operator(s) not otherwise identified in this

Permit. Failure to file the Transfer of Ownership constitutes a separate and independent violation, and is cause for voiding this Permit. The burden of applying for a Transfer of Ownership is on the new owner(s) and/or operator(s). Any Permit transfer authorized pursuant to a transfer of ownership request shall contain the same conditions as this Permit. [NCUAQMD Rule 400 §5.0; Rule 102 §5.0]

Verification: The project owner shall submit to both the District and CPM the request for transfer of ownership before commencing operation by a previously unidentified owner and/or operator (see also **AQ-39**).

AQ-61 For purposes of this Permit, the terms identified in the Definition Section shall have the meaning set out therein. [NCUAQMD Rule 102 §5.0]

Verification: No verification needed.

EMISSIONS & OPERATION

AQ-62 This Permit does not authorize the emission of air contaminants in excess of those allowed by the Federal Clean Air Act, California Health and Safety Code or the Rules and Regulations of the NCUAQMD. This Permit shall not be considered as permission to violate existing laws, ordinances, regulation or statutes of other governmental agencies.

Verification: No verification needed.

AQ-63 Permittee shall not discharge 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. [CH&S §41700; NCUAQMD Rule 104 §1.1]

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

AQ-64 Permittee shall not discharge into the atmosphere from any source whatsoever any air contaminant for a period or periods aggregating more than three (3) minutes in any one hour which is as dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines; or of such opacity as to obscure an observer's view to a degree equal to or greater than Ringelmann 2 or forty (40) percent opacity. [CH&S §41701; NCUAQMD Rule 104 §2.0]

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

AQ-65 The handling, transporting, or open storage of material in such a manner which allows unnecessary amounts of particulate matter to become airborne shall not be permitted. Reasonable precautions shall be taken to prevent particulate matter from becoming airborne. [NCUAQMD Rule 104 §4.0]

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

AQ-66 All equipment regulated by this Permit shall at all times be maintained in good working order and shall be operated as efficiently as possible so as to ensure compliance with all applicable emission limits. For purposes of compliance with this requirement, good working order, efficient operation, and proper maintenance shall mean the implementation of all protocols, procedures, and activities recommended by the device manufacturer or those required by this Permit. *[NCUAQMD Rule 102 §5.0]*

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

RECORDS & TRAINING

AQ-67 The Permittee shall provide training and instruction to all contractor(s), sub-contractor(s), and employee(s). Training shall include the identification of all the requirements contained within this Permit, and the appropriate method to be used to comply with the permit conditions. Training shall occur prior to any of the contractor(s), subcontractor(s), or employee(s) constructing or operating equipment authorized by this permit. Records documenting the persons receiving instruction and the instruction materials shall be made available to the APCO upon request. *[NCUAQMD Rule 105 §5.0]*

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

AQ-68 Permittee shall furnish to the APCO, within a reasonable time, any information that the NCUAQMD may request to determine compliance with this Permit or whether cause exists for modifying, revoking and reissuing, or terminating this Permit. Upon request, Permittee shall also furnish to the NCUAQMD copies of records required to be kept by this Permit. *[CH&S §42303; NCUAQMD Rule 103 §6.0, Rule 102 §5.0]*

Verification: The project owner shall submit to both the District and CPM the compliance information as needed.

PERMIT TERM

AQ-69 This Permit is issued pursuant to NCUAQMD Rule 110 Section 9 and shall only become effective after a Final Determination of Compliance has been issued by the APCO pursuant to NCUAQMD Rule 110 §9.6.

Verification: No verification needed.

AQ-70 The authorization for equipment installation and construction activities identified in this Permit shall expire no more than 545 days from date of issue. *[NCUAQMD Rule 102 §5.0]*

Verification: No verification needed.

AQ-71 Once the subject equipment has been constructed in compliance with the conditions of this permit, this Authority to Construct Permit shall serve as a Temporary Permit to Operate for a period not to exceed one hundred and eighty (180) days of operation. Should the need arise, the Temporary Permit to Operate may be extended by the APCO for up to an additional ninety (90) days for good cause shown. The burden of proof lies with the Permittee to demonstrate good cause for such action. [*CH&SC §42301.1; NCUAQMD Rule 102 §2.0*]

Verification: No verification needed.

FEDERALLY ENFORCEABLE, EQUIPMENT-SPECIFIC REQUIREMENTS

The information specified under this section is enforceable collectively and severally by the NCUAQMD, U.S. EPA, and the public.

AUTHORIZED EQUIPMENT

AQ-72 The Permittee shall install and construct the project as described in Authority To Construct application September 29th 2006 and its series of amendments ending with the most recent submittal of February 27th 2008. Should discrepancies or contradictions exist between the application and this Permit, the provisions of this Permit shall prevail. The specific components authorized are listed in Table 1.0 and Table 2.0 below. For each of the reciprocating internal combustion engines S-1 through S-10, both a Selective Catalytic Reduction system (SCR) and an oxidation catalyst shall be designated "A-(engine number) SCR" and "B-(engine number) oxidation catalyst respectively". [*NCUAQMD Rule 504 §2.1*]

Table 1.0 Authorized Emission Devices

Unit No.	Equipment	Nominal Size
S-1	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #1, equipped with lean burn technology, abated by A-1 SCR and B-1oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-2	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #2, equipped with lean burn technology, abated by A-2 SCR and B-2 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-3	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #3, equipped with lean burn technology, abated by A-3 SCR and B-3 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-4	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #4, equipped with lean burn technology, abated by A-4 SCR and B-4 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-5	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #5, equipped with lean burn technology, abated by A-5 SCR and B-5 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-6	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #6, equipped with lean burn technology, abated by A-6 SCR and B-6 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-7	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #7, equipped with lean burn technology, abated by A-7 SCR and B-7 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-8	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #8, equipped with lean burn technology, abated by A-8 SCR and B-8 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-9	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #9, equipped with lean burn technology, abated by A-9 SCR and B-9 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-10	Wärtsilä 18V50DF Dual Fuel Reciprocating Engine #10, equipped with lean burn technology, abated by A-10 SCR and B-10 oxidation catalyst	148.9 MMBtu/hr 16.3 MW 22,931 BHp
S-11	Caterpillar DM8149 (or equivalent) Diesel-fired Emergency IC Engine powering a 350kW electrical generator	469 HP
S-12	Clarke/John Deere JU6H-UF50 (or equivalent) Diesel-fired Emergency IC Engine powering a fire water pump	210 HP

Table 2.0 Authorized Control Devices

Control Equipment	Manufacturer	Model	Specifications
Oxidation Catalyst	HUG Engineering (or equivalent)	OCT-0806-040-0062/450 (or equivalent)	Catalyst: Platinum Reactor Temperature: 608 °F to 908 °F Outlet Temperature: 608 °F to 908 °F Max Flow: 143,000 acfm Control Efficiency: 13ppmvd CO @15%O ₂ while in NG Mode; 20ppmvd CO @15%O ₂ while in Diesel Mode
Selective Catalytic Reduction System	HUG Engineering (or equivalent)	RFV-0890-040-200/300 (or equivalent)	Catalyst: Vanadium Pentoxide Reactor Temperature: 608 °F to 908 °F Outlet Temperature: 608 °F to 908 °F Max Flow: 143,000 acfm Control Efficiency: 6ppmvd NOx @15%O ₂ while in NG Mode; 35ppmvd NOx @15%O ₂ while in Diesel Mode

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

AQ-73 The Permittee shall not modify the equipment subject to this permit in such a manner so as to exceed the Heat Input Capacities, or deviate from the nominal full-load design specifications as submitted in the AFC, and as identified in Table 1.1, Table 1.2, or Table 1.3. *[NCUAQMD Rule 102 §5.0]*

Table 1.1 S-1 Through S-10 Engine Specifications

Primary Fuel	Natural Gas
Backup Fuel	CARB Diesel
Design Ambient Temperature	67.5 °F
Nominal Heat Input Rate (HHV)	143.9 MMBtu/hr natural gas plus 0.79 MMBtu pilot fuel (natural gas mode) – OR – 148.9 MMBtu/hr CARB Diesel Fuel (diesel mode)
Nominal Exhaust Temperature	728°F
Exhaust Flow Rate	121,500 acfm
Exhaust Release Height	100 Feet (above grade)
Exhaust O2 Concentration, dry volume	11.6%
Exhaust CO2 Concentration, dry volume	5.3%
Emission Controls	Lean Burn Technology and SCR; Oxidation Catalyst
SIC	4911
SCC	20100202 natural gas mode; 20100301 diesel mode

Table 1.2 S-11 Engine Specifications

Primary Fuel	CARB Diesel
Nominal Heat Input Rate (HHV)	4.0 MMBtu/hr
Heat Input, gal/hr	29.1
SIC	4911
SCC	20100301

Table 1.3 S-12 Engine Specifications

Primary Fuel	CARB Diesel
Nominal Heat Input Rate (HHV)	1.68 MMBtu/hr
Heat Input, gal/hr	12.3
SIC	4911
SCC	20201607

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

AQ-74 The Permittee shall only fire reciprocating engines S-1 through S-10 with fuel which meets or exceeds the fuel specifications identified in Tables 1.3 and 1.4. Prior to firing reciprocating engines S-1 through S-10 with an Alternative Fuel or CARB Diesel with additives, the Permittee shall make a request to the APCO to switch fuel types. The request shall include all necessary information to characterize emission changes which may occur as a result of the change.

The Permittee shall not fire reciprocating engines S-1 through S-10 with a liquid fuel other than CARB Diesel without prior approval from the APCO. [NCUAQMD Rule 102 §5.0]

Table 1.4 Fuel Specifications for S-1 through S-10

Fuel Type	Property	Value
Natural Gas	Sulfur Content	< 1 gr / 100scf per test; annual average <0.33gr/100scf
CARB Diesel	Sulfur Content	< 15 ppm

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

AQ-75 Reciprocating engines S-1 through S-10 shall be equipped with a monitoring system capable of measuring and recording hours of operation (in tenths of an hour) and fuel consumption (in cubic feet and gallons) while operating in natural gas/diesel pilot mode and diesel mode. The measuring devices shall be accurate to plus or minus 1% at full scale, and shall be tested at least once every twelve months or at more frequent intervals if necessary to ensure compliance with the 1% accuracy requirement. [NCUAQMD Rule 102 §5.0]

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

AQ-76 The exhaust stacks shall not be fitted with rain caps or any other similar device which would impede vertical exhaust flow. [NCUAQMD Rule 102 §5.0]

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

AQ-77 The Permittee shall install and maintain a non-resettable hour meter with a minimum display capability of 9,999 hours upon the Emergency IC Diesel Generators S-11 and S-12. [NCUAQMD Rule 102 §5.0]

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

AQ-78 The Emergency IC Diesel Generators S-11 and S-12 shall use one of the following fuels:

- A. CARB Diesel Fuel, or
- B. An alternative diesel fuel that meets the requirements of the Verification Procedure (as codified in CCR Title 13 Sections 2700-2710), or
- C. CARB Diesel Fuel used with fuel additives that meets the requirements of the Verification Procedure (as codified in CCR Title 13 Sections 2700-2710), or
- D. Any combination of a) through d) above.

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

AQ-79 The reciprocating engines S-11 and S-12 shall be certified to meet the EPA Tier 3 emission levels. *[40 CFR 60 Subpart III]*

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

AQ-80 The Permittee shall obtain APCO approval for the use of any equivalent engine for S-11 or S-12 not specifically approved by this Authority to Construct. Approval of an equivalent engine shall be made only after the APCO's determination that the submitted design and performance data for the proposed IC engine is equivalent to the approved engine. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to both the District and CPM the application for equivalent emergency engines as needed.

AQ-81 The Permittee's request for approval of an equivalent engine shall include the following information: engine manufacturer and model number, horsepower (hp) rating, exhaust stack information, and manufacturer's guaranteed emission concentrations. *[NCUAQMD Rule 504 §4.0; NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to both the District and CPM the application for equivalent emergency engines as needed.

AQ-82 The Permittee's request for approval of an equivalent engine shall be submitted to the NCUAQMD at least 90 days prior to the planned installation date. The Permittee shall also notify the NCUAQMD at least 30 days prior to the actual installation of the NCUAQMD approved equivalent engine. *[NCUAQMD Rule 103 §6.0]*

Verification: The project owner shall submit to both the District and CPM the application for equivalent emergency engines at least 90 days prior to the planned installation date.

AQ-83 The Permittee shall install exhaust gas temperature monitoring devices at the inlet and the outlet of the oxidation catalyst. *[40 CFR §63.6625; BACT]*

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

AQ-84 Ammonia injection points shall be equipped with operational ammonia flow meters and injection pressure indicators. The flow meters shall be accurate to plus or minus 1% at full scale and shall be calibrated at least once every twelve months or at more frequent intervals if necessary to ensure compliance with the 1% requirement. *[NCUAQMD Rule 102 §5.0]*

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

AQ-85 The Permittee shall install points of access to the Emission Devices, Control Devices, and Continuous Emission Monitoring Devices such that source

testing in accordance with the appropriate reference test methods can be performed. All points of access shall conform to the latest Cal-OSHA safety standards. For purposes of compliance with this part, appropriate test methods shall mean the test methods identified in the Testing and Compliance Monitoring Conditions section of this Permit; and the collection of gas samples with a portable NO_x, CO, and O₂ analyzer. Sample collection ports shall be located in accordance with 40 CFR Part 60 Appendix A, and with the CARB document entitled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. *[NCUAQMD Rule 102 §5.0]*

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

AQ-86 Each reciprocating engine shall be equipped with a continuous emission monitor (CEM) for NO_x, CO, and O₂. Continuous emissions monitor(s) shall meet the requirements of 40 CFR part 60, Appendices B and F, and NCUAQMD-approved protocol during normal operations. The monitors shall be designed and operated so as to be capable of monitoring emissions during normal operating conditions and during Startup and Shutdowns Periods. *[NCUAQMD Regulations Appendix B]*

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

AQ-87 The Permittee shall demonstrate compliance with the ammonia slip limit by using the following calculation procedure: The ammonia emission concentration shall be verified by the continuous recording of the ratio of the ammonia injection rate to the NO_x inlet rate into the SCR control system (molar ratio). The maximum allowable NH₃:NO_x molar ratio shall be determined during any required source test, and shall not be exceeded until reestablished through another valid source test. Alternatively, the Permittee may be required to install, operate and maintain a continuous in-stack emissions monitor for emissions of ammonia. The Permittee shall obtain APCO approval for the installation and use the ammonia CEMs equipment at least 60 days prior to the planned installation date. *[NCUAQMD Rule 103 §6.0]*

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

AQ-88 Both onsite and offset emission credits were utilized for this project. Prior to commencement of construction, in accordance with Rule 106 §6.6, the Permittee shall provide to the NCUAQMD APCO documentation of transfer of ownership of offsite Emission Reduction Credits sufficient to offset the emissions identified in Table 3. Prior to commencement of the Commissioning Period, the Permittee shall surrender to the NCUAQMD sufficient offsite emission credits to offset the increases listed in Table 3.0 below. NO_x credits provided to offset PM₁₀ increases shall be at an inter-pollutant ratio of 3.58:1 after the appropriate distance ratio is applied. The Permittee shall permanently shut down the existing facility and all emission units permitted under

Title V Permit To Operate NCU 059-12 in accordance with Condition #110.
 [40 CFR 51, Appendix S; NCUAQMD Rule 110]

Table 3.0 HBRP Required Offsite Offsets By Quarter

Pollutant	Pollutant Quantities in Tons			
	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
PM ₁₀	2.45	2.35	2.37	2.34
ROC	0.62	0.59	0.59	0.59

Verification: The project owner shall submit to both the District and CPM the information on Emission Reduction Credits prior to construction.

EMISSION LIMITING CONDITONS

AQ-89 The Permittee shall not discharge particulate matter into the atmosphere from any combustion source in excess of 0.20 grains per cubic foot of dry gas calculated to 12 percent CO₂ at standard conditions. [NCUAQMD Rule 104 §3.1]

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-164**.

AQ-90 The Permittee shall not discharge sulfur dioxide into the atmosphere in excess of 1000 ppmv or 40 tons per year. [NCUAQMD Rule 104 §5.0]

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-164**.

AQ-91 Visible emissions from reciprocating engines S-1 through S-12 shall not be as dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, or of such opacity so as to obscure an observer's view to a degree equal to or greater than 20%, for any period or periods aggregating more than 3 minutes in any one hour. This visible emission limitation shall not apply during Startup or Shutdown Periods. [NCUAQMD Rule 102 §5.0]

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

AQ-92 The Permittee shall not operate reciprocating engines S-1 through S-10 such that the emissions of NO_x, from a combination of all engines, exceeds 392 lbs per hour. Furthermore, except as provided below, the Permittee shall not operate reciprocating engines S-1 through S-10 such that more than 2 units are in a Diesel Startup Period during any one Clock Hour. Following completion of the emissions testing for all ten units required under Condition #163, the Permittee may request the use of an alternative compliance demonstration method. Such a request shall include, but not be limited to the following:

- A. Identification of alternative operational limit(s) and/or alternative method(s) for determining compliance with the facility wide pound per hour NO_x emission limit; and

- B. Source test data and calculations demonstrating that revisions to emission factors, and/or utilization of an alternative compliance determination method, are appropriate.

Upon written approval by the District of the alternative compliance demonstration method, the permit limitation on the number of Diesel Mode Startups may be modified. In no event shall the facility wide hourly limit of 392 lbs of NOx be increased, nor any operational activities permitted, which would allow an exceedance of any emission limitation. [NCUAQMD Rule 102 §5.0]

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

AQ-93 The Permittee shall not discharge diesel particulate matter from reciprocating engines S-1 through S-10 while operating in Diesel Mode such that emissions of Diesel Particulate Matter exceed 0.11 g/bhp-hr. [NSPS 40 CFR Part 60 Subpart IIII]

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-164**.

AQ-94 The Permittee shall not discharge Carbon Monoxide from reciprocating engines S-1 through S-10 in excess of 0.14 g/bhp-hr or 20 ppmvd @ 15% O₂. [40 CFR 63 Subpart ZZZZ]

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-164**. A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operational report (**AQ-SC9**).

HEAT INPUT & FUEL LIMITATIONS

Engines S-1 Through S-10

AQ-95 The Permittee shall not operate reciprocating internal combustion engines S-1 through S-10 in such a manner so as to exceed the heat input capacities listed in Table 4.0 on a per engine basis. [NCUAQMD Rule 102 §5.0]

Table 4.0 Heat Input Limitations Per Engine

Each Unit ¹		Heat Input, MMBtu (HHV)	
		Hourly 3 hr rolling average	Daily 24 hour rolling average
Natural Gas Mode ²	Natural Gas	143.9	3,454
	Diesel (Pilot)	0.8	19
Diesel Mode	Diesel	148.9	3574

Notes:

- 1) Each unit can only run in either Natural Gas or Diesel Mode, not both simultaneously.
- 2) Heat Input in Natural Gas Mode is the sum of natural gas and diesel pilot also.

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

AQ-96 The Permittee shall not operate reciprocating internal combustion engines S-1 through S-10 in such a manner so as to exceed the heat input capacities listed in Table 4.1 below calculated as a sum of all 10 engines. [NCUAQMD Rule 102 §5.0]

Table 4.1 Heat Input Limitations S-1 Through S-10 Engines Combined

Sum of All 10 Units		Heat Input, MMBtu (HHV)		
		Hourly	Daily	Annual
Natural Gas Mode ¹	Natural Gas	1,439	34,536	9,277,233 ²
	Diesel Pilot	7.9	190	51,576
Diesel Mode	Diesel	1,489	30,376 ^{2,3}	148,900 ²

Notes:

- 1) Total Heat Input in Natural Gas Mode is the sum of natural gas and diesel pilot.
- 2) This limit applies to operation for maintenance and testing, and during periods of Natural Gas Curtailments as defined in this permit. The limit shall not apply to fuel consumed during the Commissioning Period.
- 3) This limit was established to ensure compliance with the PM_{2.5} standard

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

AQ-97 The Permittee shall not exceed the diesel fuel firing limits listed in Table 4.2 below while operating reciprocating engines S-1 through S-10 in Natural Gas Mode. [NCUAQMD Rule 102 §5.0]

Table 4.2 Diesel Fuel Firing Limitations (Pilot)

Engines S-1 Through S-10	Gallons of Diesel Fuel		
	Hourly 3 hr rolling average	Daily 24 hour rolling average	Annual 365 day rolling average
All Combined	58	1,402	376,734

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

AQ-98 The Permittee shall not exceed the diesel fuel firing limits listed in Table 4.3 below while operating reciprocating engines S-1 through S-10 in Diesel Mode. [NCUAQMD Rule 102 §5.0]

Table 4.3 Diesel Fuel Firing Limitations

Engines S-1 Through S-10	Gallons of Diesel Fuel		
	Hourly 3 hr rolling average	Daily 24 hour rolling average	Annual 365 day rolling average
Per Engine	1,088	26,106	—
All Combined	10,876	221,877 ^{1,2}	1,087,630 ¹

Notes:

- 1) This limit applies to operation for maintenance and testing, and during periods of Natural Gas Curtailments as defined in this permit. The limit shall not apply to fuel consumed during the Commissioning Period.
- 2) This limit was established to ensure compliance with the PM_{2.5} standard (85% average load)

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

POLLUTANT LIMITATIONS

S-1 – S-10 Startup & Shutdown Periods

AQ-99 The Permittee shall not operate reciprocating engines S-1 through S-10, such that they individually discharge pollutants exceeding the limits identified in Table 5.0 below during Startup or Shutdown Periods. *[NCUAQMD Rule 102 §5.0]*

Table 5.0 Start & Shutdown Period Emission Limits

Mode of Operation	Pollutant				
	NOx	CO	ROC	PM10	SOx
Natural Gas, lb/hr	23.6	24.1	17.9	3.6	0.4
Diesel Mode, lb/hr	164	25.5	17.2	10.8	0.22

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

S-1 – S-10 Natural Gas Mode

AQ-100 The Permittee shall not operate reciprocating engines S-1 through S-10, such that they individually discharge pollutants exceeding the limits identified in Table 5.1 below based upon a three (3) hour average with the exception of NOx which shall be based upon a one (1) hour average. The limits shall not apply during Startup or Shutdown Periods. *[40 CFR 63.6(f)(1), NCUAQMD Rule 102 §5.0]*

Table 5.1 Natural Gas Mode Emission Limits – per engine

Pollutant	Emission Rate		
	ppmvd @ 15% O ₂	lb/hr	lb/MMBtu
CO	13	4.13	0.029
NH ₃	10	1.9	0.013
NOx	6.0	3.1	0.022
PM ₁₀	-	3.6	-
ROC	28	5.1	0.035
SOx	-	0.40	0.0028

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

AQ-101 The combined discharge of pollutants, from the reciprocating engines S-1 through S-10 shall not exceed the limits listed in Table 5.2 below during any Calendar Day in which none of the engines are operated in Diesel Mode for any period of time. For purposes of compliance with this condition, the emissions from Startup and Shutdown Periods shall be included in the daily calculation of emissions. *[NCUAQMD Rule 102 §5.0]*

**Table 5.2
S-1 Through S-10 Combined Natural Gas Mode Limit**

Pollutant	Emission Rate lb/Day
CO	1,589
NH ₃	456
NOx	1,360
PM ₁₀	864
ROC	1,608
SOx	97

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

S-1 – S-10 Diesel Mode

AQ-102 The Permittee shall not discharge pollutants into the atmosphere from the reciprocating engines S-1 through S-10 while in Diesel Mode, based upon a three (3) hour rolling average, in excess of the emission limits identified in Table 5.3 below. The limits shall not apply during Startup or Shutdown Periods. *[40 CFR 63.6(f)(1), NCUAQMD Rule 102 §5.0]*

Table 5.3 Diesel Mode Emission Limits – per engine

Pollutant	Emission Rate		
	ppmvd @ 15% O ₂	lb/hr	lb/MMBtu
CO	20.0	6.9	0.047
NH ₃	10	2.1	0.014
NOx	35.0	19.9	0.134
PM ₁₀	-	10.8	0.137
ROC	40.0	7.9	0.053
SOx	0.40	0.22	0.0016

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

AQ-103 The discharge of Diesel Particulate Matter into the atmosphere from the reciprocating engines S-1 through S-10 while in Diesel Mode shall not exceed the emission limits identified in Table 5.4 below. The limits shall not apply during the Commissioning Period as defined in this permit. *[NCUAQMD Rule 102 §5.0;]*

Table 5.4 Diesel Particulate Matter Limitations

Engines S-1 Through S-10	Diesel Particulate Matter (pounds)		
	Hourly 3 hr rolling average	Daily 24 hour rolling average	Annual 365 day rolling average
Per Engine	5.56	133.4	—
All Combined	55.6	1,334	5,560

Verification:

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

AQ-104 The combined discharge of pollutants from the reciprocating engines S-1 through S-10 during any Calendar Day shall not exceed the limits listed in Table 5.5 below during any Calendar Day in which one or more of the engines are operated in diesel mode for any period of time. For purposes of compliance with this condition, the emissions from Startup and Shutdown Periods shall be included in the daily calculation of emissions.

Table 5.5
S-1 Through S-10 Combined Diesel Mode Limit

Pollutant	Emission Rate lb/Day
CO	2,219
NH ₃	506
NO _x	9,103
PM ₁₀	1,542
ROC	2,183
SO _x	97

For purposes of determining compliance with the daily PM₁₀ limit in Table 5.5, the Permittee shall not operate reciprocating engines S-1 through S-10 in Diesel Mode for more than 142 engine-hours per day. Following completion of the PM₁₀ emissions testing required under Condition #163 on all 10 engines, the Permittee may request the use of an alternative compliance demonstration method. Such a request shall include, but not be limited to the following:

- A. Identification of the highest PM emission rates of the 10 units as determined during initial performance testing.
- B. Identification of alternative operational limit(s) and/or alternative method(s) for determining compliance with the facility wide pound per day PM emission limit; and
- C. Source test data and calculations demonstrating that revisions to emission factors and/or compliance determination method(s) are appropriate.

Upon written approval by the District of the alternative compliance demonstration method, the permit limitation on the number of hours of operation in Diesel Mode may be modified. The highest PM pollutant values identified during the initial performance testing shall become the permitted emission limits for all engine units. In no event, shall the newly established emission limits be in excess of 10.8 lbs/hr. (the manufacturer's guaranteed emission rates identified in the AFC), and in the ATC materials submitted by the applicant. In no event shall the facility wide daily limit of 1,542 pounds be increased, nor any operational activity permitted, which would allow an exceedance of any emission limitation. Compliance with the daily facility wide PM emission limit shall be calculated as a function of engine hourly emission rate times the number of hours of operation per day. *[NCUAQMD Rule 102 §5.0]*

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

AQ-105 The combined discharge of pollutants from the reciprocating engines S-1 through S-10 during any calendar year shall not exceed the limits listed in Table 5.6 below. *[NCUAQMD Rule 102 §5.0]*

Table 5.6
S-1 Through S-10 Combined Annual Emission Limits

Pollutant	Emission Rate Tons/Yr
CO	172.7
NH ₃	63.3
NO _x	179.1
PM ₁₀	119.8
ROC	190.8
SO _x	4.3

Verification: The project owner shall submit to the CPM and APCO the annual operational reports that include monitoring and compliance results (**AQ-SC9** and **AQ-20**).

Engines S-11 and S-12

AQ-106 The Permittee shall not operate reciprocating engines S-11 and S-12 such that pollutant discharge into the atmosphere exceeds the quantities in Table 5.7 below. *[NCUAQMD Rule 102 §5.0]*

Table 5.7 Reciprocating Engines S-11 and S-12 Emission Limits

Unit	Pollutant	g/Hp – hr	lb/hr
S-11 Emergency Generator	CO	0.63	0.65
	DPM	0.05	0.05
	NO _x	3.47	3.59
	ROC (non-methane HC)	0.4	0.41
	SO _x	—	0.0061
S-12 Fire Pump	CO	0.59	.27
	DPM	0.14	0.06
	NO _x	4.9	2.27
	ROC (non-methane HC)	0.5	0.23
	SO _x	—	0.0026

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

AQ-107 The combined discharge of pollutants from the reciprocating engines S-11 through S-12 during any calendar year shall not exceed the limits listed in Table 5.8 below. *[NCUAQMD Rule 102 §5.0]*

Table 5.8
S-11 and S-12 Combined Annual Emission Limits

Pollutant	Emission Rate lbs/Yr
CO	45
NOx	287
DPM	5.5
ROC	31.5
SOx	0.4

Verification: The project owner shall submit to the CPM and APCO the annual operational reports that include monitoring and compliance results (**AQ-SC9** and **AQ-20**).

STARTUP COMMISSIONING & SIMULTANEOUS OPERATION

AQ-108 This Permit supplements existing NCUAQMD Permit Numbers for the HBPP of NS-020 (Boiler #1), NS-21 (Boiler #2) and NS-057 (Turbines) until such time as the sources are decommissioned. *[NCUAQMD Rule 102 §5.0]*

Verification: No verification needed.

AQ-109 The Permittee shall notify the NCUAQMD of the anticipated date of initial startup of the reciprocating engines S-1 through S-10 not more than 60 days, or less than 30 days prior to initial startup. The Permittee shall notify the APCO of the actual startup of reciprocating engines S-1 through S-10 not more than 15 days after actual initial startup. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO the notification of reciprocating engine startup not more than 60 days or less than 30 days prior to initial startup, and notification of actual startup not more than 15 days after initial startup.

AQ-110 The existing generating units at Humboldt Bay Power Plant shall be shut down as soon as possible following the commercial operation of all of the reciprocating engines S-1 through S-10. The existing generating units at Humboldt Bay Power Plant *[NCUAQMD Permit Units NS-020 (Boiler #1), NS-21 (Boiler #2) and NS-57 (Turbines)]* and any of the new HBRP reciprocating engines S-1 through S-10 shall not be in simultaneous operation for more than 180 calendar days, including their individual Commissioning Periods; and shall be shutdown and their Permits to Operate (PTOs) surrendered once engines S-1 through S-10 have successfully completed their Commissioning Phase as defined elsewhere in this permit. Operation of the existing plant units and any engine or engines for any portion of a calendar day, shall accrue toward the maximum limit of 180 days. *[NCUAQMD Rule 110, Rule 102 §5.0]*

Verification: The project owner shall surrender to the CPM and APCO the permits for existing units at Humboldt Bay Power Plan within 180 after initial startup of the new reciprocating engines.

AQ-111 Selective catalytic reduction (SCR) systems and oxidation catalysts shall serve each reciprocating engine except as provided for in Condition #114. Permittee

shall submit SCR and oxidation catalyst design details to the NCUAQMD for review and approval at least 90 days prior to scheduled delivery of these systems to the site. The Permittee shall not install or operate the SCR and oxidation catalyst systems without authorization from the APCO. *[NCUAQMD Rule 110, Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the design details for control devices not more than 90 days prior to scheduled delivery.

AQ-112 Permittee shall submit continuous emission monitor design, installation, and operational details to the NCUAQMD within 120 days following commencement of construction. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the details for continuous emission monitors not more than 120 days after commencing construction.

AQ-113 In accordance with the NCUAQMD approved Commissioning Plan required under Condition #123, the reciprocating engines shall be tuned to minimize emissions in the time frame specified in the approved Commissioning Plan. *[NCUAQMD Rule 102 §5.0;]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-114 In accordance with the NCUAQMD approved Commissioning Plan required under Condition #123, the Selective Catalytic Reduction (SCR) system and the oxidation catalyst shall be installed, adjusted, and operated to minimize emissions from each reciprocating engine in the time frame specified in the Commissioning Plan. *[NCUAQMD Rule 102 §5.0;]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-115 The continuous monitors specified in Permit Conditions #75, #83, and #86 shall be installed, calibrated, and operational prior to the first firing of reciprocating engines S-1 through S-10. After first firing, the detection range of the CEMS shall be adjusted as necessary to accurately measure the resulting range of NOx and CO emission concentrations. *[NCUAQMD Rule 102 §5.0;]*

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

AQ-116 The Permittee shall record and monitor the parameters identified in Table 7.0 of this Permit at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation). The Permittee shall use APCO approved methods to calculate heat input rates, oxides of nitrogen mass emission rates (reported as nitrogen dioxide), carbon monoxide mass emission rates, and NOx and CO emission concentrations, summarized for each hour and each day. *[NCUAQMD Rule 102 §5.0; NCUAQMD Regulation Appendix B]*

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

AQ-117 The total number of firing hours of each reciprocating engine S-1 through S-10 without abatement of emissions by the SCR system and the oxidation catalyst shall not exceed 100 hours for each engine during the Commissioning Period. Such operation of each reciprocating engine without abatement shall be limited to discrete Commissioning Activities that can only be properly executed without the SCR system and the oxidation catalyst in place. Upon completion of these activities for each engine, the Permittee shall provide written notice to the NCUAQMD and the unused balance of the allowable firing hours without abatement for that engine shall expire. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-118 When one or more reciprocating engines S-1 through S-10 are undergoing Commissioning Activities without an SCR system and oxidation catalyst installed, the Permittee shall not: *[NCUAQMD Rule 102 §5.0]*

- A. Fire more than five uncontrolled reciprocating engines simultaneously.
- B. Operate the uncontrolled engines such that their combined hours of operation exceed 90 engine-hours during any Calendar Day.
- C. Operate the uncontrolled engines such that their combined hours of operation while in the “alignment phase” exceed 13 engines-hours during any Calendar Day.

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-119 During the Commissioning Period while any of the engines are being operated without an SCR system and oxidation catalyst, the Permittee shall not operate reciprocating engines S-1 through S-10, such that the combined emissions from all of the engines regardless of their commissioning status, exceed any of the limits in Table 5.9 below: *[NCUAQMD Rule 102 §5.0]*

Table 5.9
S-1 through S-10 Combined Commissioning Emission Limits

Pollutant	lbs/hr	lbs/day
CO	197.2	2,662
NOx	323.3	4,365
PM ₁₀	54	1,296
ROC (as Methane)	86.6	1,559
SOx (SO ₂)	2.0	48.4

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-120 For each engine during its Commissioning Period, after four hours of steady-state operation of the SCR system and the oxidation catalyst has occurred, the NOx and CO emissions from that reciprocating engine shall thereafter comply with the limits specified in Permit Conditions #99 through #105. For purposes of compliance with this condition, steady-state operation shall mean: the engine, SCR system, and oxidation catalyst all functioning according to manufacturers specifications and operating in compliance with emission limits as determined by the CEMS. In no event, shall the Commissioning Period for each engine exceed 180 consecutive calendar days beginning on the first day the engine is first fired. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-121 Firing hours on 100% CARB Diesel Fuel or Alternative Liquid Fuel during the Commissioning Period shall not be considered Maintenance and Testing for purposes of compliance with the annual operating hour limitations specified in the Operational Conditions section of this Permit. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-122 The total mass emissions of NOx, CO, ROC, PM₁₀, and SOx that are emitted from the reciprocating engines during the Commissioning Period shall accrue towards the annual emission limits specified in Condition #107. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-123 The Permittee shall submit a plan to the NCUAQMD at least four weeks prior to the first operation of the first of reciprocating engines S-1 through S-10, describing the procedures to be followed during the Commissioning Period. The plan shall include a description of each Commissioning Activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the reciprocating engines, the installation and operation of the SCR systems and the oxidation catalysts, the installation, calibration, and testing of the NOx and CO continuous emissions monitors, and any activities requiring the firing of each unit without abatement by an SCR system or oxidation catalyst. *[40 CFR Part 63; NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan at least four weeks prior to the first operation of the reciprocating engines.

AQ-124 Not later than 90 days prior to first operation, the Permittee shall prepare and submit to the NCUAQMD for approval a plan for complying with the requirements of 40 CFR 63 Subpart ZZZZ. This compliance plan shall provide for an initial performance test on each engine to demonstrate that each oxidation catalyst is achieving a minimum 70% reduction in CO over a four hour period.

During the initial performance test, the Continuous Emission Monitors shall successfully complete a performance evaluation in accordance using PS3 and 4A of 40 CFR Part 60 Appendix B; the oxidation catalyst pressure drop and inlet temperature shall be measured using ASTM D6522-00 [§63.6625(a)]; and the CEMS data collected in accordance with §63.6625(a) with the data reduced to 1-hour averages.

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

AQ-125 Not later than 90 days prior to first operation, the Permittee shall prepare and submit to the NCUAQMD for approval a plan for complying with the requirements of 40 CFR 60 Subpart IIII. This compliance plan shall provide for an initial performance test on each reciprocating engine to demonstrate compliance with the NO_x and PM limitations of 40 CFR §60.4204(c)(1) and (c)(2) and shall establish operating parameters to be monitored continuously to ensure that each reciprocating engine continues to meet the applicable emission standards.

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-123**.

OPERATIONAL CONDITIONS

Engines S-1 through S-10

AQ-126 In the event of an excess emission incident, regardless of the cause, the Permittee shall immediately take corrective action to minimize the release of excess emissions. Notice shall be provided to the NCUAQMD as indicated in the Reporting and Recordkeeping Section of this Permit. For purposes of compliance with this condition, excess emissions shall mean discharge of pollutants in quantities which exceed those authorized by Federal, State, NCUAQMD Rules, and this Permit. *[40 CFR 70.6(a)(3)(iii)(B); NCUAQMD Rule 105 §5.0]*

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

AQ-127 All equipment listed in Table 1.0 Authorized Emission Devices and 2.0 Authorized Control Devices shall be operated and maintained by the Permittee in accordance with manufacturer's specifications for optimum performance; and in a manner so as to minimize emissions of air contaminants into the atmosphere. *[NCUAQMD Rule 102 §5.0]*

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

AQ-128 The Permittee shall implement and maintain a written Startup, Shutdown, and Malfunction Plan as described in as described in 40 CFR 63.6(e) (3) which contains specific procedures for maintaining the reciprocating engines S-1 through S-12, their associated control devices, their associated CEMS, sensors, measuring devices, and their associated exhaust gas duct work, during periods

of startup, shutdown, and malfunction. The plan must clearly describe the startup and shutdown sequence procedure for each unit. The Plan shall also include a specific program of corrective actions to be implemented in the event of a malfunction in either the process or control systems. Modifications to the Plan are subject to APCO approval and the Permittee shall not operate the reciprocating engines S-1 through S-12 and their associated control devices unless a NCUAQMD approved Startup, Shutdown, and Malfunction Plan is in effect. The Plan shall be submitted to the NCUAQMD not less than thirty (30) calendar days prior to the Commissioning Period for any of reciprocating engines S-1 through S-10. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the startup, shutdown, and malfunction plan at least 30 days prior to the commissioning period.

AQ-129 The Permittee shall develop, implement and maintain a written Device Operational Plan that contains specific procedures for operating the reciprocating engines S-1 through S-12, their associated control devices, their associated CEMS, sensors, measuring devices, and their associated exhaust gas duct work under the varying load conditions which may occur during normal modes of operation. The Plan shall also include specific protocols to be followed when transitioning between modes of operation. This plan shall be consistent with the requirements of this Permit, and all local, state and federal laws, rules, and regulations. The plan shall include, but not be limited to, daily system integrity inspections and the recording of operational parameters. The Plan shall be submitted to the NCUAQMD not more than ~~sixty~~ thirty (30) calendar days following expiration of the Commissioning Period for any of reciprocating engines S-1 through S-10. The Plan is subject to APCO approval. The Permittee shall not operate the reciprocating engines S-1 through S-12 and their associated control devices, after the expiration of the Commissioning Period for any of the reciprocating engines plus 60 days, unless a NCUAQMD approved Device Operational Plan is in effect. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the device operational plan within 30 days after the commissioning period.

AQ-130 The Permittee shall develop, implement and maintain a written Device Maintenance & Replacement Plan that contains specific procedures for equipment maintenance and identifies replacement intervals for components of the reciprocating engines S-1 through S-12, their associated control devices, their associated CEMS, sensors, measuring devices, and their associated exhaust gas duct work. The Plan shall be submitted to the NCUAQMD not more than thirty (30) calendar days following expiration of the Commissioning Period for any of reciprocating engines S-1 through S-10. The Plan is subject to APCO approval. The Permittee shall not operate the reciprocating engines S-1 through S-12 and their associated control devices, after the expiration of the Commissioning Period for any of the reciprocating engines plus 60 days, unless a NCUAQMD approved Device Maintenance & Replacement Plan is in effect. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to the CPM and APCO for approval the device maintenance and replacement plan within 30 days after the commissioning period.

AQ-131 The Permittee shall only operate the Reciprocating engines S-1 through S-10 in Natural Gas Mode except during the Commissioning Period, during Maintenance and Testing, and during Natural Gas Curtailments as set forth in this permit. *[NCUAQMD Rule 102 §5.0]*

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

AQ-132 The Permittee shall not operate reciprocating engines S-1 through S-10 such that Startup Periods exceed 60 minutes in length. *[NCUAQMD Rule 102 §5.0]*

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

AQ-133 The Permittee shall not operate reciprocating engines S-1 through S-10 such that Shutdown Periods exceed 30 minutes in length. *[NCUAQMD Rule 102 §5.0]*

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

AQ-134 The Permittee shall not operate the reciprocating engines S-1 through S-10 such that the combined hours of operation during Startup and Shutdown Periods exceeds 30 engine-hours per day. *[NCUAQMD Rule 102 §5.0]*

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

AQ-135 The Permittee shall not operate the reciprocating engines S-1 through S-10 such that the combined hours of operation during Startup and Shutdown Periods exceeds 3,650 engine-hours per calendar year. Of the 3,650 engine hours available hours, the hours of operation during Startup and Shutdown Periods in Diesel Mode shall not exceed 500 engine-hours per calendar year. *[NCUAQMD Rule 102 §5.0]*

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

AQ-136 The Permittee shall not operate any of the reciprocating engines S-1 through S-10 below 50% load except during Startup and Shutdown Periods. *[NCUAQMD Rule 102 §5.0]*

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

AQ-137 The Permittee shall not operate the reciprocating engines S-1 through S-10 for more than 80 engine-hours per Calendar Day at loads less than 12.0 MW. *[NCUAQMD Rule 102 §5.0]*

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

AQ-138 While operating the reciprocating engines S-1 through S-10 in Diesel Mode, the Permittee shall fire the engines:

- A. Only with CARB Diesel as specified in Table 1.4 Fuel Specifications for S-1 through S-10;
- B. For no more than 50 hours per year for maintenance and testing per engine; and
- C. Such that the combined engine operating hours do not exceed 1000.0 engine hours per year on a 365 day rolling average basis, or the combined engine hours specified in Condition of Certification **PUBLIC HEALTH-1**, whichever is less.

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

AQ-139 For each Oxidation Catalyst installed, during the performance testing required pursuant to the Testing and Monitoring section of this Permit, the Permittee shall determine the pressure drop across each catalyst. The Permittee shall operate the reciprocating engines S-1 through S-10 such that the pressure drop across the catalyst does not exceed the following acceptable range for any period of time: The acceptable pressure range is two inches of water column (plus or minus 10%) deviation from the pressure drop established during performance testing. *[40 CFR 63 Subpart ZZZZ]*

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

AQ-140 The Permittee shall not operate reciprocating engines S-1 through S-10 if the inlet temperature of the oxidation catalyst is outside of the acceptable operating range for any period of time. The acceptable operating range of the oxidation catalyst is greater than or equal to 450 °F and less than or equal to 1350 °F. Each reciprocating engine is paired with a single oxidation catalyst unit. For purposes of compliance with this condition, each engine and catalyst pair is evaluated separately. This Condition does not apply during Startup or Shut-down Periods or during malfunctions. *[40 CFR 63 Subpart ZZZZ]*

Verification: A summary of significant operation and maintenance events and monitoring records required (**AQ-151**) shall be included in the semi-annual operational report (**AQ-SC9**).

AQ-141 The Permittee shall not operate reciprocating engines S-1 through S-10 unless the CO emissions from the units are abated by the oxidation catalyst at a rate greater than or equal to 70% over uncontrolled emission levels, calculated on a 3 hour rolling average. Verification of the emissions reduction shall be completed in accordance with 40 CFR 63 Subpart ZZZZ. This Condition does not apply during Startup or Shutdown Periods or during malfunctions. [40 CFR 63 Subpart ZZZZ]

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

Engines S-11 and S-12

AQ-142 The Permittee shall not operate the reciprocating engines S-11 and S-12, for the purpose of maintenance and testing, in excess of the hour limits listed in Table 6.1 below [NCUAQMD Rule 102 §5.0]:

Table 6.1 S-11 and S-12 Hourly Operating Limits

Device	Daily	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
S-11	1	12	12	13	13
S-12	1	12	12	13	13

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

AQ-143 The Permittee shall not operate the reciprocating engines S-11 and S-12, for the purpose of maintenance and testing, within the same 24 hour period. [NCUAQMD Rule 102 §5.0]

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

AQ-144 The Permittee shall not operate the reciprocating engines S-11 and S-12, for the purpose of maintenance and testing, when any of the reciprocating engines S-1 through S-10 are operating in diesel mode. [NCUAQMD Rule 102 §5.0]

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

AQ-145 The Permittee shall not operate reciprocating engine S-11, for the purpose of maintenance and testing, for more than 45 minutes in any 60 minute period. [NCUAQMD Rule 102 §5.0]

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

REPORTING & RECORDKEEPING

AQ-146 The Permittee shall report all occurrences of breakdowns of the equipment listed in Table 1.0 Authorized Emission Devices or Table 2.0 Authorized Control Devices which result in the release of emissions in excess of the limits identified in this Permit. Said report shall be submitted to the NCUAQMD in accordance with the timing requirements of NCUAQMD Rule 105 §5.0.

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

AQ-147 The Permittee shall maintain a Breakdown log that describes the breakdown or malfunction, includes the date and time of the malfunction, the cause of the malfunction, corrective actions taken to minimize emissions and the date and time when the malfunction was corrected. *[NCUAQMD Rule 102 §5.0]*

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

AQ-148 The Permittee shall immediately record the following information when an event occurs where emissions from the equipment listed in Table 1.0 Authorized Emission Devices are in excess of any limits incorporated within this permit:

- A. Date and time of the excess emission event
- B. Duration of the excess emission event
- C. Description of the condition or circumstance causing or contributing to the excess emission event
- D. Emission unit or control device or monitor affected
- E. Estimation of the quantity and type of pollutants released
- F. Description of corrective action taken
- G. Actions taken to prevent reoccurrence of excess emission event.

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

AQ-149 The Permittee shall provide to the NCUAQMD, a completed "Compliance Certification" form signed by the Facility's Responsible Official which certifies the compliance status of the facility twice per calendar year. The compliance certification form must be submitted to the NCUAQMD according to the following schedule: The semiannual certification (covering quarters 1 and 2) must

be submitted prior to July 31st of the reporting year; and the annual certification (covering quarters 1, 2, 3, and 4) prior to March 1st of the following calendar year. The content of the Certification shall include copies of the records designated in Table 7.0 to be kept "Annually".

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

AQ-150 The Permittee shall maintain a monthly log of usage for the Emergency IC Diesel Generators S-11 and S-12 in accordance with applicable Reporting Requirements for Emergency Standby Engines, Item (e)(4)(I) of Section 93115, Title 17, California Code of Regulations, Air Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) engines. The monthly log of usage shall list and document the nature of use for each of the following by recording the hour meter readings for each operational event:

- A. Emergency use hours of operation;
- B. Maintenance and testing hours of operation (e.g., load testing, weekly testing, rolling blackout, general power outage, etc
- C. Hours of operation for emission testing to show compliance with §93115(e)(2)(A)3 and (e)(2)(B)3 of the ATCM;
- D. Hours of operation to comply with requirements of NFPA 25;
- E. Hours of operation for all other uses other than those specified in Section (e)(2)(A)3 and (e)(2)(B)3 of the ATCM;
- F. Fuel used through the retention of fuel purchase records that account for all fuel used in the engine and all fuel purchased for use in the engine, and, at a minimum, contain the following information for each individual fuel purchase transaction:
 1. Identification of the fuel purchased as either CARB Diesel, or an alternative diesel fuel that meets the requirements of the Verification Procedure;
 2. Sulfur content of the fuel;
 3. Amount of fuel purchased;
 4. Date when the fuel was purchased;
 5. Signature of owner or operator or representative of Permittee who received the fuel; and
 6. Signature of fuel provider indicating fuel was delivered.

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

AQ-151 The Permittee shall continuously maintain onsite for the most recent five year period and shall be made available to the NCUAQMD APCO upon request, the records as listed in Table 7.0 below.

Table 7.0 Required Records for Engines S-1 through S-10

Frequency	Information to be Recorded
Upon Occurrence	<ul style="list-style-type: none"> A. Records of maintenance conducted on engines (40 CFR 60 Subpart IIII) B. Time, duration, and fuel firing mode for each engine startup C. Time, duration, and fuel firing mode for each engine shutdown D. Time, duration and reason for each period of operation in Diesel Mode E. For each bulk delivery of diesel fuel received, certification from the supplier that the diesel fuel meets or exceeds CARB Diesel specifications F. For each bulk delivery of diesel fuel received, the higher heating value (HHV) and sulfur content of the fuel G. Fuel Mode – each operating minute shall be designated as either “Natural Gas” or “Diesel Mode”
At least one electronic reading every 15 minutes	<ul style="list-style-type: none"> A. NO_x (ppmvd @15% O₂) B. CO (ppmvd @15% O₂) C. O₂ (%) D. Exhaust gas temperature as SCR inlet (°F) E. Exhaust gas temperature at OC inlet (°F) F. Engine load (%)
Hourly (for each engine)	<ul style="list-style-type: none"> A. NO_x (ppmvd @15% O₂) and lb/hr, on a rolling 3 hour average B. CO (ppmvd @15% O₂) and lb/hr, on a rolling 3 hour average C. ROC (ppmvd @15% O₂) and lb/hr, on a rolling 3 hour average D. NH₃ (ppmvd @15% O₂) and lb/hr, on a rolling 3 hour average E. SO_x (ppmvd @15% O₂) and lb/hr, on a rolling 3 hour average F. Natural gas fuel consumption (MMBtu HHV, 3-hr rolling average) G. Diesel fuel consumption during Diesel Mode (MMBtu HHV, 3-hr rolling average) H. Volumetric proportion of natural gas to diesel pilot injection when operating in Natural Gas Mode
Daily	<ul style="list-style-type: none"> A. NO_x (lbs/day, total for all engines) B. CO (lbs/day, total for all engines) C. ROC (lbs/day, total for all engines) D. SO_x (lbs/day, total for all engines) E. PM (lbs/day, total for all engines) F. Diesel Particulate Matter (lbs/day, total for all engines) G. Natural gas fuel consumption (MMBtu HHV, for each engine and total for all engines) H. Diesel pilot fuel consumption (MMBtu HHV, all engines combined) I. Diesel fuel consumption during Diesel Mode (MMBtu HHV, for each

Frequency	Information to be Recorded
	engine and total for all engines) J. Engine load (% load on a 24 hour average for each engine and total for all engines) K. Hours of operation (each engine and total for all engines as a sum of operating minutes) L. Quantity of fuel combusted (therms and gallons for each engine and total for all engines)
Monthly	A. Sulfur content of natural gas (gr/100scf, monthly fuel testing) B. Natural gas sulfur content (gr/100scf, 12 month rolling average)
Quarterly (combined total for all engines)	A. NOx (tons) B. CO (tons) C. SOx (tons) D. ROC(tons) E. PM (tons) F. Diesel Particulate Matter (tons) G. Natural gas fuel consumption (MMBtu HHV) H. Diesel pilot fuel consumption (MMBtu HHV) I. Diesel fuel consumption during Diesel Mode (MMBtu HHV) J. Sulfur content of natural gas (gr/100scf, 12 month rolling average) K. Hours of operation (for each fuel mode) L. Quantity of fuel combusted (therms, gallons)
Annually (combined total for all engines)	A. NOx (tons) B. CO (tons) C. SOx (tons) D. ROC(tons) E. PM (tons) F. Diesel Particulate Matter (tons) G. Natural gas fuel consumption (MMBtu HHV) H. Diesel pilot fuel consumption (MMBtu HHV) I. Diesel fuel consumption during Diesel Mode (MMBtu HHV) J. Sulfur content of natural gas (gr/100scf, annual average) K. Hours of operation (for each fuel mode) L. Quantity of fuel combusted (therms, gallons)

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

AQ-152 For each Quarter, the Permittee shall submit a written report to the APCO detailing the following items for the operation of the CEMS. The report shall conform to the requirements of NCUAQMD Rules and Regulations Appendix B, Section 2.2, and shall be submitted within 30 days of the end of the quarter.

- A. Time intervals;
- B. Date and magnitude of excess emissions;
- C. Nature and cause of excess (if known);
- D. Corrective actions taken and preventive measures adopted;
- E. Averaging period used for data reporting shall correspond to the averaging period for each respective emission standard;
- F. Applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and
- G. A negative declaration when no excess emissions occurred.

Verification: The project owner shall submit to the CPM and APCO quarterly monitoring reports that include updates to the semi-annual monitoring results (**AQ-SC9**).

AQ-153 The Permittee shall provide notification and record keeping as required pursuant to 40 CFR, Part 60, Subpart A, 60.7.

Verification: No verification needed.

AQ-154 The Permittee shall annually prepare and submit a comprehensive facility wide emission inventory report for all criteria pollutants and toxic air contaminants emitted from the facility. The inventory and report shall be prepared in accordance with the most recent version of the CAPCOA / CARB reference document *Emission Inventory Criteria Guidelines*. The inventory report shall be submitted to the NCUAQMD APCO no later than March 1st of the following calendar year. The inventory report is subject to NCUAQMD APCO approval. [NCUAQMD Rule 102 §5.0]

Verification: The project owner shall submit to the CPM and APCO the annual operational reports that include monitoring and compliance results (**AQ-SC9** and **AQ-20**).

AQ-155 The Permittee shall submit the health risk assessment protocol to the NCUAQMD APCO for review no later than 9 months after the Commissioning Period for the reciprocating engines S-1 through S-10 has concluded. [NCUAQMD Rule 102 §5.0]

Verification: The project owner shall submit to both the District and CPM for approval the health risk assessment protocol within 9 months after the commissioning period.

AQ-156 No later than 14 months after the Commissioning Period for reciprocating engines S-1 through S-10 has concluded, the Permittee shall submit to the NCUAQMD APCO a revised health risk assessment. The health risk assessment shall be prepared pursuant to an NCUAQMD APCO approved protocol based upon CARB and California Office of Health and Hazard Assessment guidance documents. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit to both the District and CPM the revised health risk assessment within 14 months after the commissioning period.

AQ-157 Not later than 24 hours after determining that diesel mode operation is to occur as a result of an expected Natural Gas Curtailment, the permittee shall notify the APCO by telephone, email, electronic page, or facsimile. The notification shall include, but not be limited to, the following *[NCUAQMD Rule 102 §5.0]*:

- A. The anticipated start time and duration of operation in diesel mode under the Natural Gas Curtailment; and
- B. The anticipated quantity of Diesel fuel expected to be burned under the Natural Gas Curtailment.

Verification: The project owner shall submit to both the District and CPM the notification within 24 hours after determining that diesel mode operation is to occur.

AQ-158 Not later than 24 hours following the end of a period of any diesel mode operation, the permittee shall notify the APCO by email or facsimile of the following *[NCUAQMD Rule 102 §5.0]*:

- A. The actual start time and end time of the period of diesel mode operation;
- B. The identification of the Reciprocating engines that were operated and the average load at which each reciprocating engine was operated on Diesel fuel during the diesel mode operating period; and
- C. The actual quantity of Diesel fuel consumed during the diesel mode operation.

Verification: The project owner shall submit to both the District and CPM the notification within 24 hours after the end of diesel mode operation.

TESTING & COMPLIANCE MONITORING

AQ-159 The Permittee shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F.

Verification: No verification needed.

AQ-160 The Permittee shall monitor and record exhaust gas temperature at the inlet and at the outlet of the oxidation catalyst. *[40 CFR 63 Subpart ZZZZ]*

Verification: A summary of significant operation and maintenance events and monitoring records required (**AQ-151**) shall be included in the semi-annual operational report (**AQ-SC9**).

AQ-161 Not less than thirty days prior to the date of any source test required by this Permit, the Permittee shall provide the NCUAQMD APCO with written notice of the planned date of the test and a copy of the source test protocol.

Verification: The project owner shall submit the proposed protocol for the source tests 30 days prior to the proposed source test date to both the District and CPM for approval.

AQ-162 Source test results shall be summarized in a written report and submitted to the NCUAQMD APCO directly from the independent source testing firm on the same day, the same time, and in the same manner as submitted to Permittee. Source Test results shall be submitted to the NCUAQMD APCO no later than 60 days after the testing is completed.

Verification: The project owner shall submit source test results no later than 60 days following the source test date to both the District and CPM.

AQ-163 The Permittee shall demonstrate compliance with all the emission limits identified in this Permit during the Commissioning Period of each of the reciprocating engines S-1 through S-10 using the following methods. Testing shall be conducted both while the engines are operated in Natural Gas Mode and while operated in Diesel Mode. All compliance tests shall be conducted at 50%, 75%, and 95% or greater of the operating capacity of each reciprocating engine. Alternative test methods may be approved by the APCO.

- A. Particulate Matter – CARB Method 5 (front and back half) or EPA Methods 201a and 202.
- B. Diesel Particulate Matter – CARB Method 5 (front half).
- C. Visible Emissions.
 - 1. Permittee shall perform a “Visible Emission Evaluation” (VEE) concurrent with particulate matter testing. A CARB certified contractor shall perform such an evaluation.
- D. Ammonia – Bay Area Air Quality Management NCUAQMD Method ST-1B.
- E. Reactive Organic Gases – CARB Method 100.
- F. Nitrogen Oxides – CARB Method 100.
- G. Carbon Monoxide – CARB Method 100 & ASTM D6522-00 [NESHAP ZZZZ].
- H. Oxygen – CARB Method 100 & ASTM D6522-00 [NESHAP ZZZZ].
 - 1. Oxygen shall be measured at the inlet and outlet of the oxidation catalyst.

2. Oxygen measurements shall be made at the same time as the CO measurements.
 3. Pressure drop measurements across the catalyst shall be made at the same time as the CO measurements.
- I. Natural Gas Fuel Sulfur Content – ASTM D3246.
 - J. Liquid Fuel Sulfur Content – ASTM D5453-93.

Verification: The project owner shall submit the proposed protocol for the source tests 30 days prior to the proposed source test date to both the District and CPM for approval. The project owner shall notify the District and CPM no later than 7 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 60 days following the source test date to both the District and CPM.

AQ-164 The Permittee shall demonstrate compliance with all the emission limits identified in this Permit for the reciprocating engines S-1 through S-10 once per calendar year unless indicated below, using the following methods. Except as provided in Condition #123, testing shall be conducted while the engines are operated in Natural Gas Mode. All compliance tests shall be conducted at an operating capacity of 50%, 75%, or 95% or greater during the testing of each reciprocating engine. Alternative test methods may be approved by the APCO. *[NCUAQMD Rule 102 §5.0]*

- A. Particulate Matter – CARB Method 5 (front and back half) or EPA Methods 201a and 202.
- B. Diesel Particulate Matter – CARB Method 5 (front half).
- C. Visible Emissions - Permittee shall perform a “Visible Emission Evaluation” (VEE) concurrent with particulate matter testing. A CARB certified contractor shall perform such an evaluation.
- D. Ammonia – Bay Area Air Quality Management NCUAQMD Method ST-1B.
- E. Reactive Organic Gases – CARB Method 100.
- F. Nitrogen Oxides – CARB Method 100.
- G. Carbon Monoxide – CARB Method 100.
- H. Oxygen – CARB Method 100.
 1. Oxygen shall be measured at the inlet and outlet of the oxidation catalyst.
 2. Oxygen measurements shall be made at the same time as the CO measurements.
 3. Pressure drop measurements across the catalyst shall be made at the same time as the CO measurements.

I. Natural Gas Fuel Sulfur Content – ASTM D3246.

J. Liquid Fuel Sulfur Content – ASTM D5453-93.

Verification: The project owner shall submit the proposed protocol for the source tests 30 days prior to the proposed source test date to both the District and CPM for approval. The project owner shall notify the District and CPM no later than 7 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 60 days following the source test date to both the District and CPM.

AQ-165 The engines shall be tested on a rotating basis with all of the engines to be tested in natural gas mode each year and all engines tested at the three different load values at least once every three years; and that each engine is tested at a different load each year. Each engine shall be tested, at the following loads (50%, 75%, ≥95%) or under conditions determined by the APCO to most challenge the emission control equipment. The APCO may waive some or all of the testing requirements if the results of previous compliance tests have demonstrated compliance with permitted emission limits by a sufficient margin. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-164**.

AQ-166 Permittee shall demonstrate compliance with permitted emission limits for Engines S-1 through S-10 while operating in Diesel Mode once every three years or following each 200 hours of operation of an individual engine in Diesel mode whichever is sooner. Compliance shall be demonstrated as indicated below using the following methods. All compliance tests shall be conducted while an engine is operated in Diesel mode at 50%, 75% or 95% or greater operating capacity of each engine; or under conditions determined by the APCO to most challenge the emission control equipment. Alternative test methods may be approved by the APCO *[NCUAQMD Rule 102 §5.0]*:

- A. Particulate Matter - CARB Method 5 (front and back half), or EPA Methods 201a and 202.
- B. Diesel Particulate Matter – CARB Method 5 (front half only).
- C. Visible Emissions - U.S. EPA Method 9.
- D. Ammonia – Bay Area Air Quality Management NCUAQMD Method ST-1B.
- E. Reactive Organic Gases – ARB Method 100.
- F. Nitrogen Oxides -- ARB Method 100.
- G. Carbon Monoxide – ARB Method 100.
 - 1. CO shall be measured at the inlet and outlet of the oxidation catalyst.

H. Oxygen – ARB Method 100.

1. Oxygen shall be measured at the inlet and outlet of the oxidation catalyst.
2. Oxygen measurements shall be made at the same time as the CO measurements.

I. Liquid Fuel Sulfur Content – ASTM D5453-93.

Verification: The project owner shall submit the proposed protocol for the source tests 30 days prior to the proposed source test date to both the District and CPM for approval. The project owner shall notify the District and CPM no later than 7 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 60 days following the source test date to both the District and CPM.

AQ-167 The engines shall be tested at various loads (50%, 75%, ≥95%) on a rotating basis, with one-third of the engines to be tested in diesel mode in each year; and tested at each of the three loads. The APCO may waive some or all of the testing requirements if the results of previous compliance tests have demonstrated compliance with permitted emission limits by a sufficient margin. The engines shall be tested on a rotating basis with all engines tested at the three different load values at least once every nine years; and that each engine is tested at a different load each rotation. *[NCUAQMD Rule 102 §5.0]*

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-166**.

AQ-168 The Permittee shall demonstrate compliance with the hourly, daily, and annual ROC emission limits through the use of valid CO CEM data and the ROC/CO relationship determined by annual CO and ROC source tests; and APCO approved emission factors and methodology. *[40 CFR 63 Subpart ZZZZ; NCUAQMD Rule 102 §5.0]*

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

AQ-169 The Permittee shall demonstrate compliance with the hourly, daily, and annual SO_x emission limits through the use of valid fuel use records, natural gas sulfur content, diesel fuel sulfur content, mass balance calculations; and APCO approved emission factors and methodology. The natural gas sulfur content shall be determined on a monthly basis using ASTM D3246. *[NCUAQMD Rule 102 §5.0, PSD]*

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

AQ-170 The Permittee shall demonstrate compliance with the hourly, daily, and annual PM emission limits, and the diesel particulate matter emission limits, through

the use of valid fuel use records, source tests, and APCO approved emission factors and methodology. [NCUAQMD Rule 102 §5.0, PSD]

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

AQ-171 Relative accuracy test audits (RATAs) shall be performed on each CEMS at least once every twelve months, in accordance with the requirements of 40 CFR 60, Appendix B. Calibration Gas Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The NCUAQMD shall be notified in writing at least 30 days in advance of the scheduled date of the audits. Audit reports shall be submitted along with quarterly compliance reports to the NCUAQMD within 60 days after the testing was performed.

Verification: The project owner shall submit to the CPM and APCO quarterly results of relative accuracy test audits (RATAs) as updates to the semi-annual monitoring results (**AQ-SC9**).

LOCAL ENFORCEABLE ONLY, EQUIPMENT-SPECIFIC REQUIREMENTS

FUEL USAGE

AQ-172 The Emergency IC Diesel Generators S-11 and S-12 shall use one of the following fuels:

- A. CARB Diesel Fuel, or
- B. An alternative diesel fuel that meets the requirements of the Verification Procedure (as codified in CCR Title 13 Sections 2700-2710), or
- C. CARB Diesel Fuel used with fuel additives that meets the requirements of the Verification Procedure (as codified in CCR Title 13 Sections 2700-2710), or
- D. Any combination of a) through d) above.

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

EMISSIONS

AQ-173 The Permittee shall not discharge diesel particulate matter from reciprocating engines S-1 through S-10 while operating in Diesel Mode such that emissions of Diesel Particulate Matter exceed 0.15 g/bhp-hr. [CCR Title 17 §93115]

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-166**.

OPERATIONAL CONDITIONS

AQ-174 While operating the reciprocating engines S-1 through S-10 in Diesel Mode, the Permittee shall fire the engines for no more than 50 hours per year for each engine for Maintenance and Testing. [CCR Title 17, §93115]

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

AQ-175 The Emergency IC Diesel Generators S-11 and S-12 are authorized the following maximum allowable annual hours of operation as listed in Table 6.0 below [17 CCR §93115] :

Table 6.0 Hours of Operation for Emergency IC Diesel Generators S-11 & S-12

Emergency Use	Non-Emergency Use	
	Emission Testing to Show Compliance	Maintenance & Testing
Not Limited by the ATCM	Not Limited by the ATCM	50 hours/year

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

AMBIENT MONITORING

AQ-176 No later than 180 days after construction of the equipment authorized pursuant to this permit begins, and concurrent with the commencement of operation, the Permittee shall provide full funding for the purchase and installation of a new monitoring station (Shelter; CO, NOx, PM10/PM2.5, and other sampling equipment as determined by the APCO) to be installed at a location approved by the APCO. The funding shall include all costs associated with the purchase, installation, operation and maintenance (including personnel costs) of the monitoring station for an initial period of not less than five (5) years. PG&E shall reimburse the District for costs incurred within 30 days of receiving an invoice from the District. At the conclusion of that period, the APCO may extend the operation of the site if deemed in the best interest of the District, and PG&E will continue to fund all costs associated with its continued operation. The District shall manage the procurement, operation and maintenance of the site, and District staff will be responsible for collecting, securing, and quality assuring all data. [District Rule 102 §5.0]

Verification: The project owner shall certify providing the District full funding for the ambient air quality monitoring station. A copy of the letter certifying funding shall be submitted to the CPM within 15 days of issuance.

AQ-177 No later than 180 days after construction of the equipment authorized pursuant to this permit begins, and concurrent with the commencement of operation, the Permittee shall provide full funding for the purchase and installation of a new meteorological monitoring station to be installed at a location approved

by the APCO. The funding shall include all costs associated with the purchase, installation, operation and maintenance (including personnel costs) of the meteorological monitoring station for an initial period of not less than five (5) years. PG&E shall reimburse the District for costs incurred within 30 days of receiving an invoice from the District. At the conclusion of that period, the APCO may extend the operation of the site if deemed in the best interest of the District, and PG&E will continue to fund all costs associated with its continued operation. The District shall manage the procurement, operation and maintenance of the site, and District staff will be responsible for collecting, securing, and quality assuring all data. The data collected at the station shall meet the requirements of EPA-454/R-99-005 "Meteorological Monitoring Guidance for Regulatory Modeling Applications" February 2000. [District Rule 102 §5.0]

Verification: The project owner shall certify providing the District full funding for the meteorological station. A copy of the letter certifying funding shall be submitted to the CPM within 15 days of issuance.

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BIOLOGICAL RESOURCES

Testimony of N. Misa Ward

SUMMARY OF CONCLUSIONS

The Humboldt Bay Repowering Project (HBRP) site is located on the same parcel of land as the existing Humboldt Bay Power Plant, three miles south of the city of Eureka in Humboldt County. The HBRP would impact United States Army Corps of Engineers (USACE) jurisdictional wetlands and California Coastal Commission (Coastal Commission) wetlands. In addition, the HBRP has the potential to impact special-status plant and animal species known to occur in the project vicinity; however, compliance with Section 404 of the federal Clean Water Act, staff's biological resources conditions of certification, and other laws, ordinances, regulations, and standards (LORS) discussed in the staff analysis would mitigate impacts to biological resources from the HBRP.

INTRODUCTION

This section of the Final Staff Assessment provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from the construction and operation of the HBRP. Information provided in this document addresses potential impacts to state and federally listed species, Species of Special Concern, and areas of critical biological concern. This analysis also describes the biological resources at the project site and at the locations of ancillary facilities. This document explains the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also describes compliance with applicable LORS and recommends conditions of certification.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for the HBRP (PG&E 2006a); the Draft Wetland Delineation Report (CH2MHILL 2006a); the Buhne Point Wetlands Preserve Mitigation and Monitoring Plan for the HBRP (Dains and CH2MHILL 2007); responses to staff data requests (CH2MHILL 2007a); site visits conducted on August 21, 2006, December 18, 2006, February 2, 2007, and November 6, 2007; and discussions with various agency and applicant representatives.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL	
Clean Water Act (CWA) of 1977	Title 33, United States Code, Sections 1251–1376 and Code of Federal Regulations, part 30, Section 330.5(a)(26) prohibit the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the U.S. Army Corps of Engineers.
Endangered Species Act (ESA) of 1973	Title 16, United States Code, Section 1531 et seq. and Title 50, Code of Federal Regulations, part 17.1 et seq. designate and provide for the protection of threatened and endangered plant and animal species and their critical habitat. The administering agency is the U.S. Fish and Wildlife Service (USFWS).
Migratory Bird Treaty Act	Title 16, United States Code, Sections 703–712 prohibit the take of migratory birds, including nests with viable eggs. The administering agency is the USFWS.
Bald and Golden Eagle Protection Act	Title 16, United States Code, Section 668 prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions.

STATE	
	The administering agency for the following state LORS is the California Department of Fish and Game (CDFG), except for the CWA Section 401 Water Quality Certification, which is administered by the Regional Water Quality Control Board and the California Coastal Act, administered by the California Coastal Commission.
California Endangered Species Act (CESA) of 1984	Fish and Game Code Sections 2050–2098 protect California's rare, threatened, and endangered species.
California Code of Regulations	California Code of Regulations Title 14, Division 1, Subdivision 3, Chapter 3, Sections 670.2 and 670.5 list plants and animals of California that are designated as rare, threatened, or endangered.
Fully Protected Species	Fish and Game Code Sections 3511, 4700, 5050, and 5515 prohibit the take of animals that are classified as Fully Protected in California.
Nest or Eggs – Take, Possess, or Destroy	Fish and Game Code Section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of Prey – Take, Possess, or Destroy	Fish and Game Code Section 3503.5 specifically protects California's birds of prey in the orders <i>Falconiformes</i> and <i>Strigiformes</i> by making it unlawful to take, possess, or destroy any such birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Migratory Birds – Take or Possession	Fish and Game Code Section 3513 protects California’s migratory non-game birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.
Significant Natural Areas	Fish and Game Code Sections 1930 et seq. designate certain areas in California such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Native Plant Protection Act of 1977	Fish and Game Code Sections 1900 et seq. designate rare, threatened, and endangered plants in the state of California.
Streambed Alteration Agreement	Fish and Game Code Sections 1603 et seq. regulate activities by private utilities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit.
Regional Water Quality Control Board (RWQCB)	By federal law every applicant for a federal permit or license for an activity which may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
California Coastal Act	The California Coastal Act sets out a series of policies to protect and enhance the California Coastal Zone. The Coastal Act addresses marine resources, biological productivity, environmentally sensitive habitat areas, wetlands, and other issues.

LOCAL	
Humboldt County General Plan	Chapter 3 of the Framework Plan includes biological resources policies that focus on protection and minimization of impacts to sensitive biological resources including wetlands and special-status species.

SETTING

REGIONAL AND LOCAL

The proposed HBRP site is located approximately three miles south of the City of Eureka in an unincorporated area of Humboldt County. The project is within the Coastal Zone and would be located on 5.4 acres within a 143-acre parcel currently occupied by the existing PG&E Humboldt Bay Power Plant.

The property is bounded on the north by Humboldt Bay, on the west by the King Salmon community, on the east by the Northwestern Pacific Railroad tracks, and on the south by King Salmon Avenue. East of the railroad property are Highway 101, some rural parcels, and commercial development. South of King Salmon Avenue are wetland areas

and the Humboldt Hill residential development. Southwest of Humboldt Hill is the community of Fields Landing. West of the King Salmon community are Humboldt Bay, a sand spit known as South Spit, and beyond the spit, the Pacific Ocean (HBRP 2006a, pp. 8.6-1 and 8.6-2).

A shoreline trail maintained by PG&E and the Humboldt Bay Harbor Recreation and Conservation District runs along the shoreline on the perimeter of the Humboldt Bay Power Plant property to the northwest. This portion of the trail extends from the King Salmon community south to the wetlands along the bay. This trail represents part of a planned coastal trail system that the California Coastal Conservancy envisions would eventually extend from Oregon to Mexico (HBRP 2006a, p. 8.13-6).

The project vicinity is characterized by agricultural land as well as industrial, commercial, and residential areas, and there are areas of freshwater, saltwater, and riparian marsh in the vicinity of the project site. Other vegetation communities that exist within one mile of the project site include grasslands, coastal dunes, mud flats and eelgrass beds, coyote brush scrub, North Coast forest, and North Coast riparian forest. In addition, the waters of Humboldt Bay are located adjacent to the project site (PG&E 2006a).

Special-Status Species

A variety of special-status plant and animal species are known to occur in the area presently or to have occurred in the area historically. **Biological Resources Table 1** provides a list of these special-status species in the project vicinity. The majority of the species listed in **Biological Resources Table 1** are unlikely to be impacted by the HBRP due to lack of suitable habitat at the project site. Staff provides an analysis of potential impacts to special-status species that may be impacted by the project.

BIOLOGICAL RESOURCES Table 1
Special-Status Species Reported or Suspected to Occur in the Vicinity of HBRP

Scientific Name	Common Name	Status
Plants		
<i>Abronia umbellata</i> ssp. <i>breviflora</i>	Pink sand-verbena	CNPS List 1B.1
<i>Carex arcta</i>	Northern clustered sedge	CNPS List 2.2
<i>Carex leptalea</i>	Flaccid sedge	CNPS List 2.2
<i>Carex lyngbyei</i>	Lyngbye's sedge	CNPS List 2.2
<i>Castilleja affinis</i> ssp. <i>litoralis</i>	Oregon coast Indian paintbrush	CNPS List 2.2
<i>Castilleja ambigua</i> ssp. <i>humboldtiensis</i>	Humboldt Bay owl's-clover	CNPS List 1B.2
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	Point Reyes bird's-beak	CNPS List 1B.2
<i>Erysimum menziesii</i> ssp. <i>eurekense</i>	Humboldt Bay wallflower	CNPS List 1B.1, CE, FE
<i>Gilia millefoliata</i>	Dark-eyed gilia	CNPS List 1B.2
<i>Hesperis matronalis</i> var. <i>brevifolia</i>	Short-leaved evax	CNPS List 2.2
<i>Lathyrus japonicus</i>	Sand pea	CNPS List 2.1
<i>Lathyrus palustris</i>	Marsh pea	CNPS List 2.2
<i>Layia carnosa</i>	Beach layia	CNPS List 1B.1, CE, FE
<i>Lilium occidentale</i>	Western lily	CNPS List 1B.1, CE, FE
<i>Sidalcea oregana</i> ssp. <i>eximia</i>	Coast checkerbloom	CNPS List 1B.2
<i>Spergularia canadensis</i> var. <i>occidentalis</i>	Western sand-spurry	CNPS List 2.1
Fish		
<i>Oncorhynchus kisutch</i>	S. Oregon / N. California Coho salmon	CT, FE
<i>Oncorhynchus tshawytscha</i>	California coastal Chinook salmon	CT, FT
<i>Oncorhynchus mykiss</i>	Northern California steelhead	FT

Scientific Name	Common Name	Status
<i>Eucyclogobius newberryi</i>	Tidewater goby	CSC, FE
Amphibians		
<i>Caretta caretta</i>	Loggerhead turtle	FT
<i>Chelonia mydas</i>	Green turtle	FT
<i>Dermochelys coriacea</i>	Leatherback turtle	FE
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	FT
<i>Rana aurora aurora</i>	Northern red-legged frog	CSC
Birds		
<i>Brachyramphus marmoratus</i>	Marbled murrelet	CE, FT
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	FT
<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	CE
<i>Haliaeetus leucocephalus</i>	Bald eagle	CE, FP, FFD
<i>Pandion haliaetus</i>	Osprey	CSC
<i>Pelecanus occidentalis californicus</i>	California brown pelican	CE, FP, FE
<i>Phalacrocorax auritus</i>	Double-crested cormorant	CSC
<i>Phoebastria albatrus</i>	Short-tailed albatross	FE
<i>Rallus longirostris obsoletus</i>	California clapper rail	CE, FE
<i>Strix occidentalis caurina</i>	Northern spotted owl	FT
<i>Synthliboramphus hypoleucus</i>	Xantus's murrelet	CT
Mammals		
<i>Balaenoptera borealis</i>	Sei whale	FE
<i>Balaenoptera musculus</i>	Blue whale	FE
<i>Balaenoptera physalus</i>	Fin whale	FE
<i>Eumetopias jubatus</i>	Steller sea lion	FT
<i>Megaptera novaengliae</i>	Humpback whale	FE
<i>Physeter macrocephalus</i>	Sperm whale	FE

Status Key

Federal Status

FE = Federally listed as Endangered

FT = Federally listed as Threatened

FD = Delisted

State Status

CE = State-listed as Endangered

CT = State-listed as Threatened

CSC = California Species of Special Concern

FP = Fully Protected species

California Native Plant Society (CNPS) Status

CNPS List 1B = Plants rare, threatened, or endangered in California and elsewhere

CNPS List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere

.1 = Very endangered in California

.2 = Fairly endangered in California

Sources: **PG&E 2006a**; **CDFG 2007a, 2007b**; **CNPS 2007**

Sensitive Habitats

Critical Habitat

The USFWS has designated critical habitat for the western snowy plover, beach layia, and Humboldt Bay wallflower within two miles of the project site. Critical habitat for the western snowy plover and for beach layia is located in the areas known as the North Spit and the South Spit, which are located across from the HBRP site on the western side of Humboldt Bay, as well as in an area at the mouth of the Elk River approximately one mile north of the HBRP site. The only critical habitat for Humboldt Bay wallflower within two miles of the HBRP is located on the North Spit. The project is not expected to impact any of these areas of critical habitat because they are all located at least one mile or more from the HBRP.

Aquatic Habitat

Aquatic habitats within two miles of the HBRP include seasonal wetlands, drainages, salt marsh, freshwater marsh, mud flats, California Coastal Commission wetlands, tidal channels, and Humboldt Bay. Section 404 of the federal Clean Water Act, Section 10 of the Rivers and Harbors Act, and the California Coastal Act regulate impacts to wetlands and “waters of the U.S.” Later sections of this chapter discuss impacts to aquatic habitats in more detail.

PROJECT SITE

The proposed HBRP site is located on a 143-acre parcel owned by PG&E and is currently occupied by the Humboldt Bay Power Plant. The HBRP site is situated on Buhne Point, a small peninsula along Humboldt Bay, and currently contains industrial land, landscaped areas, wetlands, Buhne Slough, and cooling water intake and discharge canals associated with the existing Humboldt Bay Power Plant. The Humboldt Bay Power Plant consists of a natural gas-fired power plant, an inoperable nuclear energy generating unit, and two mobile emergency power plants, as well as ancillary facilities. Buhne Slough and the intake and discharge channels connect to Humboldt Bay. Historical photographs of the site indicate that the majority of the proposed project site was marshy lowland prior to development (PG&E 2006a, Humboldt State University Library).

Power Plant Site and Construction Laydown Area

The HBRP would occupy 5.4 acres within the PG&E parcel. The 5.4-acre HBRP site currently contains developed areas that are part of the existing power plant, USACE-jurisdictional wetlands, and Coastal Commission wetlands. A 2.4-acre HBRP construction laydown area would be located adjacent to the HBRP site. Currently, the laydown area consists of grassland, Coastal Commission wetlands, and USACE-jurisdictional wetlands (PG&E 2006a, p. 8.2-32).

Aquatic Habitat

The USACE regulates impacts to wetlands under Section 404 of the Clean Water Act. The Clean Water Act defines “wetlands” as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support—and that under normal circumstances do support—a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (38 CFR 328.3). The project site contains approximately 20.67 acres of wetlands subject to the Clean Water Act, including areas of freshwater marsh, saltwater marsh, riparian marsh, and drainage ditches (Dains and CH2MHILL 2007).

The California Code of Regulations has a much broader definition of wetlands than does the federal Clean Water Act, stating, “Wetland shall be defined as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent and drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salts or other substances in the substrate” (14

CCR 13577). The California Coastal Commission regulates impacts to wetlands that fall under this definition, including wetlands that are also under USACE jurisdiction.

The project site contains approximately 5.69 acres that are considered wetlands by the Coastal Commission but are not considered wetlands by the USACE. These areas on the project site are considered wetlands by the Coastal Commission based solely on the fact that they support wetland indicator plants classified as “facultative” (FAC) (PG&E 2006a, p. 8.2-28). FAC plants are defined as “equally likely to occur in wetlands or nonwetlands” (Reed 1988).

Tidal channels that are located on the site are considered non-wetland “waters of the United States” and are also subject to USACE jurisdiction; however, tidal channels are not expected to be impacted by the HBRP (PG&E 2006a, p. 8.2-24). In addition, CDFG staff visited the project site and determined that none of the activities would require a 1600 permit (Streambed Alteration Agreement) (Crowe, personal communication, 2007).

Temporary Access Road and Remote Parking Areas

The HBRP would require construction of a temporary access road from King Salmon Avenue to the project site. The temporary access road would parallel the southern bank of the Humboldt Bay Power Plant intake channel. The area in which the temporary access road would be constructed contains grassland, Coastal Commission wetlands, ornamental trees and shrubs, drainage ditches, and seasonal wetlands (PG&E 2006a, p. 8.2-30, Fig. 8.2-3).

A short-term delivery parking area to be used for equipment deliveries and a temporary remote parking area for construction personnel would be constructed for the project. The short-term delivery parking area is a 0.34-acre site located on the south side of King Salmon Avenue. The parking area is currently compacted gravel; however, it is located immediately adjacent to wetlands in which special-status plant species were discovered during surveys conducted by the applicant’s biologists (PG&E 2006a, p. 8.2-30, Fig. 8.2-3).

The temporary remote parking area is located farther north on the east side of King Salmon Avenue. The proposed parking area has been used for parking in the past, but is currently abandoned. It currently consists of broken pavement and weedy vegetation. A footpath for construction personnel from this parking area to the construction site would be constructed as part of the project. The footpath may affect grassland areas but would not affect wetlands (PG&E 2006a, p. 8.2-30, Fig. 8.2-3).

Linear Facilities

Linear facilities that would be built as part of the HBRP include an electric transmission connection and a gas interconnection. Both of these facilities would be located within the footprint of the temporary access road and the HBRP site (PG&E 2006a, p. 8.2-30).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The California Environmental Quality Act (CEQA) Guidelines define “direct” impacts as those impacts that result from the project and occur at the same time and place. “Indirect” impacts are caused by the project but can occur later in time or farther removed in distance, yet are still reasonably foreseeable. The potential impacts discussed below are those most likely to be associated with construction and operation of the project.

Significance of impacts is generally determined by compliance with applicable LORS; however, because of the diversity of biological resource impacts, guidelines adopted by resource agencies may also be used.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The applicant conducted biological resource surveys of the PG&E property on which the existing Humboldt Bay Power Plant is located and on which the proposed HBRP would be located, as well as of areas within a one-mile radius of the proposed HBRP site. The applicant conducted habitat and wildlife field surveys on 10 dates in March, April, June, July, and August 2006 (PG&E 2006a, p. 8.2-2).

Effects on Wetlands

Construction of the HBRP would cause temporary and permanent impacts to wetlands that are under the jurisdiction of the USACE and the California Coastal Commission and to additional wetlands that are solely under the jurisdiction of the Coastal Commission (PG&E 2006a, p. 8.2-36). Impacts to wetlands are a potentially significant impact, and the applicant has proposed measures to mitigate wetland impacts.

USACE-Jurisdictional Waters

The applicant delineated USACE jurisdictional waters and Coastal Commission wetlands for the AFC and for the draft wetland delineation (PG&E 2006a, Fig. 8.2-3; CH2MHill 2006a). The applicant worked to avoid impacts to wetlands due to construction of the project, but, due to the prevalence of wetlands on the site, the HBRP would require fill of some drainages, seasonal wetlands, and marsh areas.

Biological Resources Table 2 indicates the acreages of USACE-jurisdictional seasonal wetlands, drainages, and riparian, salt, and freshwater marsh that would be impacted by the project as identified in the AFC and final wetland acreages verified by the USACE (Dains and CH2MHILL 2007).

BIOLOGICAL RESOURCES Table 2
Estimated Impacts to USACE-Jurisdictional Wetlands and Waters of the U.S.

Project Feature	Habitat Type	Permanent Impact (Acres)	Temporary Impact (Acres)
HBRP footprint including gas and transmission connections	Seasonal wetlands	0.10	0
	Drainages	0.07	0
	Riparian, salt, and freshwater marshes	0.05	
Construction laydown area, temporary access road, and water pipeline	Seasonal wetlands	0	0.03
	Drainages	0	0
	Riparian, salt, and freshwater marshes	0	0
TOTAL		0.22 acre	0.03 acre

Sources: PG&E 2006a, p. 8.2-32, CH2MHill 2007e, Dains and CH2MHILL 2007

California Coastal Commission Wetlands

In addition to impacting USACE-jurisdictional waters, the HBRP would impact areas that the California Coastal Commission classifies as wetlands but are not classified as wetlands by the USACE. The Coastal Commission also regulates areas that are under USACE jurisdiction. **Biological Resources Table 3** summarizes impacts to wetlands under the jurisdiction of the California Coastal Commission, including wetlands that are also under USACE jurisdiction.

BIOLOGICAL RESOURCES Table 3
Estimated Impacts to Coastal Commission Wetlands

Project Feature	Habitat Type	Permanent Impact (Acres)	Temporary Impact (Acres)
HBRP footprint including gas and transmission connections	Coastal Commission wetlands ¹	0.96	0
Construction laydown area, temporary access road, and water pipeline	Coastal Commission wetlands ¹	0	2.49
TOTAL		0.96 acre	2.49 acres

Source: PG&E 2006a, p. 8.2-32, CH2MHill 2007e, Dains and CH2MHILL 2007

¹ Acreages for Coastal Commission wetlands do not include wetlands that are under jurisdiction of the USACE; however, USACE wetlands are also under the jurisdiction of the Coastal Commission.

Wetland Mitigation Measures

The applicant designed the HBRP to minimize impacts to wetlands and has proposed measures to mitigate unavoidable impacts to wetlands (PG&E 2006a, pp. 8.2-36, 8.2-47 to 8.2-55). The applicant's proposed mitigation measures include restoration of wetland habitats disturbed during construction, restoration of historic wetlands on the PG&E property that have previously been filled, enhancement of existing wetlands on the property, and implementation of best management practices and erosion control measures (PG&E 2006a, p. 8.2-47).

Biological Resources Table 4 summarizes the mitigation ratios for temporary and permanent wetland impacts proposed by the applicant (CH2MHILL 2007e, WSQ-8; Dains and CH2MHILL 2007) and the amount of wetland mitigation land required based on the applicant's proposed mitigation ratios and the impacts to wetlands as summarized in **Biological Resources Table 2** and **Table 3**.

**BIOLOGICAL RESOURCES Table 4
Applicant's Proposed Wetland Mitigation**

Wetland Type	Applicant's Proposed Mitigation Ratio	Approximate Wetland Acreage Impacted²	Approximate Mitigation Acreage Required³
Drainages	1.5:1	0.07	0.11
Seasonal wetlands	2:1	0.13	0.25
Riparian, salt, and freshwater marshes	4:1	0.05	0.22
Other Coastal Commission wetlands	1:1	3.46	3.46
TOTAL		3.71 acres	4.04 acres

Source: PG&E 2006a, p. 8.2-48, CH2MHill 2007e, Dains and CH2MHILL 2007

² All acreages are rounded from those given in Dains and CH2MHill 2007.

³ Mitigation acreage totals are based on the same ratios for both temporary and permanent impacts.

On February 1, 2007, applicant and Energy Commission representatives met with USACE and Coastal Commission personnel to discuss the draft wetland delineation and wetland impacts that would occur during construction of the HBRP. USACE personnel indicated that the USACE may take jurisdiction over additional areas that had not been identified as USACE jurisdictional in the AFC and in the draft wetland delineation. The applicant continued to work with the USACE to verify impacts to USACE-jurisdictional wetlands and obtain a Section 404 permit for the project. At that time, Coastal Commission personnel indicated that the Coastal Commission, in its consistency determination, may recommend higher wetland mitigation ratios than have been proposed by the applicant in the AFC (CEC 2006d). Coastal Commission guidance suggests that wetland acreage and functional capacity must be maintained in order to mitigate for impacts to wetlands (Coastal Commission 1995, Ch. 2, p. 5). Specifically, the Coastal Commission is likely to recommend mitigation ratios of 4:1 for any marsh areas that are impacted (CEC 2006d). The applicant has agreed to a 4:1 mitigation ratio for impacts to marsh areas; however, the Coastal Commission has since withdrawn its involvement in the project due to a heavy workload. Based on information received from the agencies during the field meeting on February 1, 2007, PG&E updated its estimates of affected wetlands and proposed mitigation measures (CH2MHILL 2007e, WSQ-8). Subsequently, the Section 404 permit was granted in a project authorization letter dated September 26, 2007. The acreages in **Biological Resources Tables 2, 3, and 4** reflect the verification of the wetland delineation by the USACE and initial guidance from the Coastal Commission regarding wetland mitigation ratios.

Staff has proposed Conditions of Certification **BIO-1** through **BIO-6** and **BIO-8** through **BIO-9** to mitigate impacts to wetlands and other biological resources. These conditions of certification are described below.

In addition, Condition of Certification **BIO-12** requires that the project owner develop a wetland mitigation plan to mitigate impacts to wetlands under USACE and Coastal Commission jurisdiction. The applicant provided a wetland mitigation plan in July 2007 (Dains and CH2MHILL 2007), and staff deemed it acceptable as did the USACE who included it as a “Special Condition” in their project authorization letter during Section 404 permitting. The Coastal Commission also found the plan’s mitigation and monitoring to be acceptable (Luster 2008). The wetland mitigation plan would be incorporated into the project’s Biological Resources Mitigation, Implementation, and Monitoring Plan (BRMIMP, **BIO-6**). The applicant has proposed five separate areas on the PG&E property that would be used as wetland mitigation areas (CH2MHILL 2007e, Figure 2A). All five mitigation areas are in the western portion of the property along King Salmon Avenue. Mitigation Area 1 comprises 0.61 acre that is currently an abandoned parking lot and would be used as a remote parking lot during construction of the projects. After construction of the project, the parking lot would be removed, and salt marsh would be created in the area. This mitigation area would compensate for the permanent loss of Coastal Commission wetlands and USACE-jurisdictional wetlands. Mitigation Area 2 comprises 1.03 acre immediately south of Mitigation Area 1. Mitigation Area 2 is currently a disturbed upland that was likely a salt marsh prior to being filled. This area would be restored to wetland to compensate for impacts to Coastal Commission wetlands and USACE-jurisdictional wetlands. Mitigation Area 3 consists of 2.26 acres of existing salt marsh that is immediately southeast of Mitigation Area 2. Mitigation for this area would consist of removing invasive dense-flowered cordgrass (*Spartina densiflora*) to enhance the wetland. Mitigation Area 4 comprises 1.57 acre of degraded riparian wetlands vegetation that would be enhanced by replacement of non-native vegetation with native vegetation. Mitigation Area 5 comprises 0.13 acre of Coastal Commission wetlands that would be enhanced through replacement of non-native vegetation with native vegetation. The applicant previously stated that the wetland mitigation areas would be placed under conservation easement (PG&E 2006a, p. 8.2-48). Staff requested additional information regarding the conservation easements in a data request (CEC 2007a), and the applicant responded that the mitigation areas would be preserved in perpetuity under a deed restriction on the PG&E property that precludes development (CH2MHILL 2007e, WSQ8; Dains and CH2MHILL 2007). The five mitigation areas comprise a total of 5.60 acres of wetland mitigation lands, which is greater than the total mitigation land required in **Biological Resources Table 4** (4.04 acres) (PG&E 2006a, p. 8.2-48; Dains and CH2MHILL 2007). This wetland mitigation would occur in the same location as the 1.05 wetland mitigation acres required for the Site Decommissioning Preparatory Project for which the Coastal Commission issued PG&E a Coastal Development Permit in October 2007 (Mullen 2007). Nonetheless, the wetland mitigation plan includes sufficient restoration acreage to mitigate wetland impacts from both PG&E projects.

It is staff’s belief that compliance with any terms and conditions of the USACE section 404 permit, compliance with mitigation measures recommended by the Coastal Commission during earlier discussions, implementation of avoidance and mitigation measures proposed by the applicant—including implementation of the wetland

mitigation plan, and compliance with Conditions of Certification **BIO-1**, **BIO-2**, **BIO-3**, **BIO-4**, **BIO-5**, **BIO-6**, **BIO-8**, **BIO-9**, **BIO-10**, and **BIO-12** will ensure that impacts to wetlands are mitigated to less than significant levels.

Condition of Certification **BIO-1** requires the selection of a qualified Designated Biologist by the project owner. A qualified Designated Biologist is necessary to oversee the implementation of mitigation measures for impacts to wetlands. Condition of Certification **BIO-2** outlines specific duties that the Designated Biologist must carry out to mitigate impacts. Condition of Certification **BIO-3** outlines the qualifications for any Biological Monitors assigned to assist the Designated Biologist. Condition of Certification **BIO-4** describes the authority of the Designated Biologist and the Biological Monitor to ensure that impacts to biological resources, including wetlands, are avoided to the extent possible. Condition of Certification **BIO-5** describes a Worker Environmental Awareness Program (WEAP) that would be required to ensure that construction personnel do not cause additional impacts to wetlands and other biological resources during construction of the HBRP. Condition of Certification **BIO-6** describes a Biological Resources Mitigation, Implementation, and Monitoring Plan (BRMIMP) that would be prepared by the applicant that describes all measures necessary to ensure compliance with LORS and minimization of impacts related to wetlands and other biological resources. Condition of Certification **BIO-8** requires the applicant to acquire a Clean Water Act Section 401 Water Quality Certification. This certification would assist in avoiding and minimizing impacts to wetlands. Condition of Certification **BIO-9** requires the applicant to provide a copy of the Clean Water Act Section 404 permit and incorporate its terms and conditions into the BRMIMP. Obtaining this permit and implementing its terms and conditions would help ensure compliance with LORS related to wetland impacts. Condition of Certification **BIO-10** requires the applicant to incorporate feasible measures to avoid impacts to biological resources, including wetlands, in the project design. This requirement would assist in mitigating and avoiding wetland impacts. Condition of Certification **BIO-12** ensures that impacts to wetlands are mitigated through implementation of the wetland mitigation plan that complies with USACE and Coastal Commission requirements regarding wetland mitigation.

Effects on Special-Status Species

Special-Status Plants

Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*)

During pre-construction biological resources surveys, the applicant located a population of Humboldt Bay owl's-clover in a salt marsh that is adjacent to the project's short-term delivery parking area between King Salmon Avenue and the Humboldt Bay Power Plant intake channel (PG&E 2006a, p. 8.2-12, Fig. 8.2-4). Humboldt Bay owl's-clover is classified as a List 1B.2 plant by CNPS, meaning that it is rare, threatened, or endangered in California and elsewhere and fairly endangered in the state. The population is not in an area that is expected to be disturbed due to the project; however, construction activities have the potential to impact this species. For example, construction personnel or construction vehicles could accidentally enter the area, potentially disturbing individuals of this species or altering the habitat that is necessary for the species to survive.

Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*)

During pre-construction biological resources surveys, the applicant located a population of Point Reyes bird's-beak adjacent to the project's short-term delivery parking area in the same area in which the Humboldt Bay owl's-clover population is located (PG&E 2006a, p. 8.2-13, Fig. 8.2-4). Point Reyes bird's-beak is also a CNPS List 1B.2 plant. Potential impacts would be identical to potential impacts discussed for Humboldt Bay owl's-clover.

To ensure avoidance of impacts to areas in which Humboldt Bay owl's-clover and Point Reyes bird's-beak are located, the applicant has proposed mitigation measures including temporary fencing to reduce the likelihood of personnel entering the area, signage indicating the environmental significance of the area, weekly inspection of fencing, employment of best management practices to prevent drainage of toxins into sensitive habitats, and development of a restoration plan in the event of unanticipated impacts to special-status plants (PG&E 2006a, pp. 8.2-45 and 8.2-46).

Staff agrees with the applicant's proposed mitigation measures and believes that their implementation as well as the project's conformance with Conditions of Certification **BIO-1** (Designated Biologist Selection), **BIO-2** (Designated Biologist Duties), **BIO-3** (Biological Monitor Qualifications), **BIO-4** (Designated Biologist and Biological Monitor Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-6** (BRMIMP), and **BIO-8** (Water Quality Certification) would ensure that any impacts to special-status plant species would be less than significant.

No impacts are expected to other special-status plant species listed in **Biological Resources Table 1** due to lack of potential habitat on the project site.

Special-Status Wildlife

Northern red-legged frog (*Rana aurora aurora*)

The northern red-legged frog, a California Species of Special Concern, is known to inhabit wetlands on and around the PG&E property. During surveys by the applicant's biologists, northern red-legged frogs were observed in the sump adjacent to the existing detention ponds, in the landscaped area east of the existing power plant, and in a drainage ditch south of the existing power plant (PG&E 2006a p. 8.2-32). This species breeds in permanent or temporary water bordered by dense grassy or shrubby vegetation (Jennings and Hayes 1993). The HBRP is not likely to impact the northern red-legged frog breeding habitat, but it would impact wetland and grassland habitats that the species does use. There is the potential for individuals of this species to be directly impacted during construction of the HBRP. However, impacts to wetland habitat used by the northern red-legged frog would be mitigated by the wetland mitigation measures proposed by the applicant, as discussed in the "Effects on Wetlands" section of this staff assessment. In addition, the employment of a Designated Biologist and Biological Monitors who would perform daily biological monitoring during construction, implementation of worker environmental education training to educate personnel, and installation of silt fencing would mitigate impacts to the northern red-legged frog. The applicant has stated that any northern red-legged frogs discovered in construction areas would be relocated to appropriate habitat outside of the construction area (PG&E 2006a, p. 8.2-35).

Implementation of Conditions of Certification **BIO-1** (Designated Biologist Selection), **BIO-2** (Designated Biologist Duties), **BIO-3** (Biological Monitor Qualifications), **BIO-4** (Designated Biologist and Biological Monitor Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-6** (BRMIMP), and **BIO-8** (Water Quality Certification) would ensure that any impacts to the northern red-legged frog would be less than significant.

Coho salmon (*Onchorhynchus kisutch*), Northern California steelhead (*Oncorhynchus mykiss*), California coastal Chinook (*Oncorhynchus tshawytscha*) and tidewater goby (*Eucyclogobius newberryi*)

Coho salmon (state listed Threatened, federally listed Endangered), Northern California steelhead (federally listed Threatened), and California coastal Chinook (state and federally listed Threatened) are known to inhabit Humboldt Bay and its tributaries. In addition, the tidewater goby (California Species of Special Concern and federally listed Endangered) is believed to have inhabited the area historically, and USFWS expressed initial concern for the species (CH2MHILL 2007a). The USFWS later stated that there were no concerns with take of federally listed species at the site, and formal consultation would not be required. Informal consultation involving a concurrence letter to the USACE, who would have been the lead agency under Section 7 of the Endangered Species Act if formal consultation were needed, was anticipated in June 2006 (CH2MHILL 2007a). However, the USFWS subsequently stated that, due to workload constraints, they would not have time to write this no-effect letter (Crowe, personal communication, 2007). Impacts are not expected to these special-status fish species because the project would not impact Humboldt Bay or its tributaries (PG&E 2006a, p. 8.2-15 to 8.2-17). However, due to the proximity of construction to the cooling water intake and discharge channels that connect with Humboldt Bay, there is the possibility for impacts to special-status fish species and their habitat. Potential threats include sewage effluent, upstream alteration of sediment flow, diversion of water flow, and watercourse contamination resulting from vehicular activity (USFWS 2007). Measures proposed by the applicant to mitigate potential impacts to special-status fish species include hiring of a designated biologist and biological monitors to monitor construction, a WEAP to educate workers on potential impacts and LORS related to biological resources, and implementation of best management practices to minimize sedimentation and discharge of pollutants (PG&E 2006a, pp. 8.2-44 to 8.2-47).

Implementation of the following conditions of certification would ensure avoidance of impacts to special-status fish species: **BIO-1** (Designated Biologist Selection), **BIO-2** (Designated Biologist Duties), **BIO-3** (Biological Monitor Qualifications), **BIO-4** (Designated Biologist and Biological Monitor Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-6** (BRMIMP), **BIO-8** (Water Quality Certification), **SOIL & WATER-1** (Drainage, Erosion and Sediment Control Plan for Construction & Operations), **SOIL & WATER-2** (Storm Water Pollution Prevention Plan or SWPPP for Construction Activity), and **SOIL & WATER-3** (SWPPP for Industrial Activity).

Bald eagle (*Haliaeetus leucocephalus*) and California brown pelican (*Pelecanus occidentalis californicus*)

The bald eagle is listed as an endangered species and a Fully Protected species in California and was also recently delisted by the USFWS. In addition, bald eagles are protected under the Bald and Golden Eagle Protection Act. Bald eagles have been seen

at the Humboldt Bay Power Plant and may use the cooling water intake and discharge channels for foraging (Crowe and Dains, personal communication, 2006; PG&E 2006a, p. 8.2-42).

The California brown pelican is listed as Endangered under the federal and state endangered species acts and is also a Fully Protected species. California brown pelicans feed on fish in the waters of Humboldt Bay and surrounding areas; however, there are no known breeding colonies of California brown pelicans in the area. California brown pelicans have been observed foraging in the cooling water discharge channel and roosting along the shoreline near the Humboldt Bay Power Plant (PG&E 2006a, p. 8.2-19).

Impacts to bald eagles and California brown pelicans could occur through discharge of oil or other contaminants into the intake and discharge channels; however, mitigation and avoidance measures proposed by the applicant would avoid potential impacts to the intake and discharge channels and to bald eagles and California brown pelicans. These mitigation and avoidance measures include employment of a designated biologist and biological monitors to monitor construction, a WEAP to educate workers on potential impacts and LORS related to biological resources, and implementation of best management practices to minimize sedimentation and discharge of pollutants (PG&E 2006a, pp. 8.2-44 to 8.2-47).

Implementation of the following conditions of certification would ensure avoidance of impacts to bald eagles and California brown pelicans: **BIO-1** (Designated Biologist Selection), **BIO-2** (Designated Biologist Duties), **BIO-3** (Biological Monitor Qualifications), **BIO-4** (Designated Biologist and Biological Monitor Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-6** (BRMIMP), **BIO-8** (Water Quality Certification), **SOIL & WATER-1** (Drainage, Erosion and Sediment Control Plan for Construction & Operations), **SOIL & WATER-2** (SWPPP for Construction Activity), and **SOIL & WATER-3** (SWPPP for Industrial Activity).

Western snowy plover (*Charadrius alexandrinus nivosus*)

As discussed earlier, western snowy plover critical habitat is located across Humboldt Bay from the HBRP site in the areas known as the North Spit and the South Spit. The HBRP would not impact western snowy plover critical habitat. It is possible that western snowy plovers forage along the shoreline of Humboldt Bay in the vicinity of the HBRP site; however, impacts to the western snowy plover due to construction of the HBRP are not expected because no construction-related activities would occur in Western snowy plover breeding or foraging habitat.

General Wildlife and Wildlife Habitat Impacts

In addition to the loss of USACE wetland habitat and Coastal Commission wetlands discussed previously, construction of the HBRP would result in the permanent loss of approximately 1.5 acres of grassland and the temporary disturbance of approximately 2.5 acres of grassland. Grassland habitat provides foraging and/or nesting habitat for a number of common bird species (including mourning doves, house finches, and red-winged blackbirds) as well as habitat for wildlife species such as raccoons and California ground squirrels (PG&E 2006a, p. 8.2-32). In addition to the loss of grassland

habitat, any wildlife species using the habitat may be impacted due to construction of the HBRP or through the actions of construction personnel.

The applicant's proposed mitigation measures include implementation of worker environmental awareness training, construction monitoring of sensitive habitats, avoidance of sensitive habitats, preparation of a BRMIMP, pre-construction surveys for sensitive species and ground-nesting birds, monthly monitoring and compliance reports, and restoration of temporarily disturbed areas to pre-construction conditions (PG&E 2006a, pp. 8.2-44 to 8.2-47). Staff agrees with the applicant's proposed mitigation measures and recommends implementation of these proposed mitigation measures as well as Conditions of Certification **BIO-1** (Designated Biologist Selection), **BIO-2** (Designated Biologist Duties), **BIO-3** (Biological Monitor Qualifications), **BIO-4** (Designated Biologist and Biological Monitor Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-6** (BRMIMP), and **BIO-11**, which would ensure that any impacts to wildlife and wildlife habitat would be less than significant. Condition of Certification **BIO-11** outlines specific measures designed to avoid harassment and harm to wildlife during construction of the HBRP.

OPERATION IMPACTS AND MITIGATION

Humboldt Bay is located along the Pacific Flyway, one of four major bird migration routes in North America. Large numbers of migratory and resident birds use Humboldt Bay as both a feeding and resting site. Specifically, eelgrass beds and mudflats in the bay attract large concentrations of water birds due to the abundance of food that these habitats provide. The presence of large numbers of birds in the project area creates the potential for impacts to migratory and resident birds during operation of the HBRP.

Collision Impacts

The primary potential impact for birds is through collisions with the HBRP transmission lines and exhaust stacks. Three transmission lines approximately 100 to 500 feet long and 50 to 90 feet high and ten 100-foot high exhaust stacks would be part of the project (PG&E 2006a, pp. 5-2, 8.2-30, 8.2-39). Collision with the terminal ground wire (or static wire) of transmission lines has been reported as a primary cause of avian fatality from power line strikes. Transmission line ground wires are smaller in diameter and significantly less visible than the transmission wires. Ground wires are installed on transmission lines to dissipate lightning strikes, thereby preventing damage to transmission structures and equipment. Fatal strikes may also occur when birds collide with transmission and distribution wires and other structures associated with electrical power transmission (CEC 2002). Potential impacts due to collision with transmission lines and exhaust stacks is highest during periods of low visibility such as fog or rain, and the Humboldt Bay area is known to experience many foggy and rainy days (Western Regional Climate Center 2007).

Although collision impacts are likely to occur during operation of the HBRP, the potential for impacts would be decreased due to the relatively short lengths of the transmission lines and due to the fact that existing structures at the Humboldt Bay Power Plant site (such as the 120-foot tall Humboldt Bay Power Plant stacks) are taller than the proposed HBRP stacks and transmission lines. To mitigate potential impact to birds due to collision, the applicant has proposed installing bird flight diverters on the new

transmission lines interconnecting the new generators to the existing Humboldt Bay Power Plant substation (PG&E 2006a, p. 8.2-46). Bird flight diverters can reduce avian collisions by 57 to 89% (Avian Power Line Interaction Committee 1994). Staff agrees with the applicant's proposed mitigation measures. The short length of the new transmission lines, the fact that HBRP structures would be lower than existing structures on the site, and the applicant's proposal to install bird flight diverters would mitigate potential collision impacts. Staff's Condition of Certification **BIO-10** requires the installation of swan flight diverters on the new transmission line (ground wire).

Electrocution Impacts

Electrocution from transmission lines and towers may be an impact concern for large birds such as raptors and egrets. Birds are electrocuted when they simultaneously contact two conductors or a conductor and a ground wire. To mitigate potential electrocution impacts, the applicant has proposed constructing aboveground transmission lines in accordance with Avian Power Line Interaction Committee (APLIC) guidelines that are designed to significantly reduce the risk of electrocution (PG&E 2006a, p. 8.2-46). The APLIC guidelines outline methods of configuring and designing utility line components and recommend spacing distances between utility line components to reduce the likelihood of avian electrocution. Staff agrees with the proposed mitigation measure and believes that its implementation would reduce potential impacts to less than significant levels. Condition of Certification **BIO-10** requires that transmission lines be designed and built in accordance with the Avian Power Line Interaction Committee's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).

Noise Impacts

Operation of the HBRP would produce continuous noise that could disturb wildlife in the vicinity of the site. The level of noise produced by the HBRP would be similar to the level produced by the existing Humboldt Bay Power Plant, which would be decommissioned after construction of the HBRP. Because the current level of noise at the site would be similar to noise from the HBRP, staff does not believe that noise impacts from the HPRP would be significant.

Lighting Impacts

Lighting has the potential to impact wildlife in the project area. Some species of birds are believed to be attracted to night lighting. If lighting at the HBRP attracts birds, those birds would be more likely to collide with structures associated with the HBRP. To minimize the effects of lighting on birds and other wildlife, the applicant has stated that lighting would be hooded and pointed downwards and away from the bay, and staff has proposed Condition of Certification **VIS-4** to ensure that exterior lighting is minimized (PG&E 2006a, pp. 8.2-41 and 8.2-46). Implementation of the applicant's proposed mitigation measures as well as the measures in Condition of Certification **BIO-10** regarding facility lighting would ensure that lighting impacts to wildlife are less than significant.

CUMULATIVE IMPACTS AND MITIGATION

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

The HBRP is designed to replace Units 1 and 2 of the existing Humboldt Bay Power Plant as well as two Mobile Emergency Power Plants (MEPPs) that currently provide electricity generation for the region. Therefore, construction and commissioning of the HBRP would lead to the decommissioning of Units 1 and 2 and the MEPPS (PG&E 2006a, pp. 2-2 through 2-4)., Unit 3 of the Humboldt Bay Power Plant is in the process of being decommissioned. The Independent Spent Fuel Storage Installation (ISFSI) project has been constructed to provide long-term, safe storage for the spent nuclear fuel rods from Unit 3.

Decommissioning of Units 1 and 2 would benefit biological resources by reducing the volume of seawater used for once-through cooling purposes by 40,000 gallons per minute (PG&E 2006a, p. 2-2) and by reducing impacts to marine life through impingement and entrainment as a result of once-through cooling (CEC 2005, p. 2). The HBRP reciprocating engine-generators would utilize a closed loop air-cooled radiator system for cooling, eliminating the need for withdrawal of seawater for power plant cooling.

The decommissioning of Unit 3 also would result in the elimination of impacts to the Humboldt Bay ecosystem associated with the use of seawater for cooling. Unit 3 of the Humboldt Bay Power Plant is an inoperable nuclear unit that is in the planning stages for decommissioning. Although Unit 3 does not currently produce energy, it does still require the use of seawater for operations purposes and would continue to require the use of approximately 12,000 gallons per minute of seawater while it is being decommissioned. However, after final decommissioning of Unit 3, the use of seawater for cooling at the Humboldt Bay Power Plant would cease (PG&E 2006a, p. 2-2).

The ISFSI project is a key step in the decommissioning of Unit 3. Construction of the ISFSI will allow for the ultimate elimination of use of seawater for Unit 3 plant operations, which would benefit marine life. During 1999 and 2002, PG&E conducted site surveys for sensitive species, including terrestrial and marine plants and animals. While the overall Humboldt Bay Power Plant does provide suitable habitat for some species, none were observed on the ISFSI site, and thus the construction and operation of the ISFSI is not expected to adversely affect any sensitive species or their habitat. Construction of the ISFSI would not have any impact to wetlands as it would be located near the highest ground on the Humboldt Bay Power Plant property. Grassland vegetation lost in the course of excavating for the ISFSI would be only temporary, and would be replaced near completion of the ISFSI (Coastal Commission 2005).

Implementation of the applicant’s proposed mitigation measures and staff’s conditions of certification would ensure that all potential impacts due to the HBRP are mitigated to less than significant levels. In addition, any other projects that are proposed in the area, such as the removal of PG&E’s fuel oil pipeline from Olson’s Wharf to the HBRP, would

be subject to a separate evaluation under CEQA as well as LORS that protect biological resources. Although staff did not receive a copy of the Biological Assessment for this project, it appears that there may be impacts to USACE and Coastal Commission jurisdictional waters and wetlands as well as special-status species. Due to the mitigation of all potential significant impacts resulting from the HBRP and the possibility of long-term benefits from decommissioning of the Humboldt Bay Power Plant Units 1, 2, and 3, staff concludes that the HBRP would not considerably contribute to a significant cumulative impact to biological resources.

COMPLIANCE WITH LORS

The proposed project is subject to several LORS, including the California Coastal Act and the Clean Water Act. To comply with LORS, the applicant obtained a Clean Water Act Section 404 permit from the USACE. In addition, the applicant must obtain Clean Water Act Section 401 water quality certification from the North Coast Regional Water Quality Control Board. Normally, a Coastal Development permit would be required from the Coastal Commission; however, due to the Coastal Commission's withdrawal from the project, Energy Commission staff conferred with and reviewed earlier guidance from the Coastal Commission for the Final Staff Assessment to ensure compliance with provisions of the Coastal Act. Implementation of the conditions of certification would ensure compliance with all applicable LORS.

COASTAL ACT

Chapter 3 of the Coastal Act addresses coastal development projects with the potential to impact wetlands. Relevant sections are provided sequentially and analyzed below. Based upon guidance from the California Coastal Commission, staff focuses primarily on Section 30233 to determine the project's overall conformance with the Coastal Act (Luster 2007).

Section 30230 of the Coastal Act states:

Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

No impacts to marine resources would occur from construction or operation of this project because once-through cooling would not be used. The discontinuation of once-through cooling would curtail entrainment/impingement of marine organisms. This indirect benefit to biological resources would occur with the decommissioning of units 1 and 2. Staff concludes that the proposed HBRP would conform with Section 30230 as it relates to biological resources.

Section 30231 of the Coastal Act states:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored

through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

The biological productivity and quality of coastal and inland waters would not be affected by the proposed HBRP. Wastewater would be properly contained and treated by way of its discharge to the sanitary sewer system and would not enter wetlands or coastal waters. The proposed air-cooled engine-generators would not require any withdrawal of seawater, thus avoiding entrainment of marine life. The proposed stormwater outfall to Buhne Slough would treat water prior to discharge, have minimal effect to channel configuration, and not affect riparian vegetation buffers on natural drainages. Therefore, staff concludes that the proposed HBRP would conform to Section 30231 of the Coastal Act as it relates to biological resources.

Section 30233 of the Coastal Act states:

(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities...

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation...

(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary...

The Coastal Commission employs a three-test process to evaluate projects under this section of the Coastal Act. The first test determines whether the project is one of seven allowable types. The HBRP would fall into type number one above because it is a coastal-dependent industrial facility. The second test determines whether a project is the least environmentally damaging alternative. Due to the applicant's avoidance of impacts to wetlands and sensitive habitats, preparation of a wetland mitigation plan to enhance the functional capacity of wetlands, and consideration of other sites in the county (Luster 2007), the proposed project design satisfies this test. In addition, compared to a new power plant, the HBRP, being a replacement/repowering project with existing infrastructure, is a less environmentally damaging alternative. The third test involves evaluating mitigation measures to determine their feasibility and adequacy. The wetland mitigation plan describes feasible measures for mitigating wetland impacts, and these measures are expected to improve the quality of wetland habitat as discussed below under Section 30607.1. Therefore, staff concludes that the proposed HBRP would conform to Section 30233 of the Coastal Act as it relates to biological resources. According to the three tests, the project would be in overall compliance with the Coastal Act.

Section 30240 of the Coastal Act states:

*(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses depended on those **resources** shall be allowed within those areas.*

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

The project would avoid and minimize direct impacts to environmentally sensitive habitat areas including wetlands, sloughs, tidal flats, and Humboldt Bay. These areas provide habitat for special-status species such as Northern red-legged frog. The wetland mitigation plan and staff's conditions of certification would result in the avoidance of impacts to environmentally sensitive habitat areas. Therefore, staff concludes that the proposed HBRP would conform to Section 30240 of the Coastal Act as it relates to biological resources.

Section 30607.1 of the Coastal Act states:

Where any dike and fill development is permitted in wetlands in conformity with Section 30233 or other applicable policies set forth in this division, mitigation measures for development in permitted wetlands shall include, at a minimum, either acquisition of equivalent areas of equal or greater biological productivity or opening up equivalent areas to tidal action; provided, however, that if no appropriate restoration site is available, an in-lieu fee sufficient to provide an area of equivalent productive value or surface area that would be dedicated to an appropriate public agency, Or the replacement site shall be purchased before the dike or fill development may proceed. The mitigation measures shall not be required for temporary or short-term fill or diking if a bond or other evidence of financial responsibility is provided to assure that restoration will be completed in the shortest feasible time.

The applicant has proposed a wetland mitigation plan, which includes creation, restoration, and enhancement of wetlands on the PG&E property. This mitigation compensates for the permanent loss of man-made seasonal wetlands and drainages as well as the temporary loss of Coastal Commission wetlands. The restoration site is already owned by the applicant, and it would be placed under a deed restriction that precludes future development of mitigation wetlands. The applicant anticipates that the salt/brackish marsh mitigation habitat would have greater biological productivity than the man-made wetlands that would be impacted (PG&E 2006a). Staff agrees and, therefore, concludes that the proposed HBRP would conform to Section 30607.1 of the Coastal Act as it relates to biological resources.

NOTEWORTHY PUBLIC BENEFITS

There are no noteworthy public benefits to biological resources from construction of the HBRP. Possible cumulative benefits resulting from decommissioning of the existing Humboldt Bay Power Plant are discussed in the cumulative impacts section.

FACILITY CLOSURE

At some point in the future, the HBRP would experience either a planned closure or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. The project owner would prepare a closure plan prior to any planned closure. To address unanticipated facility closure, the project owner would develop an “on-site contingency plan” to be approved by the Energy Commission Compliance Project Manager (CPM). Facility closure requirements are discussed in more detail in the GENERAL CONDITIONS section of this staff assessment. The BRMIMP prepared by the project owner would also include facility closure mitigation measures.

The facility closure plan should address habitat restoration measures to be implemented in the event of a planned or an unexpected permanent closure. Planned or unexpected permanent facility closure should address the removal of the transmission conductors since birds are known to collide with transmission line ground wires.

Condition of Certification **BIO-7** contains measures that must be implemented to ensure that impacts to biological resources are addressed prior to the planned permanent or unexpected permanent closure of the HBRP.

CONCLUSIONS

The HBRP would impact USACE jurisdictional wetlands and Coastal Commission wetlands. Staff agrees with the applicant’s proposed mitigation measures to avoid and mitigate significant impacts to wetlands and other biological resources. With adoption of staff’s proposed conditions of certification, the HBRP would comply with all applicable biological resources LORS, including the Coastal Act. Compliance with the terms and conditions of necessary permits and LORS as well as implementation of conditions of certification discussed in the staff analysis would be necessary to avoid, minimize, or mitigate impacts to biological resources from the project to less than significant levels.

PROPOSED CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall assign a Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) for approval.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field; and
2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and

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

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 90 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist must be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologist Duties

- BIO-2** The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s), but remains the contact for the project owner and CPM.
1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;
 2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan, to be submitted by the project owner;
 3. Be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as wetlands and special-status species or their habitat;
 4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
 5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e. parking lots) for animals in harm's way;
 6. Notify the project owner and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of the CPM regarding biological resource issues;
8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report; and
9. Train the Biological Monitors as appropriate and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and all permits.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his/her duties are ceased as approved by the CPM.

Biological Monitor Qualifications

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

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), WEAP, and all permits.

Verification: The project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site (or related facilities) mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that the individual Biological Monitor(s) has been trained and the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to the CPM for approval 10 days prior to the first day of monitoring activities.

Designated Biologist and Biological Monitor Authority

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

If required by the Designated Biologist and Biological Monitor(s), the project owner's Construction/ Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;
2. Inform the project owner and the Construction/Operation Manager when to resume activities; and
3. Notify the CPM if there is a halt to any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt to any site mobilization, ground disturbance, grading, construction, or operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program

BIO-5 The project owner shall develop and implement a CPM-approved Worker Environmental Awareness Program (WEAP) that informs each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure about sensitive biological resources associated with the project.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media are made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures;

5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. Include a training acknowledgment form to be signed by each worker indicating that he/she received training and shall abide by the guidelines.

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

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two copies of the proposed draft WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization, submit two copies of the CPM-approved final WEAP.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for a period of at least six months after the start of commercial operation.

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

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

- BIO-6** The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to the Coastal Commission (for review and comment) and shall implement the measures identified in the approved BRMIMP. The BRMIMP shall be prepared in consultation with the Designated Biologist and shall identify:
1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
 2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;
 3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the CWA Section 404 permit;
 4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the Water Quality Certification;
 5. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

6. All required mitigation measures for each sensitive biological resource;
7. A wetland mitigation plan for temporary and permanent impacts to USACE and Coastal Commission wetlands;
8. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
9. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
10. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities—one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;
11. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
12. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
13. All performance standards and remedial measures to be implemented if performance standards are not met;
14. A preliminary discussion of biological resources related facility closure measures;
15. Restoration and re-vegetation plan;
16. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and
17. A copy of all biological resources related permits obtained.

Verification: The project owner shall provide the specified document at least 60 days prior to start of any site (or related facilities) mobilization.

The CPM, in consultation with the Coastal Commission and any other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt. If any permits have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization, the revised BRMIMP shall be resubmitted to the CPM.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures shall be reported in the Monthly Compliance Reports by the Designated Biologist (i.e. survey results, construction activities that were monitored, species observed). Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Closure Plan Measures

BIO-7 The project owner shall incorporate into the permanent or unexpected permanent closure plan and the BRMIMP measures that address the local biological resources related to facility closure and implement them.

The planned permanent or unexpected permanent closure plan shall address the following biological resources related mitigation measures. Typical measures are:

1. Removal of transmission conductors when they are no longer used and useful;
2. Removal of all power plant site facilities and related facilities;
3. Measures to restore wildlife habitat to promote the re-establishment of native plant and wildlife species; and
4. Re-vegetation of the plant site and other disturbed areas utilizing appropriate seed mixture.

Verification: Draft permanent or unexpected closure measures shall be made part of the BRMIMP. At least 12 months prior to commencement of closure activities, the project owner shall address all biological resources related issues associated with facility closure, and provide final measures, in a Biological Resources Element. The Biological Resources Element shall be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

Water Quality Certification

BIO-8 The project owner shall acquire Water Quality Certification from the Regional Water Quality Control Board in accordance with Section 401 of the Clean Water Act, or a waiver, incorporate the biological resources related terms and conditions into the project's BRMIMP, and implement them.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall provide the CPM with a copy of the final Water Quality Certification or waiver.

U. S. Army Corps of Engineers Section 404 Permit

BIO-9 The project owner shall incorporate the terms and conditions of the final Nationwide Permit per U.S. Army Corps of Engineers (USACE) Section 404 of the federal Clean Water Act into the project's BRMIMP and implement them.

Verification: At least 60 days prior to the start of any site or related facilities mobilization activities, the project owner shall include the USACE permit in the BRMIMP.

Impact Avoidance Mitigation Features

- BIO-10** Any time the project owner modifies or finalizes the project design, they shall incorporate all feasible measures that avoid or minimize impacts to the local biological resources, including the following:
1. Design, install, and maintain transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources;
 2. Avoid wetland loss to the greatest extent possible;
 3. Design, install, and maintain transmission lines and all electrical components in accordance with APLIC's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*, to reduce the likelihood of electrocutions of large birds;
 4. Design, install and maintain transmission lines and all electrical components in accordance with the APLIC *Mitigating Bird Collisions with power lines: The State of the Art in 1994* to reduce the likelihood of bird collisions;
 5. Eliminate any California Exotic Pest Plants of Concern (CalEPPC) List A species from landscaping plans;
 6. Prescribe a road sealant that is non-toxic to wildlife and plants and use only fresh water when adjacent to wetlands, rivers, or drainage canals;
 7. Design, install, and maintain facility lighting to be hooded and directed downward and toward the area to be illuminated, minimizing light casted toward wildlife habitat; and
 8. Install swan flight diverters at 5-meter intervals on the new transmission line (ground wire).

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

Mitigation Management to Avoid Harassment or Harm

- BIO-11** The project owner shall implement the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to the local biological resources:
1. Install temporary fencing and provide wildlife escape ramps for construction areas that contain steep-walled holes or trenches if outside an approved, permanent exclusionary fence. The temporary fence shall be hardware cloth or similar materials that are approved by USFWS and CDFG;
 2. Make certain all food-related trash is disposed of in closed containers and removed at least once a week;
 3. Prohibit feeding of wildlife by staff and subcontractors;
 4. Prohibit non-security related firearms or weapons from being brought to the site;
 5. Prohibit pets from being brought to the site;
 6. Report all inadvertent deaths of special-status species to the appropriate project representative. Injured special-status animals shall be reported to CDFG, and the project owner shall follow instructions that are provided by CDFG; and
 7. Minimize use of rodenticides and herbicides in the project area and prohibit the use of chemicals and pesticides known to cause harm to amphibians.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

Wetland Mitigation

BIO-12 To mitigate for temporary and permanent impacts to USACE-jurisdictional drainages, USACE-jurisdictional seasonal wetlands, USACE-jurisdictional marshland, and Coastal Commission wetlands, the project owner shall establish a minimum of 4.04 acres of wetland creation, restoration, and enhancement to ensure compliance with all USACE and Coastal Commission requirements.

The project owner shall develop and implement a wetland mitigation plan for inclusion in the project's BRMIMP. The project owner shall place wetland mitigation lands under deed restriction in perpetuity to ensure that mitigation lands are protected from future development. The wetland mitigation plan shall be prepared in consultation with the Designated Biologist and shall be

developed in accordance with USACE and Coastal Commission guidance documents. At a minimum, the wetland mitigation plan shall include:

1. Maps of wetland impact and mitigation areas;
2. Acreages of wetlands to be impacted and acreages of wetland mitigation areas;
3. Terms and conditions of deed restriction (in perpetuity) for wetland mitigation areas;
4. Description of mitigation goals and objectives;
5. Description of wetland functions lost at impact sites;
6. Description of wetland functions to be gained at each mitigation site;
7. Description of overall watershed improvements to be gained;
8. Photographs and descriptions of wetland mitigation areas, including photographs prior to the implementation of and after the completion of the wetland mitigation;
9. Construction plans for wetland restoration, creation, and enhancement work to be completed;
10. Description of planned hydrology;
11. Description of plant material to be used for wetland restoration and creation;
12. Duration of wetland mitigation monitoring and description of monitoring methods;
13. Performance standards to be used to help decide if/when proposed wetland mitigation is or is not successful; and
14. All performance standards and remedial measures to be implemented if performance standards are not met.

Verification: The project owner shall provide the final wetland mitigation plan at least 60 days prior to start of any site (or related facilities) mobilization. The CPM, in consultation with the USACE and any other appropriate agencies, will determine the wetland mitigation plan's acceptability within 45 days of receipt. The approved wetland mitigation plan and its implementation methods shall be included in the BRMIMP.

Implementation of wetland mitigation plan measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the wetland mitigation plan have been completed, a summary of all modifications to the wetland

mitigation plan made during the project's site mobilization, ground disturbance, grading, and construction phases, and which wetland mitigation items are still outstanding.

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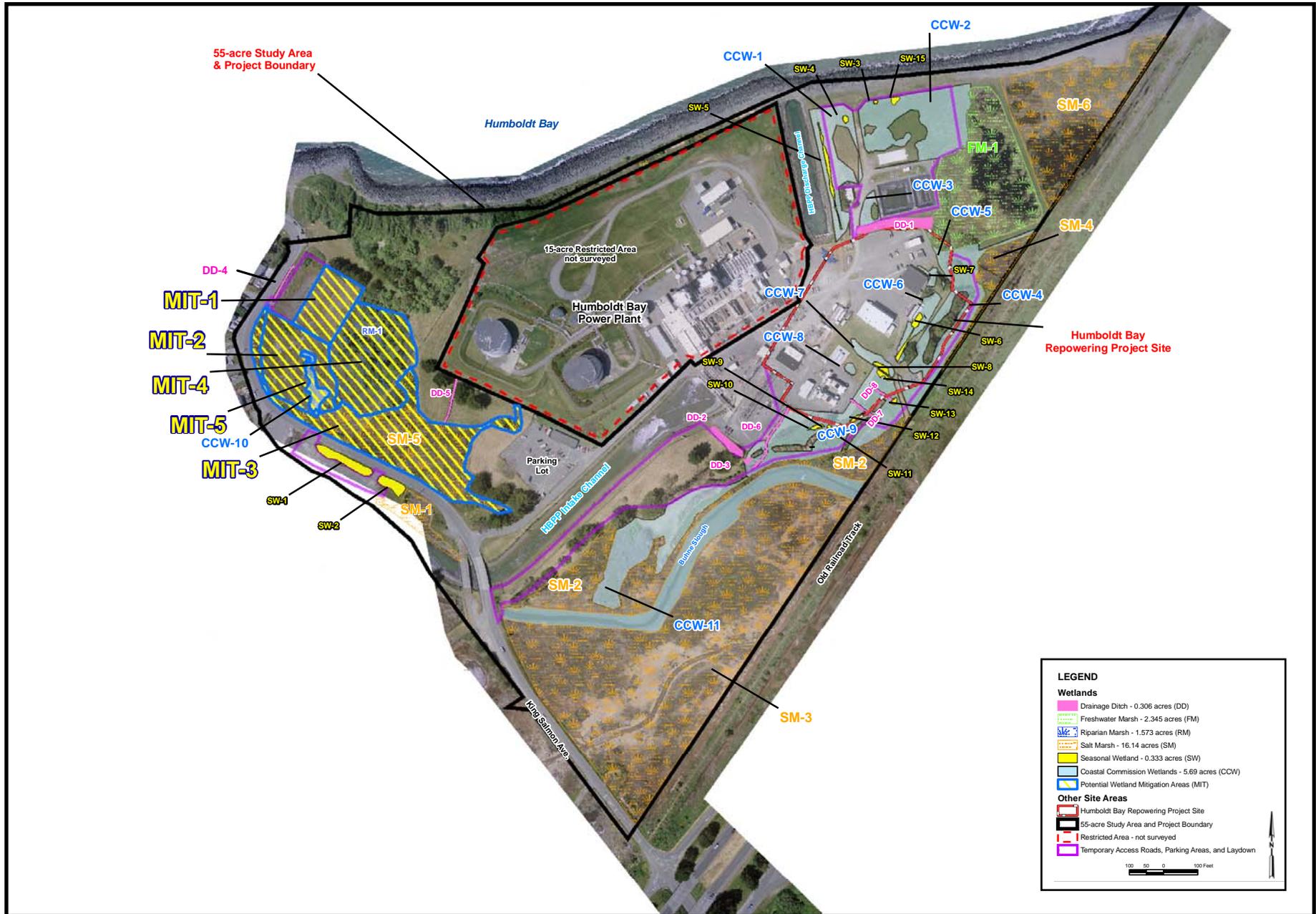
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BIOLOGICAL RESOURCES - FIGURE 1
 Humboldt Bay Repowering Project - Wetland Mitigation

MAY 2008

BIOLOGICAL RESOURCES



CULTURAL RESOURCES

Testimony of Beverly E. Bastian

SUMMARY OF CONCLUSIONS

Staff has identified a significant historical resource, the Humboldt Bay Power Plant Historic District (HBPPHD) on and adjacent to the proposed construction site of the Humboldt Bay Repowering Project (HBRP). Under California law, a historic district is a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. The HBPPHD consists of 31 structures, including two currently operating fossil-fueled units and one retired nuclear-fueled unit, all linked by common plan, dedicated function, and experimental development, representing post-World War II power generation technology in California. The HBPPHD is historically significant because of its role in the economic history of the region and state, and its role in the national history of nuclear power development.

The construction of the HBRP would result in the immediate demolition of three of the structures associated with the HBPPHD (a storage building, a transmission line tower, and a railroad spur) to accommodate building the HBRP. Staff has identified this immediate demolition of the three structures as a significant, direct adverse impact, under the California Environmental Quality Act (CEQA), on the HBPPHD. The eventual operation of the HBRP would render most of the other structures of the HBPPHD obsolete, leading, foreseeably, to their demolition, as well. Staff has identified this eventual demolition as a significant, indirect adverse impact, under CEQA, on the HBPPHD.

CEQA requires the Energy Commission to mitigate significant impacts to significant historical resources to a less-than-significant level. Consequently, staff has recommended Conditions of Certification **CUL-8** through **CUL-12** to mitigate the significant direct and indirect impacts to the HBPPHD.

Staff has also concluded that the HBRP would have no impact on known significant archaeological or ethnographic resources. To mitigate potentially significant impacts to as-yet-undiscovered significant archaeological resources, staff has recommended the adoption and implementation of Conditions of Certification **CUL-1** through **CUL-7** and **CUL-13**.

INTRODUCTION

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

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human

behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, the time when the first Europeans settled in California.

Historic-period resources are those materials, archaeological and architectural, usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be greater than fifty years old to be considered of potential historic importance. A resource less than fifty years of age may be historically important if the resource is of exceptional importance.

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

For the Humboldt Bay Repowering Project, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts from the proposed project using criteria from the California Environmental Quality Act (CEQA). The primary concern is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below the level of significance.

If cultural resources are identified, staff determines whether there may be a project-related impact to them. If the cultural resources cannot be avoided, staff determines whether any of the impacted resources are eligible for the California Register of Historical Resources (CRHR). If impacted resources are eligible for the register, staff recommends mitigation measures that ensure that impacts to the identified cultural resources are reduced to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the California Energy Commission (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 (**Cultural Resources Table 1**).

¹ Cultural resources are indirectly 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, Section 21083.2	The lead agency may require reasonable steps to preserve a unique archaeological resource in place. Otherwise, the project applicant is required to fund mitigation measures to the extent prescribed in this section. This section also allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA).
California Code of Regulations, Title 14, Section 15064.5, subsections (d), (e), and (f)	Subsection (d) allows the project applicant to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by the project. Subsection (e) requires the landowner [or an authorized representative] to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated within 24 hours of accidental discovery and required construction stoppage. Subsection (f) directs the lead agency to make provisions for historical or unique archaeological resources that are accidentally discovered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA Guidelines).
California Code of Regulations, Title 14, Section 15126.4(b)	This section describes options for the lead agency and for the project applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan (CEQA Guidelines).
Public Resources Code 5024.1	Establishes the California Register of Historic Resources (CRHR) to include properties determined eligible for the National Register of Historic Places (NRHP, State Historic Landmark No. 770 and subsequent numbered landmarks, Points of Historical Interest recommended for listing by the State Historic Resources Commission, and historical resources, historic districts, and landmarks designated or listed by a city or county under a local ordinance. CRHR criteria are 1) events, 2) important persons, 3) distinctive construction, and 4) data.

<u>Applicable Law</u>	<u>Description</u>
State	
Public Resources Code 5020.1 (h)	“Historic district” means a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
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	
Humboldt County General Plan, Section 3500	The Humboldt County General Plan includes measures to provide for the identification and protection of archaeological sites and historic structures.
Humboldt County Local Coastal Plan, Goal 3.18	This goal provides for the protection of archaeological resources.

SETTING

REGIONAL SETTING

The project area is located on the eastern shore of Humboldt Bay approximately three miles south of the city of Eureka in an unincorporated area of Humboldt County, California. The Humboldt Bay region is in the Coast Ranges Physiographic Province of California, within the Eel River sedimentary basin.

PROJECT, SITE, AND VICINITY DESCRIPTION

The local terrain, consisting of alluvium over estuarine and marine deposits, is fairly flat, except where relatively young underlying rocks have been tilted up by the numerous active faults in the area, producing, for example, Buhne Hill, located on the 143-acre PG&E Humboldt Bay Power Plant (HBPP) property. The HBPP, on part of which the proposed HBRP site is proposed, is on the north end of a small peninsula named Buhne Point (PG&E 2006a, pp. 8.4-1–8.4-2). The proposed site is on a filled marsh on the northeast side of Buhne Hill. The project site elevation ranges from 8 to 12 feet above mean sea level (PG&E 2006a, p. 2-28, pp. 8.4-1–8.4-2). The town of King Salmon occupies the southwestern part of the Buhne Point peninsula, sharing it with the HBPP, located to the northeast (PG&E 2006a, p. 8.6-1; fig. 2). The HBPP property has been used for industrial purposes since the late 1950s, but surrounding land use is mostly agricultural and rural residential. The HBPP property is bounded by Humboldt Bay to the north, by the town of King Salmon to the southwest, by Northwestern Pacific Railroad tracks to the east, and by King Salmon Avenue to the south (PG&E 2006a, p. 8.6-1).

The proposed HBRP project would consist of a 163-megawatt (MW) power-generating facility to be constructed on a 5.4-acre parcel in the east-central part of the existing

HBPP property at 1000 King Salmon Avenue, owned by the applicant, PG&E. The new generating equipment would allow the decommissioning of the existing natural-gas-fired Units 1 and 2 (combined capacity of 105 MW) and the two diesel-fired Mobile Emergency Power Plants (MEPPs) (15 MW each) that currently produce all of the HBPP's power. A non-functional nuclear-powered generating facility, Unit 3, is also located on the HBPP property, but it is currently being decommissioned under a program overseen by the Nuclear Regulatory Commission (NRC). According to the applicant, the demolition of Units 1 and 2, the removal of the fuel pipeline that conveyed the liquid fuel formerly used by Units 1 and 2, the decommissioning of Unit 3, and the removal of the MEPPs are not part of the HBRP project description (PG&E 2006a, p. 2-2; PG&E 2008b). Several structures, however, that currently occupy the part of the HBPP parcel proposed for the construction of the HBRP would have to be removed and are therefore part of the HBRP project description (PG&E 2006a, p. 2-1), including:

- Decommissioning Program project office buildings (temporary);
- Painting and Sandblasting Building;
- Two storage buildings (#7069 and #8048);
- A 115-kV transmission tower;
- A railroad spur;
- Diesel tanks for the two MEPPs;
- Underground piping; and
- Infrastructure (no details provided).

The new HBRP facility would intertie with PG&E's transmission system at the Humboldt Substation via the existing on-site Humboldt Bay Power Plant Substation and existing off-site 60-kV and 115-kV transmission lines (PG&E 2006a, pp. 5-1–5-2). The principal elements of the proposed project (PG&E 2006a, pp. 1-1–1-2, 2-1, 2-5–2-6, 2-19, fig. 2.3-1, 5-2, 6-1–6-2) include the construction, installation, or use of:

- Ten dual-fuel (natural gas and diesel) Wartsila reciprocating engine-generator sets and associated equipment, with a combined nominal output of 163 MW;
- A 40-unit radiator air-cooling array;
- Ten exhaust gas silencing stacks;
- Selective catalytic reduction system;
- Three step-up and three auxiliary transformers;
- Tanks for storage of 634,000 gallons of emergency diesel fuel (four days' supply);
- Three new tie lines to existing on-site transmission facilities, including two new, 82- and 117-foot-long, 60-kV connections and one new, 496-foot-long, 115-kV connection;
- Three new take-off structures;
- Three new steel poles;

- Replacement of three circuit breakers (two 60-kV, one 115-kV) at the HBPP Substation;
- A 10-inch-diameter natural-gas pipeline connection to existing on-site service;
- A new 10-inch ultrasonic gas meter in the existing gas regulation site;
- A 6-inch-diameter water pipeline connection to an existing groundwater well (PG&E Well No. 2), for process water and irrigation;
- A 1,200-foot-long, 4-to-6-inch-diameter, potable water connection to a Humboldt Community Services District (HCSD) main in King Salmon Avenue;
- A 4-inch-diameter sewer pipeline connection to the on-site sanitary lift station No. 3, for wastewater disposal to the HCSD;
- A temporary construction laydown area east of the existing cooling water discharge canal and north of the proposed project site;
- A temporary construction parking area southeast of the existing cooling water intake canal and southwest of the existing substation;
- A temporary construction access road running from King Salmon Avenue along the southeast side of the existing cooling water intake canal, southeast of the temporary construction parking area, southeast of the existing switch yard, and on to the proposed project site;
- A temporary remote parking area at the far west end of the HBPP property;
- A construction worker pedestrian access trail from the remote parking area, around the western fence line, across the cooling water intake canal, to the temporary construction road; and
- A short-term delivery parking area on the west side of King Salmon Avenue, about halfway between the temporary construction access road and the temporary remote parking area.

The final HBRP elevation would be 13 feet above mean sea level to avoid the 100-year flood level. Achieving this grade would require applying layers of engineered fill to the project site after the topsoil has been removed (PG&E 2006a, p. 2-34). The applicant anticipates using a commercial borrow site to obtain the necessary fill, but could select a non-commercial site (PG&E 2006a, Data Response no. 26).

Historical Background, Literature Search, Field Survey, and Resources Inventory

Europeans had explored the northern California coast by sea as early as the fifteenth century, with the first landing made at Patrick's Point in 1775 by Juan Francisco de Bodega to claim the country for the King of Spain (PG&E 2006a, p. 8.3-3). Captain Jonathan Winship and a large party of Aleut hunters on the ship, *Ocean*, made the first recorded entry into Humboldt Bay by sea in June, 1806, while working for a Russian-American fur trading company headquartered in Sitka, Alaska. Afterward the bay was seemingly forgotten until Gold Rush days (PG&E 2006a, p. 8.3-3; Historic Record Co. 1915, chap. III).

In 1848, gold was found in the Trinity River, and the search began for a suitable port for further exploration of the northwest coast region. In 1849, Dr. Josiah Gregg led an expedition by land and rediscovered Humboldt Bay. Several subsequent sea expeditions from San Francisco followed, searching out the seaward entrance to the bay. One such expedition, led by members of the Laura Virginia Association sailing on the schooner *Laura Virginia*, rediscovered the entrance to the bay in 1850. They established the first town on Humboldt Bay at Buhne Point, which they named for H. H. Buhne, the pilot of the *Laura Virginia* who had successfully maneuvered the ship over the sand bar at the mouth of the bay. The settlers named their new town Warnersville. The town, as platted, was about one mile wide and extended along 3 to 4 miles of shoreline, including the HBPP property. Only some 12 houses were ever built in the town, however, and the town site was abandoned by the late 1800s. A 1950 aerial photograph shows no remaining standing structures on the HBPP property. It is assumed that any archaeological remains of the town were destroyed when the HBPP was constructed in the late 1950s (PG&E 2006a, p. 8.3-3; Forsyth, 2007; PAR 2003, p. 10; Historic Record Co. 1915, chap. III).

In the early 1850s, two towns were established on Humboldt Bay to provide for the needs of the many miners who came to take gold from the region's rivers. Supply ships entered the bay over the treacherous sand bar and off-loaded goods and supplies at Eureka and Union (renamed Arcata in 1860). Miners soon gave way to lumbermen, and after only four years in existence, Eureka had seven lumber mills. Ships began carrying lumber out of the Humboldt Bay ports to California's growing coastal cities to the south (Anon n.d.; Historic Record Company 1915, chap. XIII). Some settlers took up cattle-raising on unforested land. Relations with the local Native Americans were uneasy due to the encroachments of the whites on resources long owned and used by the Wiyot. Cattle-stealing by the Native Americans exacerbated the situation. Remote or isolated miners and lumberjacks feared attacks, although Indian-instigated violence against whites was rare.

Fort Humboldt was established by the U.S. Army near Eureka in 1852, with the purpose, originally, to protect settlers from the Native Americans, but soon the military found itself playing the role of protector of the Indians, although ineffectually. As the hostility towards Native Americans escalated, the Army came under increasing pressure from the white settlers, especially from the influential large landowners in the area, to move the Native Americans as far away as possible. The Army's failure to do this resulted in the raising of civilian "militias" in many settlements in northwest California, to "protect property rights." One of these, the "Humboldt Volunteers," attacked the Wiyot village of *Tolowot* in the early morning hours of February 26, 1860, during the Wiyot traditional annual World Renewal Ceremony. The whites killed some 200 people, including women, children, and elders. The northern California "Indian Wars" of the early 1860s followed this event. Native Americans from all over the northwestern region were rounded up, imprisoned at Fort Humboldt, and eventually removed to reservations (Crandell 2005, pp. 12-15; 30). Fort Humboldt is recorded as California State Historical Landmark No. 154 (California Landmarks 2004).

With control of forest lands thus assured, the regional logging industry found the means—the logging railroad—to gain access to the more remote and rugged timber stands. First powered by draft animals, then by steam, these variously-gauged railroads

connected the woods to the mills and shipping facilities on Humboldt Bay. But except for the commerce via shipping, the region remained unconnected with the wider world for a comparatively long time. The Transcontinental Railroad tied Sacramento to the rest of the nation in 1869, and Los Angeles got its connection in 1876, but it was not until 1915 that the Northwest Pacific Railroad (NWPRR) connected the northwest coast region with the rest of California and the country. It was constructed between 1907 and 1914, running from Sausalito, in the San Francisco Bay area, to Arcata, at the north end of Humboldt Bay. The NWPRR became part of the Southern Pacific (SP) system in 1929, but struggled for profitability due to the high cost of maintaining the track in the face of heavy annual rainfall and flooding, unstable geology, and seismic activity. In 1983, SP shut down the line north of Willets, but an independent company was formed and served the line north of Willets for several years as the Eureka Southern Railroad before succumbing to bankruptcy. The Humboldt Bay region finally lost its rail connection to San Francisco permanently in 1992 when an earthquake and landslide at Scotia Bluff crumpled and buried the tracks (NWPRHS 2000; EPIC 2000). The old NWPRR tracks run along the southeast side of the HBPP, immediately adjacent to the proposed HBRP site. A spur line, long disused, runs southwest from the old tracks onto the HBPP. It was built in 1954 to facilitate the construction of the HBPP.

Humboldt Bay Power Plant

Electrification in Humboldt County was directly tied to the lumber industry. The machines in the mills were, at first, steam-powered, but so were the available electrical generators of the late nineteenth century. Installing a steam-powered generator to produce electricity for lighting the mill buildings was a natural progression at the mills. The fuel used by mill steam plants was the waste from the timber processing. Mills soon found they produced more electricity than they needed and so made a profit by supplying neighboring residential and downtown business districts first with street lighting, then with interior lighting. After a number of small local electric companies, either independents or offshoots of mills, competed and merged in the various cities of Humboldt County, the Western States Gas and Electric Company of Chicago bought and consolidated all of them in 1911. PG&E took over the Western States system in 1927 (Anon 1970). Except for the intensified demand for electrical power during WWII, when industrial production in the region increased to meet wartime needs, local electrical production at PG&E's single steam generator plant in Eureka and transmission from the Sacramento Valley satisfied regional demand. After the war, however, regional demand for power for new and expanding lumber mills shot up, due to the postwar boom in the housing industry across the country. The power available for PG&E to distribute was insufficient. To rapidly bridge the gap, PG&E acquired the salvaged stern of the *DonBass III*, a World War II tanker, with an operational 4.8-MW generator and steam plant. The partial ship was towed to Eureka, beached, and put into service generating electricity in December, 1946 (Anon 1970; PAR 2003, pp. 11-12). To meet long-term growth needs, PG&E planned to replace its two generating plants at Eureka with two oil-fueled units at Buhne Point on Humboldt Bay. PG&E also planned to construct a 115-kV transmission line to connect to the state's electrical grid in the Sacramento Valley. The new Buhne Point facilities, consisting of Unit 1, Unit 2, appurtenant facilities, and transmission lines, were constructed and in service by 1958 (PG&E 2006a, pp. 8.3-3 to 8.3-4; PAR 2003, p. 11-12; Anon 1970).

PG&E's building of the HBPP on Humboldt Bay was a location choice typical for merchant fleet steam-turbine electric generation plants in California in the 1950s and 1960s. Such plants were commonly located near load centers, near fuel supplies, and near a water source (PG&E 2006a, p. 8.3-10), often an ocean bay or inlet, because they depended on having lots of water to use for "once-through cooling." This technology pumped great volumes of ocean water through the plant's cooling system and expelled the warmed water directly back into the ocean, a practice being phased out today because of its harmful impacts on ocean biota. The HBPP location was typical of 1950s steam-electric plants, complete with bay-side, once-through cooling, except in one regard—it had no nearby fuel supply. PG&E had to import fuel to run the plant. It relied initially on fuel oil tankered into nearby Olson's Wharf and run through an underwater pipeline into on-site storage tanks. In 1958 a natural gas pipeline was built from the Sacramento Valley west to serve the plant and the Humboldt Bay region (PAR 2003, pp. 19-20; PG&E 2007a). To this day, the HBPP relies on imported diesel fuel to back up its natural gas supply in the winter, when the needs of higher-priority users may curtail the gas available to the plant.

The unique geographic isolation of the HBPP, remote from fuel supplies, necessitated an unusual design feature in Units 1 and 2. The reliance of the entire Humboldt Bay area on this plant and the plant's dependence (after 1958) on one natural gas line and one transmission line from the state grid, both subject to failure due to the all-too-common natural disasters in this region, made critical the plant's ability to respond very quickly to supply failures. To compensate, Units 1 and 2 were fitted with oversized steam drums which permitted them to shift from minimum load to full load in a matter of seconds (PG&E 2006a, p. 8.3-10).

Beginning in 1951, PG&E was a founding member of a consortium of electric companies, the Nuclear Power Group, committed to the design and construction of nuclear power plants. By 1956, PG&E and other companies of the group were participating in the construction of nine nuclear power plants, mostly located in the eastern United States and subsidized by federal funding. In 1959, PG&E, General Electric, and Bechtel Corporation partnered to build a small (5-MW) experimental nuclear plant called Vallecitos near Livermore. This was the first nuclear power plant in California and the first privately-funded plant in the United States. In addition to partially funding Vallecitos, PG&E provided the turbine generator that produced the power, then distributed the power produced. In addition, PG&E personnel gained invaluable experience at the Vallecitos facility. This experience, the positive outcome of the Vallecitos project, and the zealous commitment of PG&E's management to the development of profitable commercial nuclear power, motivated PG&E to undertake the building of the first economically feasible nuclear power plant in the nation, and the company began looking for the right place to build it (PAR 2003, pp. 15-19; 48).

In the 1950s, the costs of constructing a conventionally designed nuclear plant, with its large steel and concrete containment dome, made nuclear plants non-competitive against fossil-fuel plants in the commercial production of electricity in most parts of the country. But Humboldt County presented a situation where the use of fossil fuels to produce electricity was so expensive, due to the cost of transporting the fuels, that a nuclear plant could be as, if not more, economic as a fossil-fuel plant. Humboldt County also had a growing electricity market that PG&E was already, in the late 1950s, taxed to

meet with its existing fossil-fuel-fired facilities, Units 1 and 2, at the HBPP. A Unit 3 had been planned for HBPP all along, and PG&E decided to make Unit 3 nuclear-fueled (PAR 2003, pp. 19-20).

Before 1964, in the early period of building nuclear power plants, they were located on rivers and lakes where they would have a plentiful supply of water for cooling the nuclear reactor, just like the once-through-cooled fossil-fueled power plants. Remoteness from population centers was also a deliberate factor in the location of early nuclear power plants, so all previous to HBPP were built on waterfront, virgin sites in rural or semi-rural settings. The Atomic Energy Commission (AEC) had licensed six commercial nuclear power plants² previous to HBPP, and all were located on new sites. In building a nuclear unit at an existing conventional power plant, where the nuclear unit and the fossil-fueled units would run in tandem, PG&E achieved a first. One other early nuclear plant, Elk River Station, was constructed by converting a fossil-fuel plant into a nuclear plant, which operated between 1963 and 1968 and was then converted back to coal and oil (Web Sources 2008), but the fossil and nuclear units did not operate at the same time.³ In the post-1963 era, additional nuclear units were added to existing nuclear plants, for example, Dresden and Indian Point, but HBPP was the first and only conventional-plus-nuclear-configured power plant in the country dating to the pioneer commercial nuclear power period.

In a move that made the proposed HBPP Unit 3 even more economic, PG&E's engineers greatly reduced the cost of constructing the plant by designing a new, unique, and innovative containment system to replace the expensive dome of the previous nuclear power plant designs. Called "a pressure suppression system," the new design entailed building an airtight, underground, concrete and steel chamber that could be partially filled with water to suppress steam condensation and release in the event of an accident. This suppression system subsequently became the industry standard for boiling water reactors (BWRs). Another PG&E innovation placed Unit 3's suppression chamber 90 feet underground without any excavation, which further reduced the construction cost. This was achieved by forming the chamber on the ground surface and shaping its edges like vertical blades. Water jets were placed at the edges and aimed straight down at the soil. As the water jets softened the soil, the chamber slowly sank of its own weight (PAR 2003, pp. 20-22).

With an Atomic Energy Commission (AEC) license to produce 52 MW, Unit 3 began producing commercial power on August 1, 1963. To national fanfare, the plant was dedicated on September 23, 1963 (PAR 2003, p. 30). It was the first nuclear plant "constructed and privately subsidized by one company based on electrical demand and competitive economics as a profit-making venture, rather than [on] research and

² Vallecitos (1959, California), Dresden 1 (1960, Illinois), Yankee Rowe (1961, Massachusetts), Saxton (1961, Pennsylvania), Indian Point 1 (1962, New York), and Big Rock Point (1963, Michigan) (Web Sources 2008).

³ Elk River Station was owned by the AEC and was authorized to operate under the provisions of 10 CFR Part 115, but it was not licensed by the AEC (Davis 2008).

development of a new technology” (PAR 2003, p. 48). Its reliability, with a 92 percent availability rating, caused the AEC to upgrade its license to 70 MW in 1965 (PAR 2003, p. 30).

By the late 1950s, PG&E was planning a major expansion into nuclear power generation, with several facilities being planned simultaneously. One of these was a site on Bodega Bay. Spurred by the discovery of a minor fault in the rocks underlying the proposed site, public protests in Santa Rosa in the early 1960s against PG&E’s Bodega Bay nuclear plant initiated what would become an escalating public resistance to nuclear power (Wellock 1998). A contamination problem at HBPP Unit 3, caused by defective fuel rod cladding, resulted in an insignificant radiation release, but the leakage fed the rising anti-nuclear flames. Protesters called HBPP Unit 3 “the dirtiest nuclear plant in the country,” a label which stuck permanently and sullied PG&E’s reputation, despite the company’s correction of the fuel rod problem. In October, 1964, PG&E announced that it was abandoning its plans for Bodega Bay, but would continue its commitment to nuclear power, concentrating on a site near Diablo Canyon in San Luis Obispo County (PAR 2003, pp. 30-31).

The ensuing 1963-1975 nuclear power-plant-building period came to be known as “the Great Bandwagon Market.” During this time the number of orders for new plants and the size of the ordered plants grew. This boom was caused by several factors, including the loss-leader bidding competition between General Electric and Westinghouse (the primary builders of reactors), the rise of power-pooling arrangements among electrical generating utilities (such that excess power production was an income-producing asset), and the growing public concern over air pollution, especially from coal-fired plants. These factors combined to create an increase in the number of nuclear power plants ordered from 4 in 1965 to 31 in 1967. Additionally, locations closer to population centers became more common in this period (NRC n.d., pp. 9-10).

In the late 1960s and early 1970s, with 15 commercial nuclear plants operating and many more planned or being built, utility companies across the country were enthusiastic about the future of nuclear power. But the protest movement was also growing. First a minor accident at the Brown’s Ferry nuclear plant in Alabama in 1975, and then a major accident at the Three Mile Island nuclear plant in Pennsylvania in 1979, galvanized the anti-nuclear-power movement. The Nuclear Regulatory Commission (NRC), created in 1974, responded to the accidents, and to the growing public concern, with more stringent regulations for new nuclear plants and with requirements for significant upgrades at existing plants, which would be very costly to install (PAR 2003, pp. 31-32).

In the early 1970s, PG&E had learned that the Little Salmon Fault, over which Unit 3 at HBPP had been built, was an active fault. When the plant had been constructed, geologists had thought the fault was dormant. PG&E began its own seismic studies and made plans to upgrade Unit 3 for greater seismic safety. The plant was shut down for refueling and seismic retrofitting in 1976, but while this work was in progress, the NRC told PG&E it would not support restarting Unit 3 until the seismic issues were resolved. PG&E stopped the work at Unit 3. Then the Three Mile Island accident occurred, and the NRC suspended all licensing reviews while they reevaluated the entire nuclear industry. Issued in 1980, the subsequent new NRC regulations, with their costly

upgrade requirements, forced PG&E to consider its options for Unit 3. The company could complete the retrofitting work originally planned, plus additional upgrades to meet the new standards; they could convert Unit 3 to use fossil fuel; or they could decommission it. In July 1983, based on its financial analysis, PG&E announced that it had decided on the latter option (PAR 2003, pp. 32-33).

For decommissioning Unit 3, PG&E chose one of three NRC alternative processes called SAFSTOR. This entails maintaining and monitoring a nuclear reactor while its radioactivity decays, then dismantling it. Unit 3 entered SAFSTOR status in 1988 and can remain in this status until 2015, when the U.S. Department of Energy would assume responsibility for the disposition of the fuel. Unit 3's 250-foot-tall concrete vent stack was removed in 1998 to eliminate the earthquake danger it posed and to dispose of those parts of it that were contaminated by radioactivity (PAR 2003, p. 33).

Even in its decommissioning, Unit 3 achieved another nuclear industry "first." All of Unit 3's spent fuel was removed from the reactor and stored in the adjacent spent fuel pool. Thus Unit 3 was the first commercial nuclear plant to be decommissioned while keeping spent fuel on site. This method was extensively studied, and, to date, 14 other nuclear plants in the United States are using this process pioneered by PG&E at Unit 3. PG&E has also provided assistance to the NRC in updating the regulations for the future decommissioning of nuclear plants, based on the experience gained at Unit 3. PG&E is currently planning to remove Unit 3's spent fuel to another on-site storage facility, the recently completed Independent Spent Fuel Storage Installation (ISFSI) (PAR 2003, p. 34), beginning in the spring of 2008.

On May 4, 2006, the applicant submitted a records search request to the California Historic Resources Information System (CHRIS), North Coastal Information Center requesting information on all sites and previous surveys located within one mile of the project area (PG&E 2006a, p. 8.3-4). On June 30, 2006, the applicant sent a letter to the Humboldt County Historical Society seeking information regarding any known archaeological sites (both historic and prehistoric) or historic structures present within the project area (PG&E 2006a, Appendix 8.3F).

On April 10, 2006, William Shapiro completed the architectural field reconnaissance of the HBPP plant site, of the proposed HBRP construction site, and of adjacent parcels, including the community of King Salmon, seeking to identify any standing potentially historic structures. Shapiro found that some structures in King Salmon were older than 50 years, but did not record them because the proposed HBRP was not expected to have a significant impact on them (PG&E 2006a, p. 8.3-9). The CHRIS records search returned no information on these structures, so these resources have not been evaluated for potential historical significance. Staff believes that the proposed project would have no impact on standing structures of King Salmon because it would not affect them either physically or perceptually.

Under the direction of qualified architectural historian Jessica Feldman, Shapiro prepared Department of Parks and Recreation (DPR) 523 "Primary" and "District" forms for the entire HBPP, recorded as Resource PL-1, a district inclusive of the entire HBPP. A district is one type of cultural resource recognized in both state and federal law. While the other types of cultural resources—buildings, sites, structures, and objects—

generally are singular resources, a district is a collection of resources which must have certain characteristics to qualify as a district. Feldman and Shapiro did not evaluate the historical significance of the Humboldt Bay Power Plant District at the time they identified and recorded it (PG&E 2006a, p. 8.3-9; Appendix 8.3D).

Feldman and Shapiro also prepared "Primary" forms for three Humboldt Bay Power Plant District elements (a transmission line tower, a storage building (#7069), and the spur rail line which runs from the NWPRR onto the HBPP site), which would be demolished to accommodate the proposed HBRP. The applicant's discussion of the railroad spur that is an element of the Humboldt Bay Power Plant District (PG&E 2006a, p. 8.3-13) raised the possibility that the NWPRR grade and tracks, to which the spur connects northeast of the proposed HBRP site, could be a significant cultural resource. With its construction between 1907 and 1914, the railroad grade and trackage are of sufficient age to be potentially eligible for the California Register of Historical Resources (CRHR), but this historic structure has not been recorded or evaluated for significance by a cultural resources specialist. Staff, however, believes that the proposed project would have no impact on this resource because no HBPP construction activities are proposed that would affect the tracks or grade.

In response to staff's Data Request No. 27 (CEC 2006b), asking that a qualified architectural historian justify and evaluate the Humboldt Bay Power Plant District, Jessica Feldman updated the DPR 523 "District" form for the district on October 12, 2006. She augmented the discussion of the significance of the resource, added "Continuation Sheets" listing all the elements of the HBPP with their dates of construction and alteration, and illustrated HBPP elements in photographs (taken in the field in October, 2006) and with copies of construction-period architectural plans. As a further response, Feldman submitted a technical memorandum, dated December 21, 2006, explaining how the HBPP qualifies as a district and evaluating its historical significance (that is, its eligibility for the National Register of Historic Places (NRHP) (CH2MHILL 2007a, Attachment DR27-1).

No information regarding historic sites or structures within the project area was documented in Humboldt County Historical Society archives (PG&E 2006a, Appendix 8.3F). The CHRIS records search returned information on one report, PAR 2003, which was the inventory of HBPP cultural resources associated with the ISFSI construction, including a historical architecture survey of the HBPP and identification of Unit 3 as a potentially significant historical resource.

Assessment of the Historical Significance of the Humboldt Bay Power Plant Historic District

In a technical memorandum, dated December 21, 2006, the applicant's architectural historian addressed the issue of whether or not the HBPP qualified as the type of collective cultural resource known as a district. She concluded that the HBPP qualified

as a district (CH2MHILL 2007a, Attachment DR27-1, p. 4) because it met the requirements stated in National Park Service guidance (NPS 2002), including:

A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

A district derives its importance from being a unified entity, even though it is often composed of a wide variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties.

A district must be a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, style of sites, buildings, structures, and objects, or by documented differences in patterns of historic development or associations. The boundaries must be based upon a shared relationship among the properties constituting the district.

A district can comprise both features that lack individual distinction and individually distinctive features that serve as focal points. It may even be considered eligible if all of the components lack individual distinction, provided that the grouping achieves significance as a whole within its historic context.

In support of her conclusion, she noted that, “within approximately seventy acres, the Humboldt Bay Power Plant contains a significant concentration of structures all associated with the production of energy for the Humboldt County Region of northern California, and these structures are linked by a plan by PG&E that began in 1956 and concluded in 1963 for this sole purpose” (CH2MHILL 2007a, Attachment DR27-1, p. 4). In the same light, she also stated, “all of the buildings and structures convey both the visual and physical feeling of an operating power plant (despite the fact that Unit 3 is not currently operable)” (CH2MHILL 2007a, Attachment DR27-1, p. 4). She also noted that the boundaries of a potential HBPP historic district are distinguishable and would include the entire built environment within the HBPP fenced area (CH2MHILL 2007a, Attachment DR27-1, p. 5).

Staff sees a further linkage uniting the structures of the HBPP: technological progress. In addition to being linked by planning and development, as the applicant stated, the components of the HBPP are linked as a logical technological progression of the development of post-World War II electrical generation in California, going from the use of liquid fossil fuels, through the use of natural gas, to the use of nuclear fuel. HBPP exemplifies this progression. Units 1 and 2 are typical of 1950s steam-electric power plants, and in being so they typify the post-World War II expansion of the electrical generation industry in California, utilizing a coastal location and once-through cooling, burning fuel oil or diesel stored on-site in large tanks, then converting to use natural gas for fuel. Unit 3 represents the next step, the development of economically viable commercial nuclear power. Thus, the HBPPHD embodies, in one location, the history of

the development of California's postwar electrical generation technology, and the interrelationship of its structures "conveys a visual sense of the overall historic environment" they represent, as National Park Service guidance suggests.

The applicant's architectural historian acknowledged that the HBPP constitutes a district by the measures of the National Park Service (CH2MHILL 2007a, Attachment DR27-1, p. 5), and staff agrees. Staff, moreover, believes that the HBPP meets the definition of a "historic district" in state law, defined in Pub. Resources Code section 5020.1: "a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development." The California Code of Regulations identifies "historic district" as one of the types of resources eligible for the CRHR (Title 14, section 4852). While the applicant restricts the application of the term "historic district" to a district that meets the criteria for listing on the NRHP (2007b, p. 18), in this Final Staff Assessment (FSA), staff uses the term as defined in state law.

To summarize on the HBPP as a historic district, staff believes:

- The HBPP is a district (in the NRHP meaning of the term) because it is a definable geographic area that can be distinguished from surrounding properties by easily definable boundaries; and
- The HBPP is a historic district (in the Public Resources Code meaning of the term) because the individual components are linked spatially, functionally, historically, developmentally, and by plan and design.

The previous cultural resources study that was most pertinent to the cultural resources of the HBPPHD was the PAR report (2003), which was the inventory of HBPP cultural resources potentially affected by the ISFSI construction. The PAR report included a historical architecture survey of the HBPP that identified Unit 3 as a potentially significant historical resource because of its many innovations and engineering achievements. The PAR report recommended that Unit 3 was probably eligible for the NRHP on the basis of both Criterion A (associated with events that have made a significant contribution to the broad patterns of our history), at a national level of significance, and Criterion C (embodying the distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or possessing high artistic values), also at a national level of significance, with Criteria Consideration G (exceptional significance required for a resource less than 50 years of age) applying (PAR 2003, p. 48). The applicant agreed that Unit 3 was probably eligible for the NRHP (PG&E 2006a, p. 8.3-13).

The PAR report considered the eligibility of Unit 3 for the NRHP, rather than for the CRHR, because the ISFSI project was being overseen by the Nuclear Regulatory Commission, a federal agency, so the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) applied. The latter requires that the historical significance of cultural resources be evaluated in terms of eligibility for the NRHP.

The analysis in this FSA is overseen by a state agency, the California Energy Commission, so the California Environmental Quality Act (CEQA) applies. Energy

Commission cultural resources staff has reviewed the HBRP's environmental impacts under CEQA, so staff must use criteria from CEQA and the CEQA Guidelines to evaluate both the significance of the identified cultural resources and the significance of the proposed HBRP's effects on those cultural resources as an environmental impact.

The historical significance of cultural resources must be determined as defined in the CEQA Guidelines (Cal. Code of Regulations section 15064.5(a)) define a historical resource (meaning a historically significant cultural resource) as any cultural resource:

- (1) eligible for the California Register of Historical Resources (per requirements provided in Pub. Resources Code 5024.1(a-e, with reference to definitions, including "historic district," in Pub. Resources Code section 5020.1) and in Cal. Code of Regulations section 4852); or
- (2) included in a local register of historical resources (if the survey in which the resource was identified qualifies under Public Resources Code section 5024.1(g); or
- (3) determined to be a historical resource by a lead agency, provided the determination is supported by substantial evidence in the light of the whole record.

With respect to the significance of a project's impacts, CEQA states that a project resulting in a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (Pub. Resources Code section 21084.1).

To demonstrate that the HBPPHD is a historical resource (is a historically significant cultural resource) under CEQA, staff must show that the resource qualifies under (1) and/or (2) and/or (3), above. To demonstrate that the HBRP's impact on the resource may have a significant effect on the environment, staff must show that the impact would cause a substantial adverse change in the resource's significance.

Staff advises that the HBPPHD is a historical resource under CEQA, based on (1) and (3), above. The following staff discussion will support this determination by supplying the necessary "substantial evidence in the light of the whole record," in the form of a discussion of the eligibility of the HBPPHD, not for the CRHR ((1), above) but for the NRHP. Staff is taking this approach for two reasons.

First, while state law defines the term, "historic district," and provides the procedures for nominating and listing a historic district (or any other cultural resource) on the CRHR (Cal. Code of Regulations, Title 14, sections 4853, 4854, and 4855), it does not provide a detailed guide for evaluating the significance of a historic district. The National Park Service, on the other hand, has formulated and distributed for the use of cultural resources specialists in all states considerable guidance on evaluating the eligibility of a district for the NRHP, and cultural resources specialists all over the country use this guidance for districts being evaluated for state recognition. Thus, in the technical field of Historic Preservation, all discussions of the significance of districts is in terms of NRHP eligibility.

Second, a discussion of the HBPPHD's eligibility for the NRHP is equivalent to discussing its eligibility for the CRHR because, under Public Res. Code section 5024.1(d)(1), a resource formally determined eligible for, or listed in, the NRHP shall be automatically included in the CRHR, so a property that is probably eligible for the NRHP is also probably eligible for the CRHR (although not vice versa)

Staff acknowledges, however, that neither staff nor the Energy Commission can determine a resource eligible for listing on the National Register of Historic Places. This can be accomplished only through a federal regulatory process or by the Keeper of the National Register.

Staff has concluded that HBPP Units 1, 2, and 3, and their associated structures and features constitute a historic district that staff calls the HBPPHD. Units 1 and 2 are conventional power plants that burn fossil fuel to produce steam to drive generators to produce electrical power. The applicant described Units 1 and 2 as follows: "They were constructed during the heyday of the coastal steam-electric plant (1950-1970) and are very similar to many other plants of this type that were constructed during this period. Their design is the standard "semi-outdoor" type, with the open steel boiler framework and roofing and cladding in the upper stories and the remainder exposed [sic]" (PG&E 2006a, p. 8.3-10). Units 1 and 2 are currently still operating and are located to the west of the proposed HBRP project site, with Unit 1 being south of Unit 2. North of Unit 2 is retired nuclear Unit 3, which formerly used the heat from a controlled nuclear reaction to produce steam to drive a generator to produce electrical power. The 31 supporting and functionally related structures associated with Units 1, 2, and 3 are listed in Cultural Resources Appendix 1, Table 1.

The three units, and most of the structures associated with them, would not be directly affected by the construction of the HBRP, but three structures, a railroad spur, a storage building, and a transmission line tower, must be demolished to accommodate the HBRP. When PG&E began building the HBPP in 1954, the railroad spur connected the site to the NWPRR and facilitated the movement of construction materials brought in by the railroad. The spur ran southwest from the NWPRR tracks into the middle of the HBPP construction site. The spur was also used later during the construction and operation of Unit 3 and formerly ran directly into the turbine room. The concrete block storage building (#7069) was built in 1955 and used to store various supplies and materials throughout the operation of the HBPP. A later metal shed addition has been made to the northeast side. It is located east of Units 1, 2, and 3, and north of the substation. It is currently used for caustic storage. The transmission line tower was built in 1962 to facilitate the construction of Unit 3 and later was used to convey the power output from Unit 3 to the HBPP substation. It is a standard steel lattice tower located north of storage building #7069.

Where staff and the applicant differ is whether or not the HBPPHD is historically significant. For the HBPPHD to be historically significant by the measures of the National Park Service, it would have to qualify under one or more of the four criteria for listing on the NRHP. These criteria include:

- Criterion A, is associated with events that have made a significant contribution to the broad patterns of our history;

- Criterion B, is associated with the lives of persons significant in our past;
- Criterion C, 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 represents a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D, has yielded, or may be likely to yield, information important to history or prehistory.

Therefore, based on the historic context for nuclear power development and the history of the role of the HBPP in the region and state, staff believes that the HBPPHD would, if nominated, be likely to qualify as eligible for the NRHP at the national and state levels, under both Criterion A and Criterion C, making it historically significant. Staff's assessment of HBPPHD significance is summarized below. In discussing the historical significance of the HBPPHD, staff repeatedly uses the words "is likely to be" because, as stated above, neither staff nor the Energy Commission can determine a resource eligible for listing on the National Register of Historic Places. This can be accomplished only through a federal regulatory process or by the Keeper of the National Register.

- The HBPPHD is likely to be significant (eligible for the NRHP) under Criterion A (associated with events that have made a significant contribution to the broad patterns of our history), at the national level, because HBPP was the first and only conventional-plus-nuclear-configured power plant in the country in the pioneer commercial nuclear power period. Units 1, 2, and 3 combined conventional thermal and nuclear thermal technology to cost-effectively provide commercial electrical power to a transportation-challenged region, exemplifying a technological solution applicable to other geographically isolated parts of the country and providing an early illustration of the idea of economy of scale applied to nuclear power generation (see more on this below).
- The HBPPHD is also likely to be significant (eligible for the NRHP) under Criterion A at the national level because of Unit 3's distinction as the first economically viable commercial nuclear power plant in the nation.
- The HBPPHD is likely to be significant (eligible for the NRHP) under Criterion A at the state level because it was the first and only combined conventional and nuclear power plant in California.
- The HBPPHD is likely to be significant (eligible for the NRHP) under Criterion C (embodying the distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or possessing high artistic values) at the national level because in one facility it exemplifies the conventional fossil-fueled and nuclear-fueled, electricity-generating power plants of the 1950-1970 era.
- The HBPPHD is also likely to be significant (eligible for the NRHP) under Criterion C at the national level, because of Unit 3's innovative and cost-effective containment vessel design and construction method and because of the unique engineering design of the steam drums of Units 1 and 2.

- The HBPPHD is likely to be significant (eligible for the NRHP) under Criterion C at the state level because Units 1 and 2 are a good example of a typical 1950s California once-through-cooled, steam-electric power plant.

In addition to the requirement that a district meet one or more of the NRHP eligibility criteria to be considered significant, the National Park Service guidelines require, for any resource being evaluated, that the evaluator define a “period of significance” at or during which the resource attained the characteristics or associations which qualify it as significant.

In the Preliminary Staff Assessment (PSA), staff stated the opinion that the appropriate period of significance for the HBPPHD was 1956-1988 (pp. 4.3-19), beginning with the completion of Units 1 and 2 and encompassing the technological innovations of Unit 3 in on-site spent fuel storage. As a result of additional research on the early period of nuclear power plant development, staff now believes that the appropriate period of significance for the HBPPHD is 1954-1963, beginning with the construction of Unit 1 and ending with Unit 3 coming on-line in August, 1963. Staff’s additional research made it clear that while developments associated with the decommissioning of Unit 3 were technologically distinguished, they were of secondary importance to the HBPPHD as a whole, and so did not need to be included in defining the period of significance for the HBPPHD.

With a date range of 1954-1963, the possible application of a special exemption to the requirement that a resource be 50 years of age or older to qualify as significant also has to be considered. The National Park Service calls this special exemption Criteria Consideration G, and it addresses the potential significance of resources that have achieved significance within the last 50 years. With Unit 3, at only 45 years old, as a major contributor, the 1954-1963 HBPPHD, at first glance, would seem to be subject to Criteria Consideration G. But as instruction in how to apply Criteria Consideration G, the National Park Service provides two sets of examples of resources whose significance may be evaluated under Criteria Consideration G. The first set of examples consists of resources that “MUST [sic] meet Criteria Consideration G,” and the second set of examples consists of resources that “DO NOT [sic] need to meet Criteria Consideration G” (NPS 2002, p. 41).

One of the latter examples matches the HBPPHD very well: “a resource whose construction began over fifty years ago, but the completion overlaps the fifty year period by a few years or less” (NPS 2002, p. 41). Thus, the 1954-1963 HBPPHD would be exempt from Criteria Consideration G and so should be evaluated for significance in the same way as a resource 50 years of age or older.

To summarize on the appropriate period of significance for the HBPPHD and the need to apply Criteria Consideration G, staff believes:

- The appropriate period of significance of the HBPPHD is 1954-1963, beginning with the construction of Unit 1 and ending with Unit 3 going on-line in August, 1963, because this period encompasses the plant’s important developmental sequence and the functional linkage of the district components; and

- The HBPPHD is exempt from Criteria Consideration G because it is “a resource whose construction began over fifty years ago, but the completion overlaps the fifty year period by a few years or less,” so the HBPPHD can be evaluated for significance in the same way as a resource 50 years of age or older.

In addition to meeting NRHP eligibility criteria, determining an appropriate period of significance, and considering the applicability of Criteria Consideration G, National Park Service guidance requires that the integrity of a district also be considered. The National Park Service guidance on integrity for a historic district says, “For a district to retain integrity as a whole, the majority of the components that make up the district’s historic character must possess integrity even if they are individually undistinguished. In addition, the relationships among the district’s components must be substantially unchanged since the period of significance” (NPS 2002, p. 52).

Integrity is the ability of a resource to convey its historical significance, and the perception of historical significance is mediated by seven aspects of integrity, as specified by the National Park Service and codified in the California Code of Regulations (Title 14, section 4852):

1. Location—the place a resource was built or created.
2. Design—formal and informal, including concepts of form and spatial organization for resources not explicitly “designed”.
3. Materials—what the resource is made of.
4. Workmanship—hand craftsmanship and the products of skilled labor.
5. Setting—the physical environment of a resource.
6. Feeling—how the resource and the setting evoke a particular lifestyle or era.
7. Association—the direct link between an important historic event or person and a resource.

The PAR report assessed excellent integrity in all seven aspects for Unit 3 (2003, p. 50), despite the removal of its vent stack, but neither the PAR report nor the applicant addressed the integrity of any other components of the HBPPHD. The applicant, however, did briefly summarize information on alterations made to all HBPP components in a component table added to the DPR 523 “District” record as a result of staff Data Request No. 27 (see Cultural Resources Appendix 1, which is a transcription of the DPR 523 “District” record’s component table). Unit 1 alteration includes “office, shops, and warehouse expansion,” and Unit 2 is noted as “not significantly altered (CH2MHILL 2007a, Attachment DR27-1, Appendix A). Only one of the other components of the HBPPHD, the Relay Building (built in 1954), is noted in the DPR 523 Component Table as having been much altered, and that alteration consisted of doubling its size in 1958 when Unit 2 was added to the HBPP. The applicant also provides the information that the storage building (#7069) has had a metal shed added to its northeast wall (PG&E 2006a, p. 8.3-14). These enumerated alterations are reversible, if a restoration of the altered components were hypothetically contemplated,

and so do not constitute a loss of integrity. Conversion of both Unit 1 and Unit 2 from using fuel oil to natural gas in 1958 is another known alteration (PG&E 2007a). Staff believes none of these alterations is sufficient to impair the ability of Unit 1, Unit 2, or the Relay Building to convey their historical significance as major contributing components of a California steam-electric generating plant of the 1950s era, nor had the relationships among the HBPPHD's components changed since 1988. The recent (2007) completion of the ISFSI added a new element within the district boundaries, but it was built in the western part of the plant site, which had not been previously developed. To summarize on integrity, staff believes:

- The integrity of the HBPPHD is excellent in all seven aspects, with almost no attrition of contributing components and only reversible alterations made to a few contributing components.
- The relationship among the district's contributing components is substantially unchanged since 1963.
- The HBPP is a district having both features that lack individual distinction and individually distinctive features that serve as focal points, and the majority of the components possess integrity, as does the district as a whole.

In summary, staff believes that the HBPPHD is likely to be significant, at the national level, as an NRHP-eligible historic district, exempt from Criteria Consideration G and qualifying under Criteria A and C, with a period of significance of 1954-1963, inclusive of all components of the HBPP that were constructed before 1963 as contributing elements (Cultural Resources Appendix 1, Table 1). The number of contributors in the historic district is 31, and the number of non-contributors is 18 (Cultural Resources Appendix 1, Table 2), so the contributors greatly outnumber the non-contributors. In addition, staff has determined that the HBPPHD retains sufficient integrity to convey its historical significance.

Additionally, staff points to the supportive conclusions of David Byrd of the State Historic Preservation Office's (SHPO) 106 Review Section. During the PSA public review period, as a courtesy peer review, Mr. Byrd read and commented on staff's analysis of the significance of the HBPPHD and staff's recommendations for mitigation. Mr. Byrd's conclusions (Byrd 2007) can be summarized as follows:

- The SHPO, if staff's analysis were presented for formal review, would agree with her eligibility recommendation for the Humboldt Bay Power Plant Historic District;
- The mitigation measures staff proposed for the demolition of Units 1 and 2 are appropriate.
- The applicant's consultant did not adequately evaluate the HBPPHD in its historic context;
- The applicant's consultant did not appropriately apply Criterion C; and
- The applicant's consultant did not provide hard evidence for her conclusions;

Staff consequently strongly recommends that the HBPPHD is a significant historical resource under CEQA, based on the above substantial evidence. With this

recommendation, staff must evaluate the significance of any HBRP impacts to the HBPPHD.

Prehistoric Background, Literature Search, Field Survey, and Resources Inventory

The north coastal region of California has three archaeological zones: the Northwest Coast Subregion, the Eel River Subregion, and the Russian River Subregion (Fredrickson 1984, p. 472). The proposed project site is located in the Northwest Coast Subregion, for which virtually only sites of the late prehistoric period, identified as the archaeological remains of the villages of the local Tolowa, Yurok, and Wiyot Native American groups, have been well explored. The earliest radiocarbon date for this subregion is 2,260 ± 210 years B.P. (before the present). That date was obtained from hearths at the base of the historic Tolowa village of *Taiga'n*, a large site at Point St. George, north of Crescent City, possibly depopulated by a cholera epidemic very early in the European contact period. The dated hearths, however, were not associated with the Tolowa occupation, but appeared to be the remains of a much earlier, temporary camp for Native Americans seeking and processing chert and agate cobbles from the bluffs and beach as raw materials for tools (Fredrickson 1984, pp. 490-491).

So to date there is no evidence in the Northwest Coast archaeological Subregion for the earlier prehistoric periods, present in other parts of the Southwest and California, such as the Big Game Hunting Tradition (Moratto 1984, pp. 81), dating from before 10,000 years B.P.; and the Western Pluvial Lakes Tradition, dating between 10,000-7,000 years B.P. (Moratto 1984, pp. 90-103). There is only marginally better evidence for the period some archaeologists call the Archaic, the long period (7,000-1,000 years B.P.) during which technological adaptations became increasingly localized and specialized to particular environments, of which there were many in California.

Sites of the late prehistoric period, then, dating after 1,100 years B.P., are the best known for the Northwest Coast Archaeological Subregion, including a large mound known to have been the ethnographic Wiyot village of *Tolowot*, on Gunther Island⁴ in Humboldt Bay, about seven miles north of the proposed HBRP site. Starting in 1918, archaeologists conducted a number of test excavations at the site, designated archaeological site CA-HUM-67. The earliest date for the village is a radio-carbon date of 1,050 ± 200 years B.P., taken from the peat at the base of the mound. The village was abandoned after the 1860 massacre of many of its Wiyot inhabitants by American settlers. Artifacts recovered from CA-HUM-67 are the basis for the definition of the Gunther Pattern, which archaeologists identify with the settlement of the Northwest Coast Subregion by the Wiyot and Yurok peoples. The Gunther Pattern includes assemblages of bone and antler harpoon points, woodworking tools, *Dentalium* shells, abalone shell ornaments, net weights, steatite vessels, baked-clay and ground-stone figurines, ceremonial obsidian bifaces, and distinctive barbed arrow points (Fredrickson 1984, pp. 484-487).

On May 4, 2006, the applicant submitted a records search request to the California Historic Resources Information System (CHRIS), North Coastal Information Center,

⁴ The name of the town is also transcribed as *Tuluwat*. Gunther Island is also known as Indian Island.

requesting information on all sites and previous surveys located within one mile of the project area (PG&E 2006a, p. 8.3-4). On June 30, 2006, the applicant sent a letter to the Humboldt County Historical Society seeking information regarding any known archaeological sites (both historic and prehistoric) or historic structures present within the project area (PG&E 2006a, Appendix 8.3F).

The area history indicates that in the 1850s, the town of Warnersville, consisting of perhaps 12 houses, was established in the project area, and a farmstead of undetermined age occupied some part of the HBPP site before PG&E purchased the property to build the power plant. Archaeological remains of these historic-period occupations could be present in the soils of the project site, but PG&E records indicate that extensive cutting and filling were done at the plant site in 1955 to create a finish grade for the power plant (PAR 2003, p. 6). One estimate suggests that two to six feet of fill were laid on the site of the proposed HBRP (PG&E 2006a, p. 8.3-3). It is possible that excavations for HBRP piping, duct banks, and foundations could reach native soils, so potentially significant archaeological remains of either or both the prehistoric and historic period could be encountered during construction.

An archaeological field survey was conducted by the HBRP applicant that included coverage of Units 1 and 2, the construction laydown area, two temporary construction parking areas, a temporary construction access road, and a new water pipeline alignment (PG&E 2006a, figs. 2.3-1 and 8.3-1). William Shapiro, a qualified archaeologist, conducted this field survey on April 10, 2006, using transects at 20-meter intervals. Ground visibility in much of the project area was obscured due to the presence of dense vegetation and paving (PG&E 2006a, p. 8.3-6).

In Data Response Workshop Query No. 11, staff asked that additional HBPP land proposed for project use be surveyed for cultural resources. The additional 30 acres requiring survey had been proposed as either wetland mitigation land or as a trail between the proposed worker parking area and the HBRP site. William Shapiro and Nichol Jordan surveyed these areas on March 6, 2007. They found the area in dense vegetation or covered by standing water, so the ground visibility was poor. The surveyors walked 20-meter transects and employed periodic trowel tests to observe soils. No cultural resources were identified (CH2MHill 2007f, Attachment WSQ11-1).

The CHRIS record search indicated that the PG&E property had been inventoried by PAR Environmental Services in 2003 for cultural resources for the ISFSI construction project that is part of the decommissioning of Unit 3. The PAR survey included survey of the areas north of Units 1, 2, and 3, but did not include areas planned for HBRP use, including the laydown area, temporary access road, construction parking area, or power plant site. No archaeological deposits were identified in the PAR study (PAR 2003, p. 40).

The April 10, 2006, archaeological field survey of the HBPP/HBRP identified no archaeological resources (PG&E 2006a, p. 8.3-6), and the subsequent March 6, 2007 survey of 30 acres of wetland mitigation land and a worker access trail also identified no cultural resources (CH2MHill 2007f, Attachment WSQ11-1).

Ethnographic Background, Literature Search, Field Survey, and Resources Inventory

The Native American California northwest coastal peoples primarily exploited fish for food, and so settled on the banks and at the mouths of the major rivers, particularly the Klamath and Trinity, and on ocean lagoons. They also used mountain resources such as acorns and basketry materials, but did not build villages there. Culturally the California northwest coast area resembled the “Northwest Coast” culture of Oregon, Washington, and British Columbia (Fredrickson 1984, p. 473).

At the time of European contact, Native American groups on California’s northwest coast spoke 11 dialects representing 3 major linguistic groups (Fredrickson 1984, p. 477). Linguistic study of these groups suggests multiple migrations by numerous groups, but no certain details have emerged on the origins or sequence of migrations or the time depth involved in the peopling of this area. Archaeological studies also contribute little, with the earliest radiocarbon date for the region inhabited by the Wiyot, in which the HBRP project site is located, coming in relatively recently at 900 A.D. (Elsasser 1978, p. 155). The language spoken by the Wiyot belonged to the Algic superfamily. Their neighbors to the north, the Yurok, also spoke a language of the Algic superfamily, but the common ancestor of the two languages was in the dim past, interpreted by students of historical linguistics to mean that the arrivals of the Wiyot and the Yurok in northwestern California were greatly separated in time (Fredrickson 1984, p. 473). The mystery of two neighboring groups having very similar lifeways but speaking languages that are related, but only distantly—with some 2,300 years separating them, may never be solved (Elsasser 1978, p. 155).

Historically, Wiyot territory included the coast from south of the Little River to north of the Bear River Ridge and inland to the crest of the first mountain range, totaling about 300 square miles. This territory was almost entirely redwood forest. The Wiyot used the ocean very little for either food or travel, preferring to fish the still waters of Humboldt Bay and the mouths of the Eel and Mad Rivers. Fact-based estimates of the pre-contact Wiyot population have ranged from 1,000 to 3,300. Fish, mostly salmon, dominated their diet, but they also made use of mollusks, deer, and other game animals. The Wiyot constructed rectangular houses of vertical split redwood planks, with pitched roofs of the same material, where two or more families resided. Each village had a men’s sweathouse constructed in the same way. The Wiyot made many items associated with fishing, including dugout redwood boats. The Wiyot had no clans or formal status differences among individuals other than wealth. They had an elaborate system of fines and compensation for interpersonal, economic, and societal offenses, including for murder. They did not hold slaves, and the behavior of women was less restricted among the Wiyot than in other northwest California groups (Elsasser 1978, pp. 156-159; fig. 1; Crandell 2005, p. 6).

When the Americans came, in the 1850s, the Wiyot were occupying the only flat land adjacent to a good harbor between San Francisco and Humboldt Bay. Elsasser suggests this may be why the Wiyot were rapidly displaced by white settlers, often with violence. In February 1860, American settlers massacred a large number of Wiyots at the village of *Tolowot*. By the early twentieth century, and continuing up through 1968,

fewer than 200 persons identified as Wiyot could be counted in the Humboldt Bay area (Elsasser 1978, p. 156; 1986; Forsyth 2006).

The May 4, 2006, CHRIS record search also indicated three previously recorded ethnographic village sites within 0.5 miles of the project area: CA-Hum-79/*Djorokegochkok*, CA-Hum-80/*Norolrok*, and CA-Hum-83/*Dolawotkok*. Two other village sites, CA-Hum-81 and CA-Hum-82, are recorded within one mile of the project area. Only the recorded location of CA-Hum-79 is close to the HBPP, and it has apparently been mostly destroyed (PG&E 2006a, p. 8.3-5; PAR 2003, p. 40). Its potential for yielding data important in history and prehistory has not been evaluated, so its eligibility for the CRHR has not been determined. The number of archaeological/ethnographic village sites near the project area indicates that the HBRP location would have a relatively high archaeological sensitivity if it were not for the considerable ground disturbance that has occurred in connection with the mid-twentieth-century development of the peninsula.

On May 4, 2006, the applicant contacted the Native American Heritage Commission and requested that they search their files to determine if any sacred sites or traditional cultural properties are known for the project area. In addition, the applicant requested that the NAHC provide a list of and contact information for Native Americans who may have an interest in, and knowledge of, the project area. On May 5, 2006, the NAHC sent the applicant a list, with contact information, of Native Americans who might have knowledge of the project area. The NAHC recommended that the applicant contact all of the people on the list. On May 16, 2006, the applicant sent letters to each person identified on the NAHC list asking for information regarding known cultural resources within the project area (PG&E 2006a, Appendix 8.3E).

On November 1, 2006, staff sent a letter to the NAHC requesting that they provide a list of Native Americans with an interest in, and knowledge of, the project area. On November 2, 2006, the NAHC responded with a list of Native Americans and their contact information. On November 27, 2006, staff sent a letter to the seven Native Americans on the list, informing them of the proposed HBRP.

On May 5, 2006, the Native American Heritage Commission responded to the applicant's May 4 request, stating that no sacred sites or traditional cultural properties have been documented within the project area (PG&E 2006a, Appendix 8.3E). In late May, 2006, in response to the May 16, 2006 letter, the applicant received three letters from Native Americans (PG&E 2006a, Appendix 8.3E). Comments received include the following:

- May 23, 2006: Lisa D. McGinnis, representing the Bear River Band of Rohnerville Rancheria, asks to be contacted if any Native American artifacts are found (PG&E 2006a, Appendix 8.3E).
- May 25, 2006: Andrea Davis, Environmental Director for the Wiyot Tribe states that the Wiyot Tribe has records of two Native American village sites within or adjacent to the project area. Unless the applicant can demonstrate that the project is located in an area of Humboldt Bay that has been historically filled below the level of ground

disturbance, they recommend that Cultural Monitors be present onsite during all grading and excavation activities (PG&E 2006a, Appendix 8.3E).

- May 31, 2006: Paul Angell, Tribal Preservation Officer for the Blue Lake Rancheria states that there are numerous documented and undocumented Native American archaeological sites near the project area. He requests that the Wiyot Tribe be informed if any Native American resources are found (PG&E 2006a, Appendix 8.3E).

The applicant called the three Native Americans who responded to thank them for their input (PG&E 2006a, Appendix 8.3E).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires the Energy Commission to evaluate resources by determining whether they meet several sets of specified criteria. These evaluations then influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

The CEQA Guidelines provide a definition of a historical resource as a “resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR”, or “a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code,” or “any object , building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency’s determination is supported by substantial evidence in light of the whole record.” (Cal. Code of Regulations, Title 14, section 15064.5(a)). Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks from No. 770 onward (Public Resources Code, section 5024.1(d)).

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP (discussed above regarding the historical significance of the HBPPHD). In addition to being at least 50 years old,⁵ a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code section 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;

⁵ 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 five-year lag in the planning process.

- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code of Regulations, Title 14, section 4852(c)).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Public Resources Code sections 5020.1 (j) or 5024.1. Whether a proposed project would cause a substantial adverse change in the significance of historical resources is the issue that staff analyzes to determine if the project may have a significant effect on the environment. The significance of an impact depends on:

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

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

Generally speaking, *indirect impacts* to archaeological resources are those that 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 with consequent vandalism and/or greater weather exposure.

Ground disturbance accompanying construction at the proposed plant site and along the proposed linear facilities has the potential to directly impact archaeological resources, unidentified at this time. The risk of potential direct, physical impacts of the proposed construction on unknown archaeological resources is commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed project 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

HBRP Impacts on the HBPPHD and Recommended Mitigation

Construction-related activities at the HBRP site having the potential to impact the HBPPHD, which staff has determined is a significant historical resource under CEQA, include the following (PG&E 2006a, pp. 2-34):

- The demolition of Units 1 and 2 and their associated structures and features, which would foreseeably follow the initiation of operation of the HBRP, would destroy a substantial proportion of the elements of the HBPPHD; the demolition would cause a substantial adverse change in the significance of these resources, which is a significant indirect effect of the HBRP that would need to be mitigated under CEQA
- The demolition of three existing structures on the proposed HBRP site (PG&E 2006a, p. 2-1) during site preparation; these activities would destroy three HBPP elements—a storage building, a transmission line tower, and a railroad spur—that staff has identified as contributing elements of the HBPPHD; the demolition would cause a substantial adverse change in the significance of these resources, which is a significant direct effect of the HBRP that would need to be mitigated under CEQA.
- Installation of two new circuit breakers at the HBPP Substation to accommodate the new power output from the proposed repowering (PG&E, p. 5-2); this could impact the integrity of materials and integrity of design of a contributing element of the HBPPHD; and
- Erection of the exhaust silencer stacks would introduce 10 new, tall structural elements into the setting of Buhne Point; this could impact the integrity of setting of the HBPPHD, and the integrity of setting of the unevaluated but sufficiently old to be potentially significant, nearby community of King Salmon.

Staff determined that the post-HBRP demolition of Units 1 and 2 and appurtenant equipment proposed by the project (PG&E 2006a, pp. 2.2, 2.4) would have an indirect and significant impact on the HBPPHD, which staff believes is a significant historical resource under CEQA. Demolition is a significant impact, requiring mitigation. Staff is recommending new Conditions of Certification **CUL-10** and **CUL-11** (which are essentially the same as PSA Conditions of Certification **CUL-8** and **CUL-9**, except that reference to the railroad spur, transmission tower, and storage building has been omitted) to provide mitigation for the HBRP's significant indirect impact on the significant historical resource, the HBPPHD. Staff recommends in these two conditions that the applicant undertake Historic American Engineering Record (HAER) documentation of the contributing elements (listed in Cultural Resources Appendix 1) of the historic district

(except the transmission line tower, rail spur, and storage building, and Unit 3 and associated structures) prior to their demolition. HAER recordation consists of a detailed historical context and narrative for the historic district and measured drawings and large-format photography of all of the contributing elements. Because of the number and complexity of the structures to be recorded, and the need for consultation with specialists at the Heritage Documentation Program in Washington, D.C., staff has allowed long time frames for the completion of the activities required in **CUL-10** and **CUL-11**. Because none of the contributing elements of the HBPPHD, except the storage building, transmission line tower, and railroad spur, must be removed to accommodate the construction of the HBRP, and because Units 1 and 2 cannot be shut down until the HBRP is operational, the long time frames should not present a problem for PG&E.

The required HAER documentation would not include Unit 3 and associated structures, because its decommissioning is unrelated to the HBRP. Staff would advise the applicant, however, to consider having Unit 3 documented at the same time as the rest of the HBPPHD because it seems probable that Unit 3 HAER documentation will eventually be required by the NRC. PAR recommended that if “those elements of the Unit 3 facility that contribute to its historical and engineering significance would be impacted, then mitigation measures designed in consultation with the NRC and the State Office of Historic Preservation may need to be outlined and completed prior to project implementation” (PAR 2003, p. 52). Additionally, HAER documentation was the mitigative measure agreed to by NRC licensees, the NRC, and the SHPOs in the cases of the decommissioning and dismantling of two NRHP-eligible nuclear power plants, at Haddam Neck, in Connecticut, and at Big Rock Point, in Michigan.

The recommended Energy Commission conditions of certification allow the scoping of the documentation of the HBPPHD in consultation with the Heritage Documentation Program (HDP) in Washington, D.C., and provide ample time for the consultation and recordation prior to the demolition of Units 1 and 2 and their associated structures. While the recommended documentation could be labor-intensive and therefore costly, if the applicant already holds in its files original architectural drawings of Units 1 and 2 (and appurtenant equipment) and photographs of their construction, it is likely that copies of these can be submitted instead of new measured drawings. Then all that would probably be required to complete HAER documentation would be current photographs, a historic context, and an overview of the plant’s history.

The demolition of three contributing elements of a significant historical resource (the HBPPHD’s 1955 storage building (#7069), 1962 transmission tower, and 1954 railroad spur) is a significant direct impact for which mitigation is necessary. In Conditions of Certification **CUL-8** and **CUL-9** staff recommends mitigation in the form of detailed recordation in the form of Historic American Engineering Record (HAER) documentation of the three structures (the storage building (#7069), the transmission tower, and the railroad spur) that must be removed to accommodate the construction of the HBRP.

Standing structures in the community of King Salmon older than 50 years were identified during a HBRP-related architectural survey, but these structures were not recorded and evaluated for eligibility for listing on the CRHR. The applicant concluded, however, that because the HBPP has been in the setting of these structures for over 50

years, the introduction of new industrial elements into that setting would not constitute a significant impact on the King Salmon structures' integrity of setting or integrity of feeling because tall industrial structures are already part of the setting on Buhne Point (PG&E 2006a, p. 8.3-9). Staff agrees with this conclusion. Similarly, the integrity of setting and integrity of feeling of the HBPPHD would not be significantly impacted by the addition of more industrial structures because the historic district is composed of industrial structures. Consequently, procedures for identifying, evaluating, and mitigating potential visual impacts to the integrity of setting or integrity of feeling of these resources would not be required.

No assessment of the potential eligibility of the Northwest Pacific Railroad trackage and grade is available, but since no physical impacts from the HBRP would affect this resource, establishing its significance is not necessary. No procedures for identifying, evaluating, and mitigating potential impacts to such resources would be required.

Impacts on Archaeological Resources and Recommended Mitigation

Construction-related activities having the potential to adversely impact archaeological resources at the HBRP site include the following (PG&E 2006a, pp. 2-34):

- During site preparation, demolition of existing structures, topsoil removal, and preparation of drainage features; these activities would destroy all known surface cultural resources on the HBRP site;
- During construction, excavated holes for the foundations of the ten Wartsila engine-generator sets, excavated holes for the foundations of the engine hall, stacks, and auxiliary equipment, and trenches for pipelines and linear connections; these excavations could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance in the native soils of the site, under the known fill;
- During construction, ground disturbance to create pads and containment berms for diesel fuel tanks; this disturbance could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the disturbance in the native soils of the site, under the known fill;
- During installation of three new take-off structures, excavated holes for the footings for three new steel poles for new tie lines; these excavations could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance in the native soils of the site, under the known fill;
- During construction, a trench for the installation of a new 10-inch-diameter natural-gas pipeline and a new 10-inch ultrasonic gas meter; a trench for the installation of a 6-inch-diameter water pipeline connection to an existing groundwater well; a trench for the installation of a 1,200-foot-long, 4-to-6-inch-diameter pipeline connection to a HCSD main in King Salmon Avenue; and a trench for the installation of a 4-inch-diameter sewer pipeline connection to the on-site sanitary lift station No. 3, for wastewater disposal to the HCSD; these excavations could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance in the native soils of the site, under the known fill; and

- Prior to construction, ground disturbance associated with a temporary construction laydown area, three temporary parking areas, a temporary construction access road, and a construction worker pedestrian access trail; this disturbance could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the disturbance in the native soils of the site.

Staff agrees with the applicant that no significant known archaeological resources have been identified in any of the areas where the proposed project would be built. Consequently, none of the HBRP construction impacts listed above would affect known archaeological resources. However, archaeological sites from the prehistoric and ethnographic periods have been abundant in this general area, and historic-period archaeological remains could also be present.

CEQA allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction projects, and a project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Public Resources Code, section 21083.2; Cal. Code of Regulations, Title 14, sections 15064.5(f) and 15126.4(b)).

To that end as well, the applicant has proposed a number of measures intended to mitigate potential impacts to archaeological resources that could be discovered during the construction of the proposed HBRP, including the following (PG&E 2006a, pp. 8.3-14–8.3-17):

- Retaining a Cultural Resources Specialist (CRS) to be on-call to investigate any cultural resources finds made during construction;
- Monitoring during initial clearing, grubbing, trenching, and excavation for foundations;
- Implementing a construction worker training program;
- Providing procedures for halting construction in the event that there is an inadvertent discovery of archaeological deposits or human remains;
- Providing procedures for evaluating an inadvertent archaeological discovery; and
- Providing procedures to mitigate adverse impacts on any inadvertent archaeological discovery determined to be significant, including data recovery and curation of all archaeologically acquired and generated materials.

Staff's provisions for the treatment of archaeological resources unexpectedly encountered during construction are contained in recommended Conditions of Certification **CUL-1** through **CUL-7** and **CUL-13** (below), which include:

- having an archaeologist monitor all ground disturbing activities on the project site, at the laydown areas, and along the pipeline routes, when and if ground disturbance reaches native, previously undisturbed soils;
- having construction workers be trained, as part of the Worker Environmental Awareness Program, to recognize archaeological resources;
- having construction be halted if archaeological resources are encountered;

- having finds be evaluated for significance;
- having data recovery be carried out if significant impacts cannot be avoided; and
- having any non-commercial borrow and disposal sites not previously surveyed for cultural resources so surveyed.

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

Impacts on Ethnographic Resources and Recommended Mitigation

No ethnographic resources, either previously recorded or newly disclosed in the communications with Native Americans initiated by the applicant for the proposed project, were identified in the project area. Consequently, no procedures for identifying, evaluating, and mitigating potential impacts to such known resources would be required.

Operation Impacts and Mitigation

During operation of the proposed power plant, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole. So such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original project excavation. The measures recommended for mitigating impacts to previously unknown archaeological resources during the construction of the plant and linear facilities would serve to mitigate impacts from repairs occurring during operation of the plant.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(c), 15130, and 15355).

A nearby project, the ISFSI, recently constructed to facilitate the decommissioning of Unit 3, must be considered as contributing to potential cumulative impacts on the cultural resources of the HBPP area. Cumulative impacts to cultural resources in the project vicinity could occur if impacts on cultural resources from the HRBP, when added to those of the ISFSI project would be cumulatively considerable.

A cultural resources study was completed for the ISFSI. This study identified cultural resources on the HBPP property, assessed potential ISFSI project impacts to these cultural resources, and determined that construction of the ISFSI would not result in a significant impact to cultural resources, including Unit 3 (PAR 2003, pp. 51-52).

The HBRP's impacts to known archaeological and ethnographic resources have been analyzed by staff in this document and determined to be not significant with the implementation of conditions of certification providing for identification, evaluation, and

avoidance or mitigation of impacts to significant archaeological resources discovered during the project's construction. Staff determined, however, that the project would have both significant direct and indirect impacts on the contributing elements of a significant historical resource (the HBPPHD). Staff is thus recommending conditions to mitigate these impacts.

Proponents of future projects can mitigate impacts to as yet undiscovered subsurface archaeological sites to less-than-significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP). Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code section 5097.98. Since the impacts from the HBRP would be mitigated to a level less than significant by the project's compliance with Conditions of Certification **CUL-1** through **CUL-13**, and since similar protocols can be applied to other current and future projects in the area, staff does not expect any incremental effects of the HBRP to be cumulatively considerable, when viewed in conjunction with other projects.

APPLICANT'S COMMENTS ON THE PSA AND STAFF'S RESPONSES

Applicant's Comments on Staff's Analysis of the Significance of the HBPPHD

In PG&E's Initial Comments on the HBRP PSA, provided early in December, 2007, the applicant rejected staff's determination that the HBPPHD is likely to be eligible for the NRHP and thus is a historical resource under CEQA. The reasons given for this rejection were:

- Units 1 and 2 do not qualify for the NRHP individually or as part of a district with Unit 3 because they do not meet one or more of NRHP Criteria A-D (PG&E 2007b, pp. 16, 18-22);
- The only linkage the applicant sees among Units 1, 2, and 3 is that all three units generated electricity at the same location, but the co-location was solely for reasons of convenience and thus is not significant (PG&E 2007b, p. 18). Combining conventional thermal and nuclear thermal power in one power plant is not a significant event in the history of power development (PG&E 2007b, p. 21); and
- Staff agreed that Units 1 and 2 were probably not eligible for the NRHP (PG&E 2007b, p. 19).

Staff's Response to Applicant's Comments on the Significance of the HBPPHD

The applicant stated the opinion that Units 1 and 2 do not qualify for the NRHP individually or as part of a district with Unit 3 because they do not meet Criteria A-D (PG&E 2007b, p. 20). This opinion downplays the unique engineering design of Units 1 and 2 (the over-large steam drums), but, more problematically, it fails to provide any substantive evidence to support this opinion, stating merely that the units "appear" not to qualify under any of the criteria. Additionally, the applicant seems to ignore the logical interpretation of "standard design and engineering" as making Units 1 and 2

representative and typical, and thus capable of “embody[ing] the distinctive characteristics of type.”

The applicant’s conclusion on the potential significance of the HBPPHD also fails properly to consider the HBPPHD as a separate resource potentially greater than the sum of its parts. Moreover, it fails to consider appropriate National Park Service guidance, addressing whether or not all components of a historically significant district have themselves to be significant, which states, “A district can comprise both features that lack individual distinction and individually distinctive features that serve as focal points. It may even be considered eligible [historically significant] if all of the components lack individual distinction, provided that the grouping achieves significance as a whole within its historic context.” Similarly, additional National Park Service guidance on significance in districts states, “Districts that are significant will usually meet the last portion of Criterion C [represent a significant and distinguishable entity whose components may lack individual distinction], plus Criterion A, [or] Criterion B, [or] other portions of Criterion C, or Criterion D.” In the light of this guidance, merely alleging that the lack of individual significance in Units 1 and 2 disqualifies the HBPPHD as a potential NRHP district fails to consider all of the appropriate information.

The applicant provided no supporting evidence for the stated opinion that combining conventional thermal and nuclear thermal power in one power plant is not a significant event in the history of power development. Staff learned, to the contrary, that combining fossil-fueled and nuclear-fueled units in one power plant at the HBPP is a first and probably a unique development in the pioneer nuclear power plant era. PG&E co-locating its first nuclear unit next to existing conventional power plant units indicates an economic linkage that PG&E recognized and expected to use to advantage—siting and running the conventional and nuclear units together was more cost-effective than building the nuclear plant on a new site and running the two plants separately. It is possible that the nuclear plant would not have been able to produce power cost-effectively in a separate, virgin location (a more typical industry choice at the time), and that the cost-effectiveness of the conventional units would have been less had the nuclear unit not somewhat offset the cost of fossil fuels, high due to the relative isolation of California’s Northwest Coast. Adding the nuclear unit to the conventional units at HBPP represented to PG&E a kind of “economy of scale.” This was an idea that promoters of nuclear power in the post-1963 “Great Bandwagon Market” seized and used to persuade utilities nationwide to order nuclear plants many multiples larger than those of the previous period and to site them in clusters (NRC n.d., pp. 9-10). Thus PG&E’s siting of a nuclear unit next to existing fossil-fueled units trail-blazed a development that characterized the next period of nuclear power plant building.

Additionally, the significance of a historical development is commonly not recognized contemporaneously. In the 1950s, PG&E was very forward-looking. Even as it was building Units 1 and 2 at the HBPP, the company was exploring the cutting edge of electrical power production—nuclear generation. So it did not choose to add another fossil-fueled unit to the HBPP. It chose a nuclear unit in recognition of the technological and engineering advance that the unit represented and as a demonstration of the path-breaking development in which PG&E had been enthusiastically involved. PG&E did not have to have the goal of creating one power plant to represent the technological

progression of post-war electricity generation in order for that to be a result that historians would later recognize as historically significant.

In the PSA (p. 4.3-18), staff preliminarily agreed with the applicant that a hypothetical 1956-1958 HBPPHD, consisting of Units 1 and 2 and their appurtenant facilities, was not eligible for the NRHP under Criterion C. Staff had accepted the characterization of a similar facility as “typical and common” in the South Bay Repowering Project (Herbert and Walters 2006), which the applicant cited in support of the opinion that Units 1 and 2 were not eligible for the NRHP (2006a, p. 8.3-10).

Additional research has since led staff to revise its thinking on the potential eligibility of a 1950s-era, steam-driven-turbine power-generating plant under Criterion C. The fact that Units 1 and 2 “are very similar to many other plants of this type that were constructed during this period [1950-1970]” (PG&E 2006a, p. 8.3-10) has led staff to conclude that Units 1 and 2 are good examples of 1950s steam-electric plants. Thus, Units 1 and 2, being representative and of standard design and engineering, are potentially eligible for the NRHP under Criterion C, as “embody[ing] the distinctive characteristics of a type.”

Moreover, this type of plant is rapidly becoming less common as the current decade progresses. The numbers of this type of power plant are decreasing because the fleet of such power plants is aging and becoming more costly to maintain and because the once-through cooling design has become environmentally unsustainable. In recent years, the Energy Commission has seen an increasing number of applications (like the applicant’s for HBRP) to repower or replace 1950s-era once-through-cooled coastal power plants with generation technologies that do not require once-through-cooling and produce power more efficiently. In just a few more years, the type of power plant represented by HBPPHD Units 1 and 2 will be uncommon.

Applicant’s Comments on Staff’s Assessment of HBRP Impacts to the HBPPHD and on Staff’s Recommended Mitigation

In its Initial Comments on the PSA (PG&E 2007b, pp. 15; 16; 17), the applicant commented as follows:

- The demolition of Units 1 and 2 is not an indirect impact of the proposed HBRP;
- The transmission line tower is not part of the HBRP because, as explained in PG&E’s status report No. 3, its removal would be for safety reasons, not to accommodate the construction of the HBRP, and therefore mitigation for its removal should not be required;
- The rail spur does not contribute to the significance of Unit 3, which is the only significant element in the district, so removal of the rail spur is not a significant impact, and no mitigation should be required; and
- The storage building that would have to be removed and the breakers in the substation that would have to be replaced to accommodate HBRP do not contribute to the significance (if any) of Units 1 and 2, so the proposed removal and replacement are not significant impacts, and no mitigation should be required.

Because the applicant rejected staff's identifying the demolition of Units 1 and 2 as an indirect impact of the HBRP project, the applicant deemed staff's former proposed Conditions of Certification **CUL-8** and **CUL-9** (now revised as **CUL-10** and **CUL-11**) unnecessary and recommended that they be deleted (PG&E 2007b, pp. 26-29). As an alternative, the applicant offered to donate copies of documents in PG&E's files (such as engineering drawings and historic photographs) relating to the construction and operation of the HBPP to an appropriate repository and suggested that Humboldt State University might be willing to curate these materials and make them available to historians and the general public (PG&E 2007b, p. 17).

In its February 21, 2008, response to staff's query during the Second PSA Workshop, the applicant proposed a condition of certification to formalize their offer to donate archival materials to a public repository. This condition was proposed as an alternative to staff's former conditions **CUL-8** and **CUL-9** (CH2MHILL 2008b, pp. 5-6):

CUL-X

Prior to the beginning of demolition of any of the major elements of the Humboldt Bay Power Plant Units 1 or 2, the project owner shall develop a plan for the collection of historical documents and photographs pertaining to the siting and construction of the Humboldt Bay Power Plant and for the preservation of these documents, in perpetuity, within an archival records depository that is qualified to maintain and preserve the documents and to make them available to scholars and the general public for the purposes of historical research. This Historical Documents Preservation Plan will include the following:

1. A list of the specific documents or groups of documents that may be available for preservation and a brief description of the types of documents, their source, condition, and potential value to historians and the general public; and their potential availability for preservation.
2. A discussion of criteria to be used for selecting an appropriate receiving repository.
3. A timetable for the donation of the documents to the qualified receiving repository.

Verification: At least 60 days prior to initial startup, the project owner shall provide the draft Historic Documents Preservation Plan to the CPM for review and approval.

The applicant also offered, on February 21, 2008, to conduct HAER-level recordation of the transmission line tower, rail spur, and storage building (#7069) and to appropriately archive this documentation, proposing a revised version of staff's proposed **CUL-8** and **CUL-9** conditions of certification (CH2MHILL 2008b, pp. 5-6). The suggested revisions limited the HAER recordation to just the three structures (the provisions of **CUL-8** and **CUL-9** in the PSA applied to all of the contributing elements of the HBPPHD except Unit 3 and its appurtenant facilities) and shortened the time frames for employing an architectural historian and having that specialist complete and submit the recordation to the Energy Commission's Compliance Project Manager.

Staff's Response to Applicant's Comments on Impacts to the HBPPHD and Recommended Mitigation

Staff believes that, while the timing of the demolition of Units 1 and 2 may be indefinite, once the new power units are on-line, the eventual demolition is certain, making it neither "speculative" nor "unlikely to occur," which constitute CEQA's threshold for rejecting a project's indirect impact as foreseeable (Pub. Resources Code section 15064 (d)(3)).

Consequently, staff has not deleted its recommended Conditions of Certification **CUL-10** and **CUL-11** (formerly **CUL-8** and **CUL-9**), and has added a revised version of the applicant's **CUL-X**, incorporated into staff's recommended conditions of certification as **CUL-12**.

In asserting that the transmission line tower, rail spur, storage building, and substation breakers did not contribute to the significance of either Unit 3 or the HBPPHD, the applicant just stated an opinion but failed to provide evidence to support it. Staff has shown that all the components of the HBPP are linked by plan and function, and this total coherence makes all of the elements contributors to the HBPPHD. Additionally, staff has documented the role of the rail spur in the construction and operation of all the power-generating units of the HBPP, the role of the transmission line tower in conveying the power output from Unit 3, and the role of the storage building (#7069) in the operation of the HBPP.

Despite the applicant's citation of its intent to remove the transmission line tower, not because it was in the way of the proposed HBRP, but for safety reasons, announced in the applicant's HBRP Status Report No. 3, this removal was identified in the HBRP AFC project description (PG&E 2006a, p. 2-1), so the Energy Commission considers it part of the HBRP.

Staff accepts the applicant's February 21, 2008, offer to conduct HAER-level recordation of the transmission line tower, rail spur, and storage building. To accommodate the applicant's apparent concern that this recordation be completed as quickly as possible, staff incorporated most of the applicant's suggested revisions of **CUL-8** and **CUL-9**, to limit the provisions of these conditions solely to the transmission line tower, rail spur, and storage building (#7069) and to shorten the time frames for complying with these conditions.

Applicant's Comments on Appropriate Agency Oversight for the Demolition of Units 1 and 2 of the HBPPHD

In its Initial Comments on the HBRP PSA, the applicant raised the issue of what agency would appropriately have oversight on the demolition of Units 1 and 2. At that time, the applicant stated the opinion that the demolition of Units 1 and 2 would "involve an

evaluation under federal and state auspices of the[ir] historical significance...” (PG&E 2007b, p. 26), and suggested that two federal agencies could have oversight, the U.S. Army Corps of Engineers and the Nuclear Regulatory Commission (PG&E 2007b, pp. 16, 22).

On January 2, 2008, the applicant provided supplemental comments on staff’s PSA. In partial response to staff’s request for documentation of the NRC’s oversight on the demolition of Units 1 and 2, the applicant explained that demolition of Units 1 and 2 was required in “the plan for the termination of NRC License DPR-7” (PG&E 2008a, p. 5).

On January 14, 2008, the applicant further explained that because Units 1 and 2 have low level radiological contamination from Unit 3, they would have to be demolished according to NRC plans and specifications. Thus, the applicant concluded, demolition of Units 1 and 2 would be part of the NRC’s undertaking to allow PG&E to vacate the Unit 3 license (CH2MHILL 2008a).

On February 21, 2008, the applicant provided staff with its understanding of the NRC’s HBPP decommissioning process and how the demolition of Units 1 and 2 would be handled under that process. The applicant envisioned that the appropriate point in time at which the NRC should become involved with Units 1 and 2 would be when the applicant submitted the Post-Shutdown Decommissioning Activity Report (PSDAR). In this public planning document, which could be updated at any time as needed, PG&E would report to the NRC the status of the facility after shutdown and outline the activities it anticipated conducting prior to license termination. The applicant believes that the NRC “has agreed to request formal consultation with SHPOs regarding nuclear power plant decommissioning and demolition cases in connection with a licensee’s PSDAR” (CH2MHILL 2008b, p. 3). Proceeding with their suggestion, the applicant submitted to staff their March 31, 2008, update of the HBPP Unit 3 PSDAR, which includes a request to the NRC to coordinate with the SHPO to evaluate the historical significance of Units 1 and 2 before they are decommissioned (CH2MHILL 2008c, p. 3).

On April 17, 2008, the applicant informed the Energy Commission that to demolish Units 1 and 2, PG&E would have to obtain a Coastal Development Permit (CDP) from the California Coastal Commission (CCC). The applicant has thus proposed that the CCC’s CDP process is the “appropriate venue” for the consideration of impacts to Units 1 and 2 under CEQA (CH2MHILL 2008d, pp. 1-2).

Staff’s Response to Applicant’s Comments on Appropriate Agency Oversight for the Demolition of Units 1 and 2 of the HBPPHD

The applicant has requested the NRC to coordinate with the California SHPO to evaluate the historical significance of Units 1 and 2 before they are decommissioned (CH2MHILL 2008c, p. 3). However, this is not a viable approach as it would defer the determination of significance of Units 1 and 2 to the post-certification period, conflicting with CEQA requirements that the lead agency make such determinations prior to project approval.

The applicant’s most recent proposal, that the evaluation of the significance of Units 1 and 2 and the appropriate mitigation for their demolition be left to the CCC during the

course of the issuance of a CDP to PG&E, likewise defers the required determination. The Energy Commission is required under CEQA to evaluate whether the HBRP would result in any significant adverse impacts to cultural resources, and, if so, to identify mitigation measures to reduce the impacts to less than significant.

Applicant's Comments on Proposed Conditions of Certification Providing for Discoveries During Construction, and Staff's Responses

In the applicant's Initial Comments on the HBRP PSA, provided early in December, 2007, the applicant commented on specific provisions in the proposed conditions of certification intended to provide for archaeological discoveries made during construction (PG&E 2007b, pp. 23-26).

CUL-2

The applicant requested a modification to Verification Item 4, eliminating the requirement that the construction schedule be provided to the Energy Commission's Compliance Project Manager (CPM) each week and making the condition more consistent with similar requirements in Condition of Certification **PAL-2**.

Staff does not agree to this change. Previously the CPM received updated construction schedules in the Monthly Compliance Report, required under the General Conditions. Staff has recently determined it is necessary to have weekly updated schedules to better keep pace with its review of the coordination of cultural resources monitoring and construction. The weekly schedule updates do not have to be detailed and may be submitted as an e-mail to the CPM. Archaeology and Paleontology as different disciplines have differing levels of concern regarding monitoring for this project and cannot be expected to have identical provisions.

CUL-3

In reference to Condition Item 8, requiring a written agreement from a curation facility that they will accept artifacts from the project, the applicant commented that it may be difficult to arrange for blanket acceptance of artifacts from a fully qualified curation facility, suggesting that it may be best to pursue a curation agreement as part of a data recovery plan for a site found to be significant.

Staff is increasingly encountering this concern on the part of applicants. The archaeological profession recognizes that curation of recovered data is becoming more and more difficult. Staff has made changes to **CUL-3**, Item 8 and added a new item, Item 2, to the Verification for **CUL-4**, to allow the owner to make curation arrangements once a collection of artifacts and related documentation has been made.

CUL-5

The applicant requested a copy of the Energy Commission's WEAP Training Acknowledgement form.

Staff provided copies of the requested form to the applicant at the December 14, 2007, PSA Workshop.

CUL-6

The applicant requested clarification of the first paragraph of the proposed condition that provides that the CRS shall monitor full time site mobilization activities, commenting that such monitoring is only required if site mobilization activities involve ground disturbance that has the potential to impact cultural resources. The applicant suggested alternative language requiring monitoring only in native soils.

Staff has incorporated parts of the applicant's suggested language into the first paragraph of **CUL-6** and believes this change addresses the applicant's concern.

The applicant stated the belief that the fourth paragraph of **CUL-6**, requiring that the CRS report daily to the CPM on the status of cultural resources-related activities, is onerous and should be deleted. Similarly, the applicant requested that Verification Item 2, specifying the form of daily reporting by the CRS, be deleted. The applicant also requested a copy of the Energy Commission's daily monitoring log form for the Cultural Resources Monitors.

Staff provided copies of the requested monitoring log form to the applicant at the December 14, 2007, PSA Workshop.

Staff did not make the requested changes to **CUL-6** and its Verification. The daily notification requirement in **CUL-6** reflects staff's experience with compliance on previous projects. Problems arising out of failure or delay in notifying the Energy Commission of cultural resources discoveries are at the root of most cultural resources compliance problems in the past few years.

Staff views a daily cultural resources status report from the CRS to the CPM as necessary to ensure that the CPM and staff learn of discoveries in time to facilitate their appropriate and timely treatment. Under previous practice staff receives monitoring reports from the CRS only in the Monthly Compliance Report (MCR). Thus as much as six or seven weeks can have elapsed before staff learns of a discovery about which the CRS did not notify the CPM, having judged the find unimportant (although the CRS does not have the authority to make that decision), but regarding which staff may want more information. After so long a delay, staff usually cannot obtain more information because the discovery has been buried or destroyed. The delay imposed by waiting for the MCR denies staff an opportunity to obtain additional information and to assure appropriate treatment in those instances where staff might consider that necessary. By recommending a daily (ideally electronic) communication from the CRS to the CPM regarding cultural resources discoveries, staff strives to prevent a recurring and often intractable compliance problem for both staff and the project owner.

Staff also believes the daily notification requirement is feasible and easily fulfilled through current electronic technology, particularly e-mail. It is likely that the HBRP on-site construction office would be equipped for making telephone calls and probably equipped for faxing and e-mailing, as well. Alternatively, the CRS's office would have all these means of communication. Moreover, staff believes that a brief daily

communication is not unduly onerous for the CRS, as he or she should be in daily communication with the Cultural Resources Monitors (CRMs) while monitoring is ongoing. One daily telephone call, e-mail, or fax to the CPM relaying a brief message about discoveries would be neither expensive nor time-consuming. Staff expects it would just become part of a daily routine. If the CRS must be out of touch with the CRMs for any reason, the Alternate CRS could take on the responsibility of e-mailing the CPM daily. Staff has also provided the means for a CRS to request a reduction in the frequency of the required status reports when that is warranted by the situation in the field.

The applicant also requests that language be added to the next-to-the-last paragraph of **CUL-6** to provide for the eventuality that a Native American monitor cannot be obtained.

In the PSA, staff inadvertently left out the last two sentences of the next-to-the-last paragraph of **CUL-6**. Staff has restored these sentences and believes this change will address the applicant's concern.

The applicant proposes the first sentence of **CUL-6** Verification Item 4 be revised for clarification as follows (changed language shown in italics):

No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of *the information transmittal* letters sent to the Chairperson of *the* Native American tribes or groups who requested *the information*. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

Staff agrees to the requested change and has incorporated this clarifying language into the first sentence of **CUL-6** Verification Item 4.

CUL-7

The applicant indicated that clarification was needed that **CUL-7** Verification Item 2 refers to Department of Parks and Recreation (DPR) 523 forms for properties newly discovered during construction.

Staff added clarifying language to **CUL-7** Verification Item 2, so specifying.

Additionally, during the second PSA Workshop, on January 16, 2008, the applicant expressed concern that the 24 hours allowed in **CUL-7** Verification 2 for the CRS to submit DPR 523 forms to the CPM was not sufficient to complete a DPR 523 form that would have a map and attachments of "detail" forms. As an alternative the applicant suggested language for **CUL-7** Verification Item 2 that provided for the CRS submitting a technical memorandum to the CPM within 24 hours for a cultural resources find that the CRS considered potentially significant.

Staff did not adopt the applicant's suggested language but changed **CUL-7** Verification Item 2 to stipulate that the DPR 523 form required is only a draft of the "Primary" DPR 523 form, but must include locational data in the form of UTM's obtained using GPS

units. With these changes, the applicant accepted **CUL-7** Verification Item 2 at the second PSA Workshop.

CUL-13

Because the applicant has indicated that fill needed to raise the HBRP site grade may be acquired from a non-commercial borrow site, staff has added a new condition, **CUL-13**, to provide for the cultural resources survey, if needed, of any non-commercial soil borrow site.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

In the first PSA Workshop, on December 14, 2007, Michael Welch, representing the Redwood Alliance, told staff that there is public interest in the historical significance of Unit 3. His group had, in the past, encouraged PG&E to preserve the control room of Unit 3 and move it off-site for public display. He did not think that the public had much concern about Units 1 and 2.

The Energy Commission has no authority over PG&E's disposition of Unit 3, but staff believes that the appropriate documentation and recordation of Unit 3 could be accomplished under NRC oversight during the decommissioning process.

COMPLIANCE WITH APPLICABLE LORS

If staff's recommended conditions of certification, below, are adopted, the proposed HBRP would be in compliance with the applicable state and local laws, ordinances, regulations, and standards listed in Table 1.

Humboldt County has general language promoting preservation of standing historic structures and archaeological resources in its General Plan. Staff's recommended conditions of certification require specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources. Consequently, if HBRP implements these conditions, its activities would be consistent with the general historic preservation goals of the Humboldt County General Plan.

CONCLUSIONS AND RECOMMENDATIONS

Staff has concluded that the Humboldt Bay Repowering Project (HBRP) would have no impact on known significant archaeological or ethnographic resources, but would have a significant direct impact on three contributing elements of a significant historical resource, the HBPPHD, and a significant indirect impact on all additional contributing elements (except Unit 3 and associated structures) of that same significant historical resource. These significant impacts on the HBPPHD would require mitigation to reduce them to a less-than-significant level. That mitigation is incorporated into recommended Conditions of Certification **CUL-8** through **CUL-12**, which provide for the HAER recordation of the extant contributing elements of the HBPPHD.

Recommended Conditions of Certification **CUL-1** through **CUL-7** and **CUL-13** 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 newly found archaeological resources assessed as significant. To accomplish this, the conditions provide for cultural resources awareness training for construction workers, for the cultural resources survey of any non-commercial borrow site the applicant may use, for the archaeological and Native American monitoring of ground-disturbing activities, for the recovery of significant data from discovered archaeological deposits, for the writing of a technical archaeological report on monitoring activities and results, and for the curation of recovered artifacts and other data.

Conditions of Certification **CUL-1** through **CUL-13** would ensure that any impacts to known and unknown cultural resources located in the areas discussed in this assessment are mitigated to a less-than-significant level.

CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance,¹ the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternate CRSs, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resource Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to CPM approval of the CRS and alternate CRSs, unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for non-compliance on this or other projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR 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;

¹ "Ground disturbance" includes "preconstruction site mobilization"; "construction ground disturbance"; and "construction grading, boring and trenching," as defined in the General Conditions for this project.

2. at least three years of archaeological or historic, as appropriate (per nature of predominate 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 knowledgably make recommendations regarding the significance of cultural resources.

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

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or
2. an AS or AA 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 specialists, e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.
2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved monitor may serve in place of a CRS so that construction may continue up to a maximum of 3 days without a CRS. If

cultural resources are discovered then construction shall remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this Condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.
4. At least 10 days prior to any specialists beginning tasks, the resume(s) of the technical specialists shall be provided to the CPM for review and approval.
5. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources Conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. 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 submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

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

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

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

Verification:

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

2. If there are changes to any project-related footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance for those changes.
3. If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.
4. On a weekly basis during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.
5. Within five days of identifying changes, the project owner shall provide written notice of any changes to the scheduling of the construction phase.

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

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

1. 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. A prescriptive treatment plan may be included in the CRMMP for limited resource types. A refined research design shall be prepared for any resource where data recovery is required.
2. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions 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."
3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground

disturbance, construction, and post-construction 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 and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures will be implemented prior to the start of construction and how long they would be needed to protect the resources from project-related effects.
7. A statement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, 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 and related documentation recovered during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.
9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during construction and cannot be treated prescriptively.
10. A description of the contents and format of the Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

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

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities, including any new surveys of borrow sites, and shall include dates, times and locations, results, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 forms, and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

If the project owner requests a suspension of 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 resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

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

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site and on the linear facilities. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must

be resumed when ground disturbance, such as landscaping, resumes. The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction 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;
4. 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;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. An acknowledgement form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

Verification:

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

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

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

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

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

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended. The CRS or alternate CRS shall report daily to the CPM on the status of cultural resources-related activities at the construction site, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

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

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

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS 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.

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

During and after construction, the project owner shall fulfill the requests received from Native American tribes or groups to be notified if Native American artifacts are found.

Verification:

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log. While monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS.
2. Daily, as long as no cultural resources are found, the CRS shall provide a statement that “no cultural resources over 50 years of age were discovered” to the CPM as an e-mail, or in some other form acceptable to the CPM. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily reporting shall be provided to the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting.
3. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.
4. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairperson of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records and copies of any comments or information provided by the Native Americans in response.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS, and the CRMs in the event of a cultural resources discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources over 50 years of age or, if younger, considered exceptionally significant are found, or impacts to such resources

can be anticipated, construction shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting as provided in CUL-6 shall continue during all ground-disturbing activities wherever project construction is not halted. The halting or redirection of construction 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. Notification shall include a description of the discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of eligibility, and recommendations for mitigation of any cultural resources discoveries, whether or not a determination of significance has been made.
2. The CRS has completed field notes, measurements, and photography for a DPR 523 primary form. The "Description" entry of the DPR 523 form shall include a recommendation on the significance of the find. The project owner shall submit completed forms to the CPM.
3. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt construction activities 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. Completed draft DPR 523 "Primary" forms, including locational data in the form of Universal Transverse Mercator (UTM) readings obtained using GPS units, for resources newly discovered during construction shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

CUL-8 Prior to the demolition of the rail spur and transmission line tower associated with Unit 3, and the storage building (#7069) associated with Units 1 and 2, the project owner shall obtain the services of an architectural historian. The project owner shall provide the CPM with the name and resume of the architectural historian. No ground disturbance shall occur prior to CPM

approval of the architectural historian, unless specifically approved by the CPM.

The resume for the architectural historian shall include names and telephone numbers of contacts familiar with the architectural historian's work and all information needed to demonstrate that the architectural historian has the following qualifications:

1. meets the Secretary of Interior's Professional Standards for architectural history;
2. has at least three years' experience in recording twentieth-century industrial structures; and
3. has completed at least one recordation project within the past five years involving coordination with the National Park Service's Heritage Documentation Program (HDP).

Verification:

1. At least 45 days prior to demolition of the storage building (#7069), the transmission tower, and the on-site railroad spur, the project owner shall submit the name and resume of the selected architectural historian to the CPM for review and approval.
2. At least 35 days prior to the demolition of the storage building (#7069), the transmission tower, and the on-site railroad spur, the project owner shall confirm in writing to the CPM that the approved architectural historian is available for onsite work and provide a date by which the architectural historian will undertake the HAER documentation of the three structures.

CUL-9 Prior to the demolition of the rail spur and transmission line tower associated with Unit 3, and the storage building (#7069) associated with Units 1 and 2, the project owner shall ensure that the approved architectural historian prepares documentation of these structures to the standards of the Historic American Engineering Record (HAER). The project owner shall ensure that the architectural historian consults with the HDP, in Washington, D. C., and complies with HDP guidance on the extent and content of documentation appropriate for these structures, as contributing elements of a probable National Register of Historic Places-eligible district and as a significant historical resource under CEQA, and on the format and materials to be used in the documentation.

To provide for the contingency that the HDP may require additional information after reviewing the architectural historian's draft documentation, the project owner shall ensure that the architectural historian over-records (for example, "brackets" all photographs; takes duplicate photogrammetric readings and measurements, if required by the HDP; makes copies daily of all field notes and logs and retains them in a separate location), in the field, those physical aspects (e.g., measurements, photographs, and photogrammetry) of the storage building (#7069), transmission tower, and

the on-site railroad spur that will not be accessible after these structures have been demolished.

No ground disturbance or demolition of the transmission line tower, rail spur, or storage building (#7069) shall occur prior to the completion by the architectural historian of the over-recording (defined above), in the field, of the three structures, and the submission to and approval by the CPM of the draft HAER documentation, unless specifically allowed by the CPM.

The project owner may make available to the architectural historian original architectural drawings of Units 1 and 2 and associated structures, and photographs of their construction held in its files, so these can be submitted as part of the HAER documentation instead of new measured drawings.

Verification:

1. At least 20 days prior to demolition of the storage building (#7069), the transmission tower, and the on-site railroad spur, the project owner shall submit to the CPM a letter or memorandum from the architectural historian detailing the scope of the HDP-recommended documentation of the three structures.
2. At least 15 days prior to demolition of the storage building (#7069), the transmission tower, and the on-site railroad spur, the project owner shall provide a copy of the draft HAER documentation of these structures to the CPM for review and approval.
3. The owner shall retain copies of the CPM-approved HAER documentation of the rail spur and transmission line tower associated with Unit 3, and the storage building (#7069) associated with Units 1 and 2. In the event that the rest of the HBPPHD structures are also documented to HAER standards, the owner shall include the HAER documentation of the rail spur and transmission line tower associated with Unit 3, and the storage building (#7069) associated with Units 1 and 2, in the HBPPHD HAER documentation package and carry out the disposition that is provided in **CUL-11**. In the event that the rest of the HBPPHD structures are not documented to HAER standards, the owner shall donate the HAER documentation of the rail spur and transmission line tower associated with Unit 3, and the storage building (#7069) associated with Units 1 and 2, to the same repository as the HBPP materials donated under **CUL-12**.

CUL-10 Prior to the demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District (listed in Cultural Resources Appendix 1, Table 1), excluding the transmission line tower, rail spur, storage building (#7069), and Unit 3 and associated structures, the project owner shall obtain the services of an architectural historian. The project owner shall provide the CPM with the name and resume of the architectural historian. No ground disturbance shall occur prior to CPM approval of the architectural historian, unless specifically approved by the CPM.

The resume for the architectural historian shall include names and telephone numbers of contacts familiar with the architectural historian's work and all information needed to demonstrate that the architectural historian has the following qualifications:

1. meets the Secretary of Interior's Professional Standards for architectural history;
2. has at least three years' experience in recording twentieth-century industrial structures; and
3. has completed at least one recordation project within the past five years involving coordination with the National Park Service's Heritage Documentation Program (HDP).

Verification:

1. At least 450 days prior to demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District (listed in Cultural Resources Appendix 1, Table 1), the project owner shall submit the name and resume of the selected architectural historian to the CPM for review and approval.
2. At least 420 days prior to the demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District, the project owner shall confirm in writing to the CPM that the approved architectural historian is available for onsite work and provide a date by which the architectural historian will undertake the HAER documentation of all of the contributing components of the Humboldt Bay Power Plant Historic District listed in Cultural Resources Appendix 1, Table 1.

CUL-11 Prior to the demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District (listed in Cultural Resources Appendix 1, Table 1), excluding the transmission line tower, rail spur, storage building (#7069), and Unit 3 and associated structures, the project owner shall ensure that the approved architectural historian prepares documentation of these structures to HAER standards. The project owner shall ensure that the architectural historian consults with the HDP, in Washington, D. C., and complies with HDP guidance on the extent and content of documentation appropriate for these structures, as contributing elements of a probable National Register of Historic Places-eligible district and as a significant historical resource under CEQA, and on the format and materials to be used in the documentation.

To provide for the contingency that the HDP may require additional information after reviewing the architectural historian's draft documentation, the project owner shall ensure that the architectural historian over-records (for example, "brackets" all photographs; takes duplicate photogrammetric readings and measurements, if required by the HDP; makes copies daily of all field notes and logs and retains them in a separate location), in the field, those physical aspects (e.g., measurements, photographs, and photogrammetry) of any of the contributing components of the Humboldt Bay

Power Plant Historic District that will not be accessible after these structures have been demolished.

No demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District (Cultural Resources Appendix 1) shall occur prior to the completion by the architectural historian of the over-recording, in the field, of these resources and the submission to and approval by the CPM of the draft HAER documentation, unless specifically allowed by the CPM.

The project owner may make available to the architectural historian original architectural drawings of Units 1 and 2 and associated structures, and photographs of their construction held in its files, so these can be submitted as part of the HAER documentation instead of new measured drawings.

Verification:

1. At least 390 days prior to demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District, the project owner shall submit to the CPM a letter or memorandum from the architectural historian detailing the scope of the HDP-recommended documentation of the HBPPHD.
2. At least 360 days prior to demolition of any of the contributing components of the Humboldt Bay Power Plant Historic District, the project owner shall provide a copy of the draft HAER documentation of these structures to the CPM for review and approval.
3. Within 180 days after completion of demolition of all of the contributing components of the HBPPHD, except Unit 3 and associated structures, the project owner shall submit to the CPM copies of the transmittal letters for the submission of copies of the final HAER documentation of the HBPPHD, including the rail spur and transmission line tower associated with Unit 3, and the storage building (#7069) associated with Units 1 and 2, to the California State Library and to at least two local libraries in Humboldt County, and a copy of the letter of acceptance of the final HAER documentation by the Library of Congress.

CUL-12 After the architectural historian employed to produce the HAER recordation of the HBPPHD has completed research in and all necessary copying of PG&E's files relevant to the planning, construction and early operation of the HBPP, the project owner shall develop a plan for the collection of historical documents and photographs, dating between 1950 and 1965, and pertaining to the siting and construction of the Humboldt Bay Power Plant, and for the preservation of these documents, in perpetuity, within an archival records depository that is qualified to maintain and preserve the documents and to make them available to scholars and the general public for the purposes of historical research. This Historical Documents Preservation Plan shall include the following:

1. A list of the specific documents or groups of documents that may be available for preservation and a brief description of the types of documents, their source, condition, and potential value to historians and the general public; and their potential availability for preservation.

2. A discussion of criteria to be used for selecting an appropriate receiving repository.
3. A schedule for the donation of the documents to the qualified receiving repository.

Verification:

1. Within 60 days after the architectural historian employed to produce the HAER recordation of the HBPPHD has completed research in, and all necessary copying of, PG&E's files relevant to the planning, construction and early operation of the HBPP, the project owner shall provide the draft Historic Documents Preservation Plan to the CPM for review and approval.
2. Within 60 days of receipt of the initial, and each subsequent, acknowledgement-of-receipt-of-donation letter from the repository chosen to receive the donated copies of HBPP documents, the project owner shall submit to the CPM a copy of the letter, until the letter acknowledging the last donation, according to the schedule of donations in the approved Historic Documents Preservation Plan, is received and a copy submitted to the CPM.

CUL-13 If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, the CRS shall survey the borrow and/or disposal site/s for cultural resources and record on DPR 523 forms any that are identified, unless less-than-five-year-old cultural resources surveys of these sites are submitted to and approved by the CPM. When the survey is completed, the CRS shall convey the results and recommendations for further action to the project owner and the CPM, who will determine what, if any, further action is required. If the CPM determines that significant archaeological resources that cannot be avoided are present at the borrow site, **CUL-6** and **CUL-7** shall apply. The CRS shall report on the methods and results of these surveys in the CRR.

Verification:

1. As soon as it is determined that a non-commercial borrow site and/or disposal site will be used, the project owner shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.
2. In the absence of documentation of recent archaeological survey, at least 30 days prior to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site/s for archaeological resources. The CRS shall notify the project owner and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

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CULTURAL RESOURCES APPENDIX 1

**Table 1, Humboldt Bay Power Plant Historic District
List of Contributing Components for Period of Significance 1954-1963²**

Contributor Name	Year Built	Associated With	Year Removed	Year Altered	Type of Alteration
Unit 1	1954	Unit 1		various	Office, shops, and warehouse expansion
Unit 2	1958	Unit 2		various	Not significantly altered
Unit 3	1963	Unit 3		1988	Decommissioned; stack removed
Relay Building	1954	Unit 1		1958	Expansion—doubled its size
Well No. 1	Unknown		Before 1955		Covered; non-operational
Cooling Water Intake Canal	1954	Unit 1		1958 (Unit 2) 1963 (Unit 3)	Additions for each new unit; no other known alterations
Intake Canal	1954	Unit 1		1963	North end widened (dredged?)
Discharge Canal	1954	Unit 1			No known alterations
Discharge Headworks	1954	Unit 1			No known alterations
Discharge Canal Outlet	1954	Unit 1			Possible dredging and /or widening; no significant alterations
Oil-Water Separator (also known as the Oily-Water Separator)	1954	Unit 1			No known alterations
Distilled Water Tanks (2)	1954	Unit 1			No known alterations

² Transcribed from the component table included in the applicant's DPR 523 "District" record update (CH2MHill 2007a, Response to Data Request 27).

Contributor Name	Year Built	Associated With	Year Removed	Year Altered	Type of Alteration
Fresh Water Tank (also known as the Raw Water Tank)	1954	Unit 1			No known alterations
Propane Tank	1954	Unit 1			No known alterations
CO ₂ Tank	1954	Unit 1			No known alterations
Fire Pump House	1954	Unit 1			No known alterations
Fuel Oil Tank 1 (also known as No. 1 Fuel Oil Storage Tank)	1954	Unit 1			No known alterations
Fuel Oil Tank 2 (also known as No. 2 Fuel Oil Storage Tank)	1954	Unit 1			No known alterations
Entrance Road	1954	Unit 1		1958	Extended to reach Unit 2
Secondary Road (southeast of Intake Canal)	Unknown (appears in 1957 site plan)	Unit 1			No longer in use, but traces of road are visible
Railroad Spur	Unknown (appears on 1954 site plan)	Unit 1			Abandoned in place after Unit 3 no longer operational
Fuel Oil Service Tank 1 (also known as No. 1 Fuel Oil Service Tank)	1954	Unit 1			No known alterations
Fuel Oil Service Tank 2 (also known as No. 2 Fuel Oil Service Tank)	1958	Unit 2			Regular maintenance; no significant alterations

Contributor Name	Year Built	Associated With	Year Removed	Year Altered	Type of Alteration
Light Oil Tank 2 (also known as Diesel Storage Tank)	1954	Unit 1			Regular maintenance; no significant alterations
Fuel Oil Pipeline	1955 ³	Unit 1 (?) Unit 2	Proposed for the summer of 2008		Inactive since 1991; flooded with water since 1992
Secondary Regulator Station 1 (also known as Secondary Gas Regulator 1)	1958	Unit 2			Regular maintenance; no significant alterations
Secondary Regulator Station 2 (also known as Secondary Gas Regulator 2)	1958	Unit 2			Regular maintenance; no significant alterations
Existing Well	Unknown	Unit 1	Unknown	Unknown	Unknown if this was removed, but it is located underneath Fuel Oil Storage Tank 2
60-kV Switchyard	1954	Unit 1			Regular maintenance; no significant alterations
60/12-kV Unit Substation	Between 1958 and 1963	Unit 2			Regular maintenance; no significant alterations
King Salmon Avenue Bridge	Unknown	Unit 1			Regular maintenance; no significant alterations

³ Data on the fuel oil pipeline was taken from a letter, dated December 14, 2007, from Michael J. Momber, PG&E Planner, to David Hull, Humboldt Bay Harbor, Recreation and Conservation District, regarding contracting for the preparation of a CEQA document for the pipeline's removal.

Contributor Name	Year Built	Associated With	Year Removed	Year Altered	Type of Alteration
Storage building (#7069)	1955	Unit 1, Unit 2, Unit 3		?	Metal shed addition on northeast side
Primary Regulator Station	1958; at the site of Well No. 1	Unit 2			Regular maintenance; no significant alterations
Assembly Building	Between 1958 and 1963	Unit 2			
Transmission Line Tower	1962	Unit 3			
Unit 3 Vent Stack	1963	Unit 3	1998		
Radwaste Treatment (also known as Liquid Radwaste Treatment)	1963	Unit 3			Regular maintenance; no significant alterations
Hydrogen Storage	Between 1958 and 1963	Unit 2			
Waste Solids Vault	1963	Unit 3	Unknown; but does not appear on current maps		
Machine Shop and Instrument Calibration (also known as Hot Shop)	1963	Unit 3			Regular maintenance; no significant alterations
Septic Tank	1963	Unit 3			Regular maintenance; no significant alterations
OCB Unit 3	1963	Unit 3	Unknown, but does not appear on current maps		

Contributor Name	Year Built	Associated With	Year Removed	Year Altered	Type of Alteration
Hydrants (19 in 1958)	Various	Unit 2	Unknown	Unknown	No data available

**Table 2, Humboldt Bay Power Plant Historic District
List of Non-Contributing Components for Period of Significance 1954-1963⁴**

Name	Year Built	Year Removed	Type of Alteration
Guard House	post-1963		
Training Building	post-1963		
Drawing Resources Building	post-1963		
Office Building	1991		
Low-Level Storage	post-1963		Regular maintenance; no significant alterations
Hazardous Storage Building	post-1963		
Effluent Ponds	post-1963		
Processing Slab	post-1963		
Office (5-wide)	1988		Temporary construction
Miscellaneous Sheds— Painting Office	Between 1963 and 1999 (on 1999 site plan)	Between 1999 and 2006	No longer on site
Sandblast and Painting Facility	post-1999		
Paint and Materials c-vans	post-1999		
Storage c-vans	post-1999		
115-kV breaker	post-1999		
MEPP Diesel Tanks	post-1999		
Gas Turbine MEPP 1	post-1999		
Gas Turbine MEPP 2	post-1999		
Independent Spent Fuel Storage Installation	2007		

⁴ Transcribed from the component table included in the applicant's DPR 523 "District" record update (CH2MHill 2007a, Response to Data Request 27).

HAZARDOUS MATERIALS MANAGEMENT

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

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that the project's proposed use of hazardous materials 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., the applicant would be required to develop a Risk Management Plan. To insure adequacy of the Risk Management Plan, staff's proposed conditions of certification would require that the Risk Management Plan be submitted for concurrent review by United States Environmental Protection Agency, Humboldt County Health and Human Services Department, Division of Environmental Health (DEH), and the California Energy Commission staff. In addition, staff's proposed conditions of certification require Humboldt County's DEH review, and staff review and approval of the Risk Management Plan prior to 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, and site security.

INTRODUCTION

The purpose of this Hazardous Materials Management analysis is to determine if the proposed Humboldt Bay Repowering Project (HBRP) 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 facility. 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 impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide employees 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 the requirements applicable to the protection of workers from such risks.

Aqueous ammonia (19% ammonia in aqueous solution) is the only hazardous material proposed to be used or stored at the HBRP in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (PG&E 2006a, Table 8.5-2). Aqueous ammonia will be used for controlling oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with 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 elevated 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, corrosion inhibitors and biocides, will be present at the proposed facility. Hazardous materials used during the construction phase include gasoline, diesel fuel, motor oil, hydraulic fluid, welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials will be used onsite during construction. 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. Natural gas will be delivered through an existing 10-inch-diameter pipeline that connects to PG&E's backbone transmission line 145 miles away. Natural gas from PG&E's Tomkins Hill wells will also be used by the project (PG&E 2006a, Section 6.0). The HBRP project will require the transportation of aqueous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following federal, state, and local laws, ordinances, regulations, and standards (LORS) 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 (LORS)**

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 United States Code (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)	Establishes a nationwide emergency planning and response program and imposes reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on Risk Management Plans (42 USC §112(r))	Requires the states to implement a comprehensive system to inform 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.

Applicable Law	Description
49 Code of Federal Regulations Parts 172-800 (49 CFR 172-800)	U.S. Department of Transportation (U.S. 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 significant volumes of oil that may leak into navigable waters.
49 CFR Part 190	Outlines gas pipeline safety program procedures.
49 CFR 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 U.S. Department of Transportation of any reportable incident by telephone and then submit a written report within 30 days.
49 CFR Part 192	Addresses transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land uses that characterize the surrounding land. This part also contains regulations governing pipeline construction that must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a Pipeline Integrity Management Program.
6 CFR Part 27	The Chemical Facility Anti-Terrorism Standard (CFATS) regulation of the U.S. Department of Homeland Security (DHS) requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Agency (CUPA) for approval.
Title 8, Cal. Code Regs., Section 5189	Requires facility owners to develop and implement effective safety management plans to insure 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 RMP process.

Title 8, Cal. Code Regs., Section 458 and Sections 500 to 515	Set forth requirements for 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 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 to be discharged into sources of drinking water.

The Certified Unified Program Agency (CUPA) with responsibility to review RMPs and Hazardous Materials Business Plans (HMBPs) is the Humboldt County Division of Environmental Health (DEH). In regards to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of California Code of Regulations, Title 24 and the 2007 California Building Code (PG&E 2006a, Section 8.4.1.4.2).

SETTING

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 to 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 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 the associated health risks. When wind speeds are low and the atmosphere is stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the Air Quality section (8.1) and Appendix 8.1 of the Application for Certification (AFC) (PG&E 2006a). Staff agrees with the applicant that use of F stability (stagnant air, very little mixing), wind speed of 1.5 meters per second, and the highest temperature recorded in the area in the last 3 years are appropriate for conducting the Offsite Consequence Analysis. Staff believes these represent a reasonably conservative scenario and thus reflects worst case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The site topography is mostly flat, with an average elevation of about 8-12 feet above mean sea level. Terrain in the project vicinity is generally flat to the north and east and rises rapidly to the south and east due to the Humboldt Hill land feature (PG&E 2006a, Sections 2.6.1, 8.1.1.1, and Figure 8.1-1).

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 large bearing on health risk. Appendix 8.9A and Figure 8.9-1 of the AFC provide a list of sensitive receptors within six miles of the project site and their locations. The nearest sensitive receptor is the South Bay Elementary School located about 0.5 miles southeast of the project. Two additional schools and a daycare are located about 1 mile from the site (PG&E 2006a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD 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 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 utilizes the most current acceptable public health exposure levels (both acute and chronic) set 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 it 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 controls and administrative controls concerning hazardous materials usage. Engineering controls are those physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent a spill of hazardous material from occurring or which can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that will help to prevent accidents or 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 in the AFC (PG&E 2006a, Section 8.5). Staff's assessment followed the five steps listed below:

Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Table 8.5-2 of the AFC 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 the 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 size 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 even with 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 a level that is less than significant, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to a level that is less than significant. It is only at this point that staff can recommend approval of the facility's use of hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for off-site impacts as they will be stored in a solid form or in small quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are discussed briefly below.

During the construction phase of the project, hazardous materials proposed for use include paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil,

hydraulic fluid, lubricants, and welding flux. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved, the infrequent use and hence 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 of very low volatility and represent limited off-site hazard even in larger quantities.

During operations, hazardous chemicals such as hydraulic and lubricating oils and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at HBRP), would be used and stored in relatively small amounts and represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity.

Various cleaning chemicals and detergents as well as corrosion inhibitors (such as potassium 2-ethylhexanoate) and sulfuric acid (in sealed batteries) will be stored on-site, but will not pose a risk of off-site impacts because of the small volumes stored and their relatively low vapor pressures that will keep spills confined to the site.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: natural gas and aqueous ammonia.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk as a result 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% in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14%, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release were to occur 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 it can explode under certain conditions (as demonstrated by the recent natural gas detonation in Belgium in July of 2004).

While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. The National Fire Protection Association (NFPA 85A) requires 1) the use of double block and bleed valves for gas shut-off; and 2) automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. The safety management plan proposed by the applicant would address the handling and use of natural gas and significantly reduce the potential for equipment failure due to improper maintenance or human error. The proposed facility will not require the installation of any new off-site gas pipeline.

Aqueous Ammonia

Aqueous ammonia will be used in controlling NO_x emissions from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. Two aboveground storage tanks will be used to store the 19% aqueous ammonia with a combined maximum capacity of 54,000-gallons (PG&E 2006a, Section 8.5.2.3.2).

Based on staff's analysis, as described above, aqueous ammonia is the only hazardous material that may pose a risk of off-site impacts. 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 instead of the much more hazardous anhydrous ammonia (i.e. ammonia that is not diluted with water) poses far less risk.

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses the four "bench mark" exposure levels of ammonia gas occurring off-site. These include: 1) the lowest concentration posing a risk of lethality of 2,000 ppm; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 parts-per-million (ppm); 3) the Emergency Response Planning Guideline (ERPG) Level 2 of 150 ppm, which is also the RMP Level 1 criterion used by 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 averaged over 30 minutes. Thus, any plausible exposures due to a potential accidental release that produces exposures below 75 ppm will be considered insignificant. If staff's analysis determines that the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will 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 and their applicability to different populations and exposure-specific conditions is provided in **Hazardous Materials Appendices A and B**.

Section 8.5.2.4 and Appendix 8.5B of the AFC (PG&E 2006a) describe the modeling parameters used for the worst case accidental releases of aqueous ammonia in the applicant's Offsite Consequence Analysis (OCA). This modeling used the SLAB numerical air dispersion model for a worst-case release associated with a failure of one storage tank into the containment area and an alternative scenario consisting of a release of ammonia during truck unloading. Staff conducted its own independent modeling and found significant differences between the results it found and those the applicant found. Staff found that with an uncovered secondary containment structure, a spill of aqueous ammonia would result in impacts to the off-site public due to the migration of ammonia vapors. Staff determined that this potential impact would be significant yet could be mitigated by the use of standard engineering controls that are used at all other Energy Commission-certified power plants. The use of a subsurface vault to contain the spilled aqueous ammonia or the placement of a cover on the top of the secondary containment structure would limit the surface area of the aqueous ammonia pool thus limiting the rate of vapor loss from the pool. This then reduces the

airborne concentration to insignificant levels. Staff therefore modeled such a structure where the spilled pool of aqueous ammonia would be open to the atmosphere through a drain opening (or spaces between the cover and the containment walls) no more than 10.5 square feet (the equivalent of a 1" space between the cover and the inside perimeter wall of the 39' by 23' secondary containment structure).

The following assumptions were made in the HARP (Hotspots Analysis and Reporting Program) analysis of potential impacts due to an aqueous ammonia spill from the on-site aqueous ammonia storage tank at the HBRP.

Dispersion Analysis Using HARP

- Meteorological data used: Representative (2004 met file provided by Applicant)
- Area source: Assume 10.5 square feet exposed surface of pool (this represents an area of a one inch space around the entire inside perimeter of the secondary containment structure)
- Release height: 4 feet (assumed; this is min height allowed in HARP)
- Emission rate: 1.6 g/m²/sec (derived using QR algorithm), which is equivalent to 12.63 lb/hour ammonia
- Rural
Fine grid: 300 m with 10 m resolution for concentrations at discrete distances and the 75 ppm isopleth
1000 m with 50 m resolution for 2 ppm isopleth
- Distances determined to:
Maximum
300 ppm
150 ppm
75 ppm
50 ppm
2 ppm (odor threshold)

Results of this analysis are presented in **Hazardous Materials Management Table 2**. The maximum ammonia concentration modeled for a tank spill at Humboldt is 895 ppm at approximately 13 feet from the ammonia tank, 299 ppm occurs at a distance of approximately 83 feet, 148 ppm occurs at 164 feet distant, and 75 ppm occurs at a distance of approximately 275 feet which is on-site. The odor threshold (2 ppm) is estimated to occur approximately 1,930 feet from the ammonia tank and therefore it is conceivable that a slight odor could be noticed off-site at various locations depending upon the wind direction.

**Hazardous Materials Management Table 2
Results of the Aqueous Ammonia Storage Tank Spill Analysis**

ALGORITHM			
$QR = \frac{(0.0035)(u^{0.78})(MW^{(2/3)})(A)(VP)}{(T)}$			
INPUT			
Wind speed (u)	1.5	m/sec	
Stability class	F		
Terrain	Rural		
Molecular weight (MW)	17	g/g-mole	
Vapor pressure (VP)	190	mm Hg	
Temperature	82	°F	
Temperature (T1)	301	°K	
VARIABLES			
Area of drain in feet	10.5	ft ²	
Side length of drain	3.24	ft	
Area of drain in meters	0.98	m ²	
Side length of drain	0.99	m	
EMISSIONS			
QR	0.21	lb/min	
QR	12.63	lb/hr	
QR	1.11E+05	lb/yr	
QR	1.59	g/sec	
QR	1.6	g/m ² /sec	
Concentrations at discrete distances using HARP:			
Distance (feet)	Distance (meters)	Airborne Conc.	
		(µg/m ³)	(ppm)
13	4	6.21E+05	895
83	25	2.08E+05	299
164	50	1.03E+05	148
275	84	5.20E+04	75
368	112	3.47E+04	50
1,930	588	1.42E+03	2.0

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

Staff believes that with the incorporation of the engineering controls proposed by the applicant and requested by staff for the storage and transfer of aqueous ammonia, any potential accidental release of aqueous ammonia at the project site will not cause a significant impact and will not represent a significant risk to the public.

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Elements of facility controls and the safety management plan, as required by condition of certification **HAZ-3**, are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineering safety features proposed by the applicant for use at this facility include:

- construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery plus the amount of water that would be ejected from the fire suppression system during 20 minutes;
- physical separation of stored chemicals in isolated containment areas separated by a noncombustible partition in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes;
- installation of an automatic sprinkler system and an exhaust system for indoor hazardous materials storage areas;
- construction of a covered secondary containment area surrounding the aqueous ammonia storage tanks that can hold 150% of the contents of one tank plus the volume of 24 hours of rain assuming the 25-year storm;
- construction of a bermed containment area surrounding the truck unloading area with a sloped floor draining into the covered secondary containment around the storage tanks;
- process protective systems including continuous tank level monitors, temperature and pressure monitors, alarms, check valves, and emergency block valves.

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs, process safety management programs and by complying with all applicable health and safety LORS.

A worker health and safety program will be prepared by the applicant and will include (but is not limited to) the following elements (see the **Worker Safety and Fire Protection** section in this FSA 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 operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At the facility, the project owner will be required to designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety official will oversee the health and safety program and will have the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community in the event that the health and safety program is violated.

The applicant will also prepare an RMP for aqueous ammonia as required by CalARP regulations and condition of certification **HAZ-2** that would include a program for prevention of accidental releases and responding to an accidental release of aqueous ammonia. A Hazardous Materials Business Plan (HMBP) will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (PG&E 2006a, Section 8.5.4.2.2).

On-site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an Emergency Response Plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established that include evacuation, spill cleanup, hazard prevention, and emergency response.

The Eureka Fire Department Regional Hazardous Materials Response Team (EFD HMRT) will be the responder for hazardous materials incidents. Estimated response time is about 45 minutes. At staff's request, the applicant has engaged in discussion with the Humboldt Fire Department and EFD regarding potential impacts the HBRP may have on their capability to respond to incidences. All parties involved have agreed that potential impacts from the HBRP would affect the EFD HMRT. The applicant has stated that the dialog with EFD HMRT has been very productive and that an agreement was reached that PG&E will provide the HMRT with new ammonia detectors. PG&E and the EFD are also jointly preparing a FEMA grant application for a new hazmat response vehicle (CH2MHILL 2007c, WSQ 22). These measures will reduce the impacts HBRP may have on the HMRT's capability to respond. Staff therefore concludes that with the fulfillment of the agreement between PG&E and the EFD, the HMRT will be adequately equipped to respond in a timely manner.

In addition to HMRT's spill response, designated plant personnel will be assigned to a hazardous materials response team and receive first responder training, hazardous materials technical training, and training in mitigation and control measures (PG&E 2006a Section 8.5.4.2.1 and CH2MHILL 2007a DR WS #53 and #56).

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia and cleaning chemicals, will be transported to the facility via tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the applicant's proposed transportation route for hazardous materials delivery (along Highway 101 to King Salmon Avenue, to the project site), considering its potential for impact on public and sensitive receptors and agrees that this is a suitable route, as it includes a major U.S. highway and avoids passing directly by any local schools. The applicant stated that delivery of hazardous materials will comply with Caltrans, USEPA, California DTSC, CHP, and California State Fire Marshal regulations (PG&E 2006a, Section 8.5.4.2.4).

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend on the location of the accident and on 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 on three factors:

- the skill of the tanker truck driver,
- the type of vehicle used for transport, and
- accident rates along similar roads.

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 (Highway 101). Consistent with CEQA, staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq., the US Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also address the issue of driver competence. See AFC section 8.12 (PG&E 2006a) for additional information on regulations governing the transportation of hazardous materials.

To address the issue of tanker truck safety, aqueous ammonia will be delivered to the proposed facility in U.S. DOT certified vehicles with design capacity of 6,500 gallons. These vehicles will be designed to U.S. DOT Code MC-306 or MC-307. These are high integrity vehicles designed for hauling of caustic materials such as aqueous 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 risks of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article which references the 1990 Harwood et al. study, to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The maximum usage of aqueous ammonia each year of operation of the proposed HBRP will require about 156 tanker truck deliveries of aqueous ammonia per year, each delivering about 6,500 gallons. Each delivery will travel approximately 0.4 miles from Highway 101 to the facility along King Salmon Avenue. (Staff did not include the distance traveled along U.S. 101 as that is a major four-lane highway when traversing a populated area.) This would result in an annual cumulative total of about 62.4 miles of delivery tanker truck travel on a two-lane road 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 one million.

Also, in response to concerns raised by the public, staff is including a requirement within **HAZ-6** that deliveries of aqueous ammonia be scheduled only during those times of the day when school buses are not present on the transportation route. The project owner would be required to coordinate those deliveries with any school in the area whose buses (or contractor buses) use the designated hazardous materials transportation route.

Staff therefore believes the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility are insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public combined with the already diluted concentration of the aqueous ammonia being transported. The transportation of similar volumes of hazardous materials on the nation's highways is not unique nor an infrequent occurrence. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Staff concludes that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

Seismic Issues

The possibility exists that an earthquake would cause the failure of a hazardous materials storage tank. The quake could also cause the failure of the secondary containment system (berms and dikes) as well as electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the 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, heighten the concern regarding earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those 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 that should be followed in adequately 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 were impacted by this quake. Referring to the sections on **Geologic Resources and Hazards** and **Facility Design** in the AFC, staff notes that the proposed facility must be designed and constructed to the applicable standards of the 2007 California Building Code and the 1997 Uniform Building Code. The site is within Seismic Zone 4 (PG&E 2006a Section 8.4.1.4.2). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks designed to standards similar to those in California, staff determined that tank failures at the project site during seismic events are not probable and do not represent a significant risk to the public.

Site Security

This facility proposes to use hazardous materials identified by the US EPA as materials where special site security measures should be developed and implemented to prevent unauthorized access. US EPA published a *Chemical Accident Prevention Alert* regarding site security (EPA 2000a), the U.S. Department of Justice published a special report on *Chemical Facility Vulnerability Assessment Methodology* (US DOJ 2002), the North American Electric Reliability Corporation (NERC) published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy published a 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 facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. While the rule applies to aqueous ammonia solutions of 20% or greater and this proposed facility plans to utilize less than 20% aqueous ammonia, staff still believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

The applicant has stated that a security plan will be prepared for the proposed facility, and will include a description of perimeter security measures, and procedures for evacuating, notifying authorities of a security breach, monitoring fire alarms, conducting site personnel background checks, site access, and a security plan and background checks for hazardous materials drivers. Perimeter security measures utilized for this facility may include security guards, security alarms, breach detectors, motion detectors, and video or camera systems (PG&E 2006a Section 8.5.4.2.5). In response to data requests submitted by staff regarding security at the HBRP site, the applicant has stated

that the HBRP site will have its own perimeter and perimeter fence separate from that of the existing HBPP (which is under the security requirements of the federal Nuclear Regulatory Commission) and that during operations the perimeter security will be operated and manned by its own security personnel (CH2MHILL 2007c, DR #59-63).

In order to ensure that this facility or a shipment of hazardous material is not the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** requires both a Construction Security Plan and an Operations Security Plan. These plans would require the implementation of Site Security measures consistent with the above-referenced documents and Energy Commission guidelines.

The goal of these conditions of certification is to provide for the minimum level of security for power plants to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant 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 consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP will be 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 will provide guidance in the form of a vulnerability assessment (VA) decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (codified at 6 CFR Part 27).

These security measures include perimeter fencing and breach detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach. Site access for vendors will 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 fleets and employ only drivers who are properly licensed and trained. The project owner will be required, through its contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements that hazardous materials vendors prepare and implement security plans per 49 CFR 172.800 and ensure that all hazardous materials drivers are in compliance with personnel background security checks 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. Department of Energy, or NERC, after consultation with appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the operation of the HBRP combined with existing facilities to result in cumulative impacts on the population within the area. Staff determined that the chemical with the most potential to cause a cumulative impact is aqueous ammonia. However, it is expected that with the mitigation measures proposed by applicant and staff's suggested conditions of certification, there will be very little possibility for significant off-site air-borne concentration of ammonia gas, and

accordingly even less possibility for there to be simultaneous off-site plumes from other facilities to merge and cause any significant off-site impact. The nearest facility that stores and uses ammonia is the Humboldt Creamery Association, located about 8 miles from the proposed HBRP site (PG&E 2006a, Section 8.5.3). At this distance there are no potential cumulative impacts from the use and storage of hazardous materials.

The applicant will develop and implement a hazardous materials handling program for the HBRP project independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, as proposed by the applicant and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in offsite 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 HBRP site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant cumulative impact.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

There were several verbal comments made by the public at workshops on hazardous materials management issues. Staff is unaware of any agency comments on this issue.

The comments on hazardous materials addressed a concern over the safety of using a 19% aqueous ammonia solution for selective catalytic reduction. Concerns were raised about the potential impacts of an accidental release of aqueous ammonia on-site and during transport to the site in an environment where children, schools, and other sensitive receptors exist.

Response:

Various sections of the FSA provide a more detailed analysis but a summary of staff's analysis appears here. A water solution of ammonia is much safer than the pure form of ammonia – anhydrous ammonia – and has been used in Energy Commission-certified power plants for decades without incident. In fact, no aqueous ammonia has been spilled from an on-site storage tank or piping system in an amount that caused any on-site or off-site impacts at Energy Commission-certified power plants in California since the inception of the Commission. In fact, staff is unaware that any aqueous ammonia has leaked from a power plant system. This excellent safety record is due to the many stringent safety requirements imposed on any project owner and the commitment of the project owners to safety. Staff has conducted health-protective air dispersion modeling to identify potential risks should a spill occur and has imposed additional stringent safety requirements at those power plants. The combination of engineering controls, administrative controls, spill prevention, spill containment, and spill cleanup response all serve to reduce the risk of harm to the public to well below the level of significance. All measures that can be done to protect the public are implemented. Additionally, a recent search of the federal hazardous materials transportation accident data base shows that no incidences involving a tanker truck carrying aqueous ammonia on the way to an Energy Commission-certified power plant has ever occurred. Regarding concerns raised about the transportation of aqueous ammonia through the area, staff proposes

that the applicant consult with the local school districts and that no deliveries be made during hours when the route is used by school buses (see proposed condition **HAZ-6**).

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the HBRP as proposed by the applicant and conditioned by staff, would be in compliance with all applicable LORS concerning long-term and short-term project impacts in the area of Hazardous Materials Management.

CONCLUSIONS

Staff's evaluation of the proposed project indicates that with the implementation of mitigation measures proposed by staff and the applicant and with fulfillment of staff's conditions of certification, hazardous materials use will pose no significant impacts on 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 an RMP. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by U.S. EPA and Energy Commission staff. In addition, staff's proposed conditions of certification require review and comment from the Humboldt County Division of Environmental Health (DEH) and staff's review and approval of the RMP prior to 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 as well as site security.

Staff recommends the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed and operated to comply with 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 by staff are required, 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. **HAZ-1** ensures that no hazardous material would be used or stored at the facility except those listed and in the concentrations and volumes listed, in Appendix B of this staff assessment, unless there is prior notification to the Humboldt County Division of Environmental Health (DEH) and approval by the Energy Commission CPM. **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 a condition (**HAZ-3**) requiring development of a safety management plan for the delivery of aqueous ammonia. The development of a Safety Management Plan addressing delivery of ammonia will further reduce the risk of any accidental release not

addressed by the proposed spill prevention mitigation measures and the required RMP. **HAZ-4** requires that the aqueous ammonia storage tank be designed to comply with applicable LORS. The transportation of hazardous materials is addressed in **HAZ-5** and a restriction on the route and time-of-day transport of aqueous ammonia is addressed in **HAZ-6**. Site security during both the construction and operations phases is addressed in **HAZ-7** and **HAZ-8**.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material, stored in amounts greater than 100 gallons as a liquid or 50 pounds as a solid, not listed in Appendix B, below, or in greater quantities or concentrations than those identified by chemical name in Appendix B, below, unless notification is given to the Humboldt County Division of Environmental Health and approved not less than two (2) business days 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 and storage quantities contained at the facility.

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) to the Certified Unified Program Agency (CUPA) -- Humboldt County Division of Environmental Health (DEH) -- and the CPM for review. After receiving comments from the CUPA and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final Business Plan and RMP shall then be provided to the CUPA for information and to the CPM for approval.

Verification: At least sixty (60) days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval. At least sixty (60) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA 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. 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 sixty (60) days prior to the first delivery of aqueous ammonia 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 Boiler and Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin

capable of holding 125% of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The secondary containment shall include a cover that would minimize evaporation of ammonia to the air and the area around the storage tank, tanker transfer pad, and ammonia skid shall be equipped with ammonia sensors. The final design drawings and specifications for the ammonia storage tank, secondary containment basin, cover, transfer pad, and the number, location, and specifications of the ammonia sensors 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, secondary containment basin, cover, transfer pad, and the number, location, and specifications of the ammonia sensors 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 that meet or exceed the specifications of U.S. DOT Code MC-307.

Verification: At least sixty (60) days prior to the first receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter proposed to be provided to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM (Highway 101 to King Salmon Avenue, to the project site). The project owner shall submit any desired change to the approved delivery route to the CPM for review and approval. The project owner shall also consult with officials of the Eureka City Unified School District and the South Bay Union School District regarding school bus schedules and shall prohibit vendors through contractual language from transporting aqueous ammonia to the site at times that would coincide with school bus traffic along Highway 101 and King Salmon Avenue.

Verification: At least sixty (60) days prior to receipt of any hazardous materials on site, the project owner shall submit to the CPM for review and approval copies of 1) notices to hazardous materials vendors describing the required transportation route, 2) the contract with the aqueous ammonia vendor describing the time of day limitation on deliveries, and 3) evidence that officials of the Eureka City Unified School District and the South Bay Union School District have been consulted.

HAZ-7 At least 30 days 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. Perimeter security consisting of fencing enclosing the construction area;
2. Security guards;

3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;
5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. 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 In order to determine the level of security appropriate for this power plant, the project owner shall prepare a Vulnerability Assessment and submit that assessment as part of the Operations Security Plan to the CPM for review and approval. The Vulnerability Assessment shall be prepared according to guidelines issued by the North American Electrical Reliability Corporation (NERC 2002), the U.S. Department of Energy (DOE 2002), and the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002).

Physical site security shall be consistent with the guidelines issued by the NERC (Version 1.0, June 14, 2002), the DOE (2002), and U.S. Department of Homeland Security regulations (6 CFR Part 27) and shall also be based, in part, on the use, storage, and quantity of hazardous materials present at the facility.

The project owner shall also prepare a site-specific Security Plan for the operational phase and shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented will be determined by the results of the Vulnerability Assessment but in no case shall the level of security be less than that described as below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Specifications for permanent full perimeter fence or wall, at least 8 feet high;
2. Specifications for a main entrance security gate, either hand operable or motorized;
3. Evacuation procedures;
4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;
 - 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 ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law 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 contractor personnel that visit the project site.
6. Site access controls for employees, contractors, vendors, and visitors;
7. 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 conformity with 49 CFR part 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;
8. Specifications for a 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, at a minimum, the main entrance gate and the ammonia storage tank; and
9. Additional measures to ensure adequate perimeter security consisting of either:
 - a. Security guards present 24 hours per day, 7 days per week.

or

 - b. Power plant personnel on-site 24 hours per day, 7 days per week and **all** of the following:
 1. The CCTV monitoring system required in number 9 above shall include cameras that are able to pan, tilt, and zoom (PTZ), have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **and**

2. Perimeter breach detectors **or** on-site motion detectors. (“Virtual” breach detection software is acceptable and other methods may be submitted to the CPM for approval.)

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power plant components (e.g., transformers, gas lines, compressors, etc.) depending on 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 Corporation, after consultation with appropriate law enforcement agencies and the applicant.

Verification: At least 30 days prior to the initial receipt of hazardous materials on-site, the project owner shall notify the CPM that a site-specific Vulnerability Assessment and Operations Site Security Plan are 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 updated certification statements are 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 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 PPM as a threshold for initiating the evaluation of risk of exposure associated with potential accidental releases of ammonia. While this level is not consistent with the 150-ppm level used by EPA and Cal/EPA 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 (ERPGs) 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. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

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

**Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines**

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH ²	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	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 min.	Protects nearly all segments of general population from irreversible effects
STEL ²	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL ³	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	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 min. 30 min. 10 min.	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 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. 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)	150 ppm	60 min.	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) warns 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
TWA, Time-Weighted Average
WHO, World Health Organization

Hazardous Materials Appendix B

**Hazardous Materials Appendix B Table 1:
Hazardous Materials Proposed for Use at the HBRP^a**

Material	CAS No.	Application	Location	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ^b
Aqueous Ammonia 19 % solution	7664-41-7	NO _x Emissions Control	Outdoors in the ammonia unloading/storage area	Health: irritation to permanent damage from inhalation, ingestion, and skin contact Physical: reactive, vapor is combustible	54,000 gallons	100 lb
Cleaning chemicals/ Detergents	None	Periodic cleaning of engines	Workshop		110 gallons	NA
Corrosion inhibitor (Potassium 2-ethylhexanoate, 1H-Benzotriazole methyl)	3164-85-0 29385-43-1	Cooling water corrosion inhibitor	Radiator array and jacket water circuit	Health: may cause irritation to eyes, harmful if ingested Physical: None	5,500 gallons	NA
Diesel No. 2 (Fuel Oil for engines)	None	Fuel for engines	Diesel fuel tank	Health: Eye and skin irritation Physical: combustible	634,000 gallons	42 gal
Diesel No. 2 (Fuel Oil for black start and fire pumps)	None	Fuel for fire pump and black start unit	Diesel fuel tank	Health: Eye and skin irritation Physical: combustible	600 gallons	42 gal

Material	CAS No.	Application	Location	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ^b
Hydraulic Oil	None	Engine lubricating oil	Contained within equipment	Health: hazardous if ingested Physical: combustible	33,000 gallons	42 gal
Exxon Mobile Pegasus 805 lube oil (zinc, phosphorodithoic acid, poly butenyl succinimide)	7440-66-6 68649-42-3	Engine lubricating oil	Oil storage areas	Health: hazardous if ingested Physical: flammable	34,500 gallons	42 gal
Mineral Insulating Oil	8012-95-1	Transformers/switchoyard	Contained within transformers	Health: minor health hazard Physical: may be combustible	15,870 gallons	42 gal
Mineral Lubricating Oil	None	Generator lubricating oil	Electrical generators	Health: minor health hazard Physical: may be combustible	12,000 gallons	42 gal

a. Source: PG&E 2006a Tables 8.5-1 through 8.5-3.

b. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

LAND USE

Testimony of Amanda Stennick

SUMMARY OF CONCLUSIONS

Energy Commission staff concludes that the Humboldt Bay Repowering Project (HBRP) is consistent with §30413(d) of the California Coastal Act (Coastal Act), Humboldt County's zoning designations, zoning code, and the Humboldt Bay Area Plan (HBAP). With adoption of the conditions of certification proposed in the **Air Quality** and **Public Health** sections of this document, the project would be compatible with existing and planned land uses. The project also would not abut any zoned residential areas or impact farmland or other agricultural areas.

INTRODUCTION

The land use analysis of the HBRP focuses on two main issues: the project's consistency with local and state land use plans, ordinances, and policies; and the project's compatibility with existing and planned land uses. In general, a power plant and its related facilities could be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of noise, dust, public health, traffic, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. A power plant may also create a significant land use impact if it converts prime or unique farmland or farmland of statewide importance to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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

Responsible Agencies	
Federal	The proposed project is not located on federally administered public lands and is therefore not subject to federal regulations pertaining to land use.
State California Coastal Commission Public Resources Code § 25500 et seq.	California Coastal Act of 1976, Public Resources Code §3000, et seq. §25529 of the Warren-Alquist Act
Local Humboldt County	Humboldt County General Plan Volume II: Humboldt Bay Area Plan of the Humboldt County Local Coastal Program and Zoning Ordinance

SETTING

The 5.4-acre HBRP site is within the 143-acre parcel (APN 305-131-34) owned by Pacific Gas and Electric Company (PG&E) in the unincorporated area of Humboldt

County. The site is three miles south of Eureka, on Buhne Point along Humboldt Bay. The existing Humboldt Bay Power Plant is situated west of the HBRP site. The proposed project site is zoned coastal dependant industrial (MC) with combining district designations for coastal resource dependant (C), flood hazard (F), and coastal wetland (W). The Humboldt County land use designations for the site are MR/MC (Resource Dependent Industrial/Coastal Dependent).

There are several small residential communities within five miles of the HBRP site, including King Salmon, Humboldt Hill, and Fields Landing. **Land Use Figure 1** shows the project location and surrounding land uses.

PROJECT SITE AND VICINITY DESCRIPTION

Land uses and natural features on the project parcel include industrial land, power plant cooling water intake and discharge canals, wetlands, and Buhne Slough. The property is bounded on the north by Humboldt Bay, on the west by the King Salmon community, on the east by Northwestern Pacific Railroad tracks, and on the south by King Salmon Avenue. Land uses surrounding the site include Highway 101, some rural residential, commercial development, wetland areas, the Humboldt Hill residential development, the community of Fields Landing, Humboldt Bay, a sand spit (South Spit) and the Pacific Ocean. An existing public trail that is part of the California Coastal Trail system (California Coastal Trail, 2006) is on the north side of the Humboldt Bay Power Plant site along Humboldt Bay.

Buhne Slough is a local fishing area. The Elk River Wildlife Area is approximately 2,000 feet to the northeast of the HBRP site. Several recreational parks are in the City of Eureka, which is north of the site and located outside the one-mile radius. Within a one-mile radius of the HBRP site are South Bay Elementary School and a senior home, Sun Bridge Seaview Care Center, and two churches, the Redwood Christian Center and the Calvary Community Church.

PROJECT DESCRIPTION

The HBRP is a repowering project for the existing Humboldt Bay Power Plant (HBPP), a designated coastal dependent facility. It would be on the same property as the existing power plant and would utilize the plant's existing infrastructure (natural gas pipeline, electric transmission line, and well water). The HBRP would not require new transmission lines outside of the existing switchyard. A new potable water line would be constructed within the HBPP site with connections to an existing water main on King Salmon Avenue.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines and performance standards or thresholds identified by the Energy Commission staff, based

on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the project results in:

- Conversion of Farmland.
 - Converts Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency and the USDA Natural Resources Conservation Service Web Soil Survey, to non-agricultural uses.
 - Conflicts with existing zoning for agricultural use, or a Williamson Act Contract.
 - Involves other changes in the existing environment which, due to their location or nature could result in conversion of farmland to nonagricultural use.
- Physical disruption or division of an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction over the project. This includes, but is not limited to, a General Plan, community or specific plan, local coastal program, airport land use compatibility plan, or zoning ordinance.
- Individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable or compound or increase other environmental impacts.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if it creates unmitigated noise, dust, public health or safety hazard or nuisance; results in adverse traffic or visual impacts; or precludes, interferes with, or unduly restricts existing or future uses. Please see the **Noise, Public Health, Traffic and Transportation, Air Quality, and Visual Resources** sections of this document for a detailed discussion of project impacts and mitigation.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

There are no properties within one mile of the proposed project site that are identified as Unique Farmland, or Farmland of Statewide Importance. Prime Farmland within one mile of the HBRP is within the Elk River Valley and on portions of Humboldt Hill within one-half mile east of the HBRP. This land is zoned and designated Agricultural-Exclusive in the Humboldt County General Plan. No land within one mile of the proposed project site is subject to the restrictions of a Williamson Act contract. Because the HBRP requires no offsite linears beyond King Salmon Avenue near the entrance to HBPP, project implementation would not bring about any changes in the environment that could result in the conversion of farmland to nonagricultural use. Neither the construction nor operational activities of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use.

Therefore, the proposed project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion.

Physical Division of an Existing Community

Because the project would be sited within the existing 143-acre Humboldt Bay Power Plant parcel in an area used for power generation, staff does not expect temporary construction related effects, such as dust and noise to impact adjacent land uses. Similarly, neither the size nor the nature of the HBRP would result in a physical division or disruption of an established community, no new physical barriers would be created by the project, and no existing roadways or pathways would be blocked. Because the HBRP requires no offsite linears other than the potable water connection on King Salmon Avenue, project implementation would not present a new physical barrier within the community. Project implementation would result in the continued industrial use of an industrial site. Please see the **Air Quality** and **Noise** sections of the PSA for a complete discussion of construction impacts and mitigation.

Conflict with any Applicable Habitat or Natural Community Conservation Plan

Humboldt County does not have a Multispecies Habitat Conservation Plan, but is subject to the Humboldt Bay Harbor Recreation and Conservation Act. Please refer to the **Biological Resources** section of this document for a thorough discussion of the project's potential impacts on biological resources and compliance with the Humboldt Bay Harbor Recreation and Conservation Act regarding biological resources.

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

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design and operational components, and siting to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority. This includes all applicable federal, state, and local laws, ordinances, regulations, and standards, including those adopted by the Coastal Commission and Humboldt County. From a CEQA perspective, the analysis places particular emphasis on any environmental effect that may be avoided or mitigated by conformity with the applicable LORS.

The project must demonstrate consistency with the Coastal Act policies, which constitute the standards used by the Coastal Commission in its coastal development permit decisions; these are discussed below.

California Coastal Act

The Coastal Act establishes a comprehensive approach to govern land use planning along the entire California coast. The Coastal Act also sets forth general policies (Public Resources Code §30200 et seq.) that govern the Coastal Commission's review of

permit applications and local plans. In the case of energy facilities, Section 30600 of the Coastal Act states: (a) Except as provided in subdivision (e), and in addition to obtaining any other permit required by law from any local government or from any state, regional, or local agency, any person, as defined in Section 21066, wishing to perform or undertake any development in the coastal zone, other than a facility subject to Section 25500, shall obtain a coastal development permit. Section 25500 specifically identifies the Energy Commission's exclusive power to certify sites for power generation facilities 50 MW or greater and related facilities anywhere in the state.

The project site is within the Coastal Zone in an unincorporated area of Humboldt County. Although Humboldt County has a certified Local Coastal Program (LCP), the HBRP site is within the retained jurisdiction of the Coastal Commission. The Coastal Commission retains jurisdiction of tidelands trust and other public trust lands such as historical coastal wetlands within areas that would otherwise fall under the jurisdiction of the LCP. The Coastal Commission is responsible for issuing Coastal Development Permits in its retained jurisdiction, based on an evaluation of the project's conformity with the policies of the California Coastal Act of 1976. The policies of Humboldt County's LCP, general plan, and zoning ordinance, however, are used by the Coastal Commission as guidance (HBRP 2006a; Luster 2006). Because the Energy Commission has jurisdiction over power plants and all related facilities (Public Resources Code, Section 25500), the Energy Commission issues a license in lieu of any state or local permit and must make findings concerning whether the proposed modification conforms with state and local laws, ordinances, regulations and standards, including land use plans and zoning. To that end, Humboldt County's LCP, general plan and zoning ordinance and the Coastal Commission's policies will be used as guidance by the Energy Commission for LORS determination.

California Coastal Act Consistency Determination

Energy Commission staff received a letter from the Coastal Commission (docketed on October 16, 2007) stating that due to its staff's substantial workload and limited resources, the Coastal Commission will be unable to participate in the Application for Certification (AFC) reviews currently before the Energy Commission. As a result, the Coastal Commission will not be developing the report as it normally would for the HBRP siting case pursuant to Coastal Act Section 30413(d).

The Coastal Commission further noted that the HBRP (as well as other power plants located in the coastal zone) is proposing to end the environmentally destructive use of seawater for once-through cooling and instead employ dry cooling technology, which the Coastal Commission has strongly supported during past power plant reviews. The move away from once-through cooling reduces the Coastal Commission's concerns about the type and scale of impacts associated with these proposed projects and about the ability of these projects to conform to Coastal Act provisions. As such, the Coastal Commission's letter encourages the Energy Commission to incorporate some aspects of Coastal Act conformity into our review.

In light of the Coastal Commission's letter, staff has determined that the project would be consistent with the land use related policies of the Coastal Act based on staff's review of the project and the applicable Coastal Act policies. Staff's analysis with each applicable requirement is discussed below. Please refer to the **Biological Resources**,

Hazardous Materials, Visual Resources, Soils and Water, and Cultural Resources sections of this document for a complete discussion of the project's compliance in these areas with the Coastal Act provisions.

Coastal-Dependent Developments

The Coastal Act §30255 states: Coastal-dependent developments shall have priority over other developments on or near the shore line. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland. When appropriate, coastal related developments should be accommodated within reasonable proximity to the coastal-dependent uses they support.

The HBRP is a repowering project for the existing Humboldt Bay Power Plant, which is a designated coastal-dependent facility by the Coastal Commission. The site is zoned coastal-dependent industrial (MC) by Humboldt County. The HBRP would be located on the same property as the existing power plant and would utilize the plant's existing infrastructure including the natural gas pipeline, electric transmission line, well water, and sanitary sewer pipeline (HBRP 2006a). The Coastal Act §30101 defines "Coastal-dependent development or use" as any development or use which requires a site on, or adjacent to, the sea to be able to function at all. While the HBRP would not use ocean water for once-through cooling and on this basis may not be considered coastal dependent, locating the HBRP at the site of the existing Humboldt Bay Power Plant, which is a coastal-dependent facility, allows the HBRP to utilize the plant's infrastructure, thereby avoiding offsite construction of linears or other infrastructure. Constructing the HBRP on this site would avoid the need to develop in areas of Humboldt County unaccustomed or unsuited to this type of industrial development. Construction of the HBRP would also discontinue the use of once-through-cooling, which would have positive impacts on biological resources.

The region needs an electric generating facility and constructing the HBRP on the Humboldt Bay Power Plant site prevents the need for development in another area of the Coastal Zone or elsewhere outside the Coastal Zone. The Humboldt Bay Power Plant has been an established industrial site since the 1950s. The proposed 2007-2008 addition of the Independent Spent Fuel Storage Installation (ISFSI) underground cask storage vault for spent nuclear fuel will require for the foreseeable future that the parcel remain as an industrial site, as there are no off-site alternatives for storing spent nuclear fuel at this time. Therefore, the proposed HBRP would be a suitable use for this site.

Coastal-Dependent Industrial Facilities

The Coastal Act §30260 states: Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section and Sections 30261 and 30262 if (1) alternative locations are more environmentally damaging; (2) to do otherwise would adversely affect the public welfare; and (3) adverse environmental affects are mitigated to the maximum extent feasible.

The HBRP project would be sited within the boundary of the existing Humboldt Bay Power Plant site. Therefore, the HBRP is consistent with the Coastal Act policy that prefers onsite expansion of existing power plants to development of new power plants in undeveloped areas of the Coastal Zone.

The AFC states that the project qualifies as reasonable long-term growth of the existing facility because it is consistent with a 1978 Coastal Commission report that envisioned additional power generating equipment at the Humboldt Bay Power Plant¹. The 1978 report states that the areas adjacent to the PG&E Humboldt Bay Power Plant are not designated as areas that would prevent achievement of the objectives of the Coastal Act should reasonable expansion occur. As shown in the 1978 report, the Coastal Commission anticipated reasonable expansion of the Humboldt Bay Power Plant in this location. Staff concludes that the HBRP is consistent with Section 30260 of the Coastal Act.

Environmentally Sensitive Habitat Areas

The Coastal Act §30240 (b) states: Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

Buhne Slough, a local fishing area, and the Elk River Wildlife Area are within one-mile of the HBRP site. The **Biological Resources** section of this document provides a detailed analysis of how the HBRP would comply with this section of the Coastal Act. An existing public trail that is part of the California Coastal Trail system is located on the north side of the HBRP site, along Humboldt Bay. The **Visual Resources** section of this document provides a detailed analysis of how the HBRP would comply with this section of the Coastal Act.

From a land use perspective, construction and operation of the HBRP would not significantly impact environmentally sensitive habitat areas and parks, including the existing public trail on the north side of the HBRP site because the HBRP would be entirely within the fenced perimeter of the Humboldt Bay Power Plant. Within the HBRP site, the project would affect some wetlands under the jurisdiction of the U.S. Army Corps of Engineers and Coastal Commission. However, these effects would be mitigated as a result of PG&E's Buhne Point Wetlands Preserve Mitigation and Monitoring Plan as discussed under the Biological Resources section of this document.

Public Access Policies

The Coastal Act §30211 states: Development shall not interfere with the public's right of access to the sea where acquired through the use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

The Coastal Act §30212 (a) states: Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except

¹ Designation of Coastal Zone Areas Where Construction of an Electric Power Plant Would Prevent Achievement of the Objectives of the California Coastal Act of 1976, 1978 California Coastal Commission.

where (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources; (2) adequate access exists nearby; or (3) agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.

The HBRP would be located entirely within the fenced perimeter of the Humboldt Bay Power Plant. Construction and operation of the HBRP would not impede or deter public access in the coastal zone, including use of the existing public trail on the north side of the HBRP site. Further, it would not require additional rights-of-way for related transmission or linear facilities that could impede or deter public access in the coastal zone.

The AFC states that adequate public access will exist at the HBRP site because an existing trail along the Humboldt Bay shoreline crosses the property on which the HBRP site is located (the trail extends along the shoreline paralleling the northern fence line of the site boundary). This trail represents part of a planned coastal trail system that the California Coastal Conservancy envisions would eventually extend from Oregon to Mexico (HBRP 2006a). As a Coastal Commission condition of approval for PG&E's ISFSI, PG&E is required to "maintain and enhance the existing accessway by establishing a deed restriction for the accessway and submitting a plan subject to [Coastal Commission] Executive Director review and approval describing measures necessary to provide continued safe public access to the site." The condition ensures that the coastal access on the property will be maintained and that future modifications to the accessway would be made as a result of coastal erosion and sea level rise. In addition, PG&E is required to implement improvements to the accessway, such as an even walking surface and signage (HBRP 2006a). PG&E completed these accessway improvements in 2007.

While the existing trail satisfies the Coastal Commission's requirements for public access, the **Warren-Alquist Act (Pub. Resources Code § 25500 et seq.)** section below, discusses the Energy Commission's statutory requirement for a public use area for the HBRP.

State Agencies

Pursuant to Public Resources Code §30413(b) of the Coastal Act, the Coastal Commission shall "designate those specific locations within the Coastal Zone where the location of a facility, as defined in § 25110, would prevent the achievement of the objectives of this division; provided, however, that specific locations that are presently used for such facilities and reasonable expansion thereof shall not be so designated." The proposed 5.4-acre HBRP site would be located entirely within 143-acre parcel (APN 305-131-34) owned by PG&E. The Coastal Commission has not designated the existing PG&E power generation facility site as a site that is inappropriate for the facility or for reasonable expansion. As stated above, the HBRP is consistent with Coastal Act provision that prefers onsite expansion of existing power plants to development of new power plants in undeveloped areas of the Coastal Zone.

Warren-Alquist Act (Pub. Resources Code § 25500 et seq.)

Pursuant to § 25529 of the Warren-Alquist Act, the Energy Commission shall require the establishment of an area for public use as a condition of certification of a facility proposed in the Coastal Zone as follows:

"When a facility is proposed to be located in the Coastal Zone or any other area with recreational, scenic, or historic value, the [Energy] Commission shall require, as a condition of certification of any facility contained in the application, that an area be established for public use, as determined by the Commission. Lands within such area shall be acquired and maintained by the Applicant and shall be available for public access and use, subject to restrictions required for security and public safety. The Applicant may dedicate such public use zone to any local agency agreeing to operate or maintain it for the benefit of the public. If no local agency agrees to operate or maintain the public use zone for the benefit of the public, the Applicant may dedicate such zone to the state. The [Energy] Commission shall also require that any facility to be located along the coast or shoreline of any major body of water be set back from the shoreline to permit reasonable public use and to protect scenic and aesthetic values."

On January 16, 2008, staff conducted a field review of potential public use areas and held a public workshop to discuss the statutory requirement for public use for this project. Staff met with representatives from PG&E, Humboldt County, and the Redwood Community Action Agency to determine where opportunities for public use exist and how to best provide such an area within the community.

Selection Criteria

In its review of the potential projects discussed at the workshop, staff used the following criteria as guidance for selecting an appropriate public use area:

- Would the project provide a specific and tangible benefit to the community?
- Are the project plans developed?
- Is the project environmental review and permitting underway or completed?
- Would the project cause a public nuisance?
- Would the project be properly operated and maintained?
- Can the project component that would be funded by PG&E be developed regardless of where and when additional funding is obtained?
- Would the project funding mechanisms allow PG&E to make a one-time contribution?

Included in the options discussed for public use areas were a paddle boat access at King Salmon Slough, adding pedestrian and bicycle lanes along King Salmon Avenue, reconstructing a former onsite PG&E employee park, and several projects within the City of Eureka's Elk River Access Project. The first two options were rejected because of additional environmental review and the need for federal and local permits; the third option was rejected due to public safety concerns. Based on the above criteria, staff determined that a project within the Elk River Access Project would best meet the needs of the community, as well as the statutory requirement for a public use area. Some of

the projects evaluated in the Elk River Access Project include surfaced public parking, information kiosks, day-use areas, observation platforms, paddle-boat access, interpretive signing, picnic facilities, restroom facilities, landscaping, native plant restoration, undergrounding of utility lines, development of multiple use trails, and improvements for public safety.

Cost Assessment

In addition to the site selection criteria, staff looked at the costs of public use areas under consideration for the HBRP and compared them with the costs for public use areas on past siting cases. The following is a list of several recent siting cases in the Coastal Zone and an estimate of what was spent by project developers for public use areas pursuant to § 25529 of the Warren-Alquist Act (adjusted for 2009 dollars using an inflation factor of 3.5 percent per year):

- El Segundo – Bike trail widening and park benches - \$100,000 in 2005, or $1.14 \times \$100,000 = \$114,000$ in 2009 dollars;
- Moss Landing – Easements and Trails - \$410,000 in costs in 2000, or $1.315 \times \$410,000 = \$539,000$ in 2009 dollars; and
- Morro Bay – A purchase of seven acres for \$1,400,000 was used to satisfy both § 25529 of the Warren-Alquist Act and the City of Morro Bay requirements for a public use area/coastal access. Therefore, the estimated cost in 2009 dollars (for the Energy Commission requirement only) would be $1.175 \times \$700,000 = \$823,000$.

The above information provided staff with some guidelines to assess an appropriate dollar amount for public use associated with the HBRP. The applicant suggested that staff calculate the § 25529 requirement based on the number of project megawatts or acres of land disturbed by the project. The Energy Commission has never taken this approach but instead has looked at existing site conditions (such as proximity of recreational/public use areas) and elicited local agency input to determine the best way to satisfy § 25529 of the Warren-Alquist Act.

Other Considerations

In addition to the Warren Alquist requirement for public use areas, the Humboldt Bay Area Plan of the Humboldt County Local Coastal Program (HBAP) requires public access for new development projects (see **Land Use Table 2**). While not considered a new project (as discussed on page 4.5-6), staff notes that if the Energy Commission approves the HBRP, PG&E would receive the right for dedicated use of coastal lands for another 30 to 50 years, and the proposed addition of the ISFSI would ensure for the foreseeable future that the parcel remain as an industrial site. Should PG&E fund a public use area as a requirement of licensing, the ongoing use of the HBRP site, while predominantly industrial, would not preclude the public's use and enjoyment of adjacent coastal lands.

Elk River Access Project

Based on the above criteria and input received from the public, the Redwood Community Action Agency, the applicant, and the city of Eureka, staff determined that the Truesdale Vista Point to Hilfiker Lane Trail component of the Elk River Access

Project would be the best option for meeting the statutory requirement for a public use area. The Truesdale Vista Point to Hilfiker Lane Trail has been identified in the City of Eureka's General Plan and Capital Improvement Program as a priority for local public access improvement projects.

The Elk River Access Project is within the city limits of Eureka and is managed by the city and the Department of Fish and Game; the city is the lead agency for all CEQA-related environmental reviews and permitting. The city has completed the biological surveys of the Elk River Access Project area and anticipates receiving the required Coastal Development Permits in late 2008 or early 2009. The Elk River Access Project is located within a two-mile radius of the HBRP site and is an important asset to the community. When completed, it will provide and enhance shoreline access within the 300-acre Elk River Wildlife Area.

At the workshop, PG&E stated it was willing to fund a project to provide a public use area, preferably in a manner that limits them to a one-time contribution for a project that can be readily implemented. Staff believes the Truesdale Vista Point to Hilfiker Lane Trail project would best satisfy statutory requirements because the City of Eureka would separately fund the annual maintenance and operation costs, and capital improvements within the Elk River Access Project would not require environmental analysis beyond the scope of the city of Eureka's and the Coastal Commission's current efforts. Furthermore, construction of the Truesdale Vista Point to Hilfiker Lane Trail would provide an important link to the Humboldt Bay shoreline trail system, the California coastal trail, and would eventually tie into the existing trail at HBPP.

When constructed, the Truesdale Vista Point to Hilfiker Lane Trail would be about 2,265 feet long and 10 feet wide, with a crushed shale surface. Any future construction of day-use facilities and trail support amenities, such as picnic tables, trash receptacles, interpretive signs and kiosks, and restroom facilities would be funded through other mechanisms as discussed in the Elk River Access Project. Because of its designated priority, high use potential, and proximity to the HBRP site, staff believes that this project would meet the requirements for public use area, pursuant to § 25529 of the Warren Alquist Act. In addition, the City of Eureka has expressed its support for the funding of Truesdale Vista Point to Hilfiker Lane trail as provided in a letter to the Energy Commission dated April 7, 2008 (Eureka 2008c).

PG&E's Cost

The cost of the Truesdale Vista Point to Hilfiker Lane Trail (as discussed in the Elk River Access Project Recommendations) was estimated in 2002 to be \$164,000. The cost in 2009 dollars (the year the City of Eureka expects to begin construction for projects in the Elk River Access Project) would be about \$230,000. PG&E's cost to fund this trail would fall into the lower range, compared with the public use area costs for El Segundo, Morro Bay, and Moss Landing Power Plants. Also, because the trail would be a component of the City of Eureka Elk River Access Project, it would not obligate PG&E to fund future operation and maintenance costs, and would satisfy PG&E's preference for a one-time contribution for a project that can be readily implemented.

To that end, staff proposes PG&E fund the Truesdale Vista Point to Hilfiker Lane Trail as described in the Elk River Access Project Recommendations. To meet PG&E's request that it only be responsible for a one-time contribution, the City of Eureka has agreed to accept a check in the amount of \$230,000 for this public use area. The city would then deposit the check in a dedicated account that would allow the expenditure of the funds to be used for the sole purpose of developing the Truesdale Vista Point to Hilfiker Lane Trail. To ensure satisfaction of this requirement, staff proposes Condition of Certification **LAND-2**.

Humboldt County

As stated above, the project site is within the Coastal Zone in an unincorporated area of Humboldt County. Although Humboldt County has a certified LCP, the HBRP site is within the retained jurisdiction of the Coastal Commission. The policies of Humboldt County's LCP, general plan, and zoning ordinance, however, are used by the Coastal Commission as guidance (HBRP 2006a; Luster 2006). Therefore, the Energy Commission will use Humboldt County's LCP, general plan, and zoning ordinance as guidance for LORS determination.

Humboldt County General Plan Volume II: Humboldt Bay Area Plan of the Humboldt County Local Coastal Program

The Humboldt County LCP identifies land uses and standards by which development will be evaluated within the Coastal Zone. The Humboldt County General Plan Volume II: Humboldt Bay Area Plan of the Humboldt County Local Coastal Program (HBAP), where the proposed project is located is one of six planning areas of the LCP. The uses and standards contained in the HBAP have been adopted by Humboldt County and certified by the Coastal Commission. These uses and standards are consistent with the Humboldt County General Plan and Zoning Ordinance and are in conformance with and satisfy the policies and requirements for coastal land use contained in the California Coastal Act of 1976 (HBAP 1995). The project's conformance with the relevant policies in the HBAP is discussed in **Land Use Table 2**. Please refer to the **Biological Resources, Visual Resources, Soil and Water, Traffic and Transportation, and Noise** sections of this document for a complete discussion of the project's consistency in these areas.

The land use designations for the site are MR/MC (Resource Dependent Industrial/Coastal Dependent). The purpose of these designations is to protect coastal wetlands, provide for the development of upland areas consistent with resource protection and enhancement, and protect and preserve parcels on or near the sea for industrial uses dependent on or related to the harbor. The HBAP designates a project such as the HBRP a conditional use under the MR/MC land use designations. The HBRP's consistency with policies in the HBAP document is discussed in **Land Use Table 2**, below.

The Humboldt County General Plan, Volume I, is currently being updated. As stated by the county, the land use designations on the project site will not change as a result of updating (Hofweber 2007). Staff concludes that the HBRP is consistent with the relevant policies in the HBAP.

**LAND USE Table 2
Humboldt County HBAP Consistency**

Humboldt County LCP	Goals/Objectives/Policy	Consistency Determination
<p>Industrial/Coastal-Dependent Development</p> <p>Resource-Dependent Development</p>	<p>3.13.B.1.b conditional uses within Coastal Dependent Industrial (MC) designations include...coastal-related industrial uses, including... electrical generating facilities or other facilities which require an ocean intake, outfall, or pipeline. Alterations, improvements, and relocations of existing general industrial uses within the MC designation may also be permitted.</p> <p>Uses specified in Section 30233 a (1) and (5) of the Coastal Act including new or expanded port, energy, and coastal dependent facilities</p>	<p>Consistent. See staff's discussion under CALIFORNIA COASTAL ACT.</p> <p>Consistent. See staff's discussion under CALIFORNIA COASTAL ACT.</p>
<p>Industrial Development Policies – General</p>	<p>3.14B.1 New industrial development, except as may be otherwise provided in this plan, shall be located within, contiguous with, or in close proximity to, existing developed industrial areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources.</p> <p>3.14B1 (13142.5)b For each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life.</p>	<p>Consistent. The project is located within an existing industrial area and will not have significant adverse effects on coastal resources.</p> <p>Consistent. The HBRP will not use seawater for Industrial Development cooling.</p>
<p>Industrial Development Policies – Coastal Marine Environments</p>	<p>3.14B1 (30232)a Industrial uses shall include mitigation and design features for compatibility with adjacent land uses, in particular screening and/or landscaping to buffer adjacent residential and recreational uses.</p>	<p>Consistent. The HBRP has increased the stack height to improve air dispersion characteristics (as explained in the AIR QUALITY section of this document). To mitigate potential Visual impacts, visual screening landscaping will be provided (See the VISUAL RESOURCES section of this document).</p>
<p>Industrial Development Policies – Coastal Dependent Industrial</p>	<p>3.14B3 Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other</p>	<p>Consistent. The proposed project is located within an existing power plant site.</p>

	<p>policies of this division, they may nonetheless be permitted in accordance with this section and Sections 30261 and 31262 if (1) alternative locations are unfeasible or more environmentally damaging; (2) to do otherwise would adversely affect the public welfare; and (3) adverse environmental effects are mitigated to the maximum extent feasible.</p> <p>3.14B3 a. The initial study and subsequent environmental review of a proposed coastal dependent or coastal related facility shall include consideration of alternative sites within appropriate land use designations for the proposed project, and shall rate the sites according to the following priority: Priority 1 Sites: sites with existing facilities suitable, with minor alteration, to accommodate the proposed use, or that could accommodate the proposed use through expansion.</p>	<p>Consistent. Staff in its alternatives analysis, considered several sites in addition to the proposed site and found the proposed site to be the environmentally superior site (see the ALTERNATIVES section of this document). The Humboldt Bay Power Plant site is a Priority 1 site as designated in section 3.14B3a of the HBAP.</p>
Public Access	<p>3.5B(30212) Public access shall be provided for new development projects except where (1) it is inconsistent with public safety, military security needs, or protection of fragile coastal resources; 2) adequate access exists nearby; 3) agriculture would be adversely affected.</p>	<p>Consistent. See staff's discussion under CALIFORNIA COASTAL ACT and WARREN-ALQUIST ACT.</p>
Standards for Plan Designations	<p>4.10 The Area Plan Land Use Maps indicate the planned principal use for all areas in the Coastal Zone. These planned uses are the basis on which zoning and subsequent development decisions are made; their intent is to guide the development of each area within the framework of community goals and their objectives and the requirements of the Public Resources Code Section 30000 et. seq.</p>	<p>Consistent. The proposed HBRP is in accordance with the planned uses for areas in the Coastal Zone (Luster 2006; Hofweber 2007).</p>

Source: Humboldt County, 1995, 2000, as cited in HBRP AFC

Humboldt County Zoning Regulations

The project site is zoned coastal-dependent industrial (MC) with combining district designations for coastal resource dependent (C), flood hazard (F), and coastal wetland (W). This zoning designation specifically relates to those industrial land uses that are given priority by the Coastal Act of 1976 for location adjacent to the coastline. Examples of uses in this designation are thermal power plants, seawater intake structures, discharge structures, tanker support facilities, and other similar uses that must be located on or adjacent to the sea in order to function. **Land Use Table 3** shows the project's consistency with the applicable sections of the Humboldt County Zoning Ordinance.

As stated in the **Geology and Paleontology** section of this document, the Federal Emergency Management Agency (FEMA) has identified the HBRP site as lying in Zone A, which is subject to 100-year flooding. Humboldt County has established the base flood elevation for the 100-year flood at +6 feet. The HBRP plant grade would be established at +11 to +12 feet, with finished floor elevations at +13 feet. Therefore, the HBRP as constructed would not be within the 100-year flood zone (CH2MHILL 2007a).

Because the project site is in Zone A (an area of 100-year flood), it has a flood hazard (F) designation. The purpose of Flood Hazard Areas is to minimize public and private losses due to flood and tsunami conditions in specific areas of the county. Humboldt Bay and the proposed HBRP site are in an area that could be inundated by a tsunami. Because the project site lies within a tsunami inundation zone, the facilities would be constructed to minimize the impacts of flooding and potentially high wave forces. All major structures would also be anchored to avoid flotation from buoyancy (PG&E 2006a, Sec. 8.15.1.3). For further discussion, see the **Geology and Paleontology** section of this document.

The County Zoning Ordinance (section 313-3.4 Maximum Structure Height) specifies a maximum height of 50 feet, plus one foot for each foot of front yard setback over 50 feet, up to a maximum height of 75 feet. To improve air dispersion characteristics (as discussed in the **Air Quality** section of this document), the HBRP stack height was changed from 75 feet to 100 feet.

Because the Coastal Commission is responsible for issuing Coastal Development Permits in its retained jurisdiction, Humboldt County's LCP and zoning ordinance would not apply. In situations like this where the Coastal Commission would retain its permit jurisdiction, its standard of review would be Chapter 3, Section 30251 of the Coastal Act, as cited below.

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

Energy Commission staff in the **Visual Resources** section of this document, analyzed the proposed 100-foot stack height in the context of Section 30251 and concluded that it (1) would not substantially degrade the current setting along the ocean, (2) would not alter existing landforms, and (3) would be visually compatible with the character of the surrounding area. Based on the **Visual Resources** analysis, land use staff concludes that allowing the stacks to exceed the 75-foot height restriction would not impair the integrity of the zoning district or the surrounding area. As a comparison to existing conditions at HBPP, the two exhaust stacks for Units 1 and 2 are 120 feet high. Staff is proposing condition of certification **LAND-1**, to ensure compliance with the remaining design standards in the MC zone.

**LAND USE Table 3
Humboldt County Zoning Consistency**

Humboldt County Zoning Code	Regulations/Standards	Consistency Determination
Standards for Industrial Development that Impact Nonresidential Zones	103.1.4.6: All manufacturing and fabricating areas shall be enclosed in buildings.	Consistent. The generator sets would be enclosed. (Section 2.5.2 of the AFC).
MC: Industrial/Coastal-Dependent	313-3.4 Minimum Lot Size: 10,000 square feet.	Consistent. The lot size is 5.4 acres and would exceed the minimum. (Section 8.6 of the AFC).
MC: Industrial/Coastal-Dependent	313-3.4 Maximum Structure Height – 50 feet plus 1 foot for each foot of front yard setback over 50 feet to a maximum of 75 feet.	Consistent. To improve air dispersion characteristics (as explained in the AIR QUALITY section of this document), the HBRP stack height was changed from 75 feet to 100 feet. Energy Commission staff, acting on behalf of Coastal Commission staff, concludes that allowing the stacks to exceed the 75-foot height restriction would not impair the integrity of the zoning district or the surrounding area.

Source: Humboldt County, 1995, 2000, as cited in HBRP AFC

Energy Commission staff has found no unmitigated significant adverse impacts in the areas of **Noise, Traffic and Transportation, Visual Resources, Air Quality, and Public Health**. Therefore, staff concludes that the HBRP has no significant unmitigated land use impacts and would be compatible with existing or planned land uses.

Staff has considered the minority population identified in **Socioeconomics Figure 1** and the Census 2000 data that shows the low-income population within the six-mile radius in its land use analysis. Because the minority and low-income populations are considerably lower than the 50% threshold, staff concludes there are no land use-related environmental justice issues.

Indirect impacts

Staff does not expect the removal of Units 1 and 2 to contribute to indirect land use impacts. Construction of the HBRP will result in ceasing of operation and surrendering of air permits for Units 1 and 2 as well as the Mobile Emergency Power Plants (MEPPs); but it will not directly result in the demolition of any of the structures and associated equipment that comprise Units 1 and 2 for the following reasons:

- Demolition of the structures and associated equipment is not necessary to construct the HBRP. Units 1 and 2, and the MEPPs need to be fully operational to serve the Humboldt County load until the HBRP is constructed, commissioned, and fully operational;
- Some of the Unit 1 and 2 infrastructures is shared by Unit 3 and cannot be removed without approval of the decommissioning plans for Unit 3.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects

of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, section 15130.)

The proposed project would not contribute to regional impacts related to new development and growth. The HBRP is a repowering project for the existing Humboldt Bay Power Plant, a coastal dependent facility. It would be located on the same property as the existing power plant and would use the plant's existing infrastructure (natural gas pipeline, electric transmission line, well water, and sanitary sewer).

In addition to the HBRP, other activities occurring on the Humboldt Bay Power Plant parcel include PG&E's ISFSI project, the decommissioning of Unit 3. Because these projects would occur onsite, staff concludes they would not disrupt or physically divide an established community, nor would they preclude or unduly restrict existing or planned uses, or contribute to significant adverse cumulative land use impacts.

Staff does not expect potential cumulative impacts of PG&E's ISFSI project and the construction and operation of the proposed HBRP to be significant because the ISFSI will only result in an underground cask storage vault and security building being added to the Humboldt Bay Power Plant parcel. The ISFSI will be located on Buhne Point Hill, southwest of PG&E Units 1, 2, and 3, and more than one-half mile from the HBRP.

Staff does not expect the decommissioning of Unit 3 to contribute to cumulative land use impacts. The planned decommissioning of Unit 3 is not a part of the HBRP project; but activities undertaken for this decommissioning may coincide with the HBRP and the ISFSI projects. While no definite schedule for the Nuclear Regulatory Commission (NRC) approved decommissioning activities exists, final decommissioning of Unit 3 will not likely occur during construction of the HBRP due to the long lead times needed for site characterization and NRC approval (HBRP 2006a).

Staff's discussion under **Conflict with any Applicable Land Use Plan, Policy, or Regulation** shows the project to be consistent with the Humboldt County land use and zoning designations. Therefore, staff finds that the project would not by itself or cumulatively have an adverse effect on land use.

Staff has considered the minority population identified in **Socioeconomics Figure 1** and the Census 2000 data that shows the low-income population within the six-mile radius in its land use analysis. Because the minority and low-income populations are considerably lower than the 50% threshold, staff concludes there are no land use-related environmental justice issues.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any public or agency comments related to land use.

CONCLUSIONS

The project would be sited within the existing 143-acre Humboldt Bay Power Plant parcel in an area used for power generation. Neither the size nor the nature of the

HBRP would result in a physical division or disruption of an established community. No new physical barriers would be created by the project, and no existing roadways or pathways would be blocked. Project implementation would result in the continued industrial use of an industrial site.

Pursuant to §30413(d) of the California Coastal Act (Coastal Act), Energy Commission staff concludes that the HBRP is consistent with the Coastal Act, the HBAP, and Humboldt County's land use designations and zoning code.

With the adoption of conditions of certification proposed in the **Air Quality** and **Public Health** sections of this document, the project would be compatible with existing and planned land uses. The HBRP also would not abut any zoned residential areas, or impact farmland or other agricultural areas. Should the Energy Commission certify the project, staff proposes the following conditions of certification.

CONDITION OF CERTIFICATION

LAND-1 The project owner shall comply with the design and performance standards for the MC Industrial/Coastal Dependent Zone set forth in the Humboldt County Zoning Ordinance, as follows:

- All manufacturing and fabricating areas shall be enclosed in buildings.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval written documentation including evidence of review by Humboldt County that the project conforms to the design and performance standards of the Zoning Ordinance.

LAND-2 The project owner shall make a \$230,000 contribution to the City of Eureka for its Elk River Access Project for use by the City for the following capital improvement project: the Truesdale Vista Point to Hilfiker Lane Trail.

Verification: At least 30 days prior to the start of construction, the project owner shall provide to the CPM a receipt demonstrating the deposit of \$230,000 with the City of Eureka in a dedicated account for the Truesdale Vista Point to Hilfiker Land Trail component of the Elk River Access Project.

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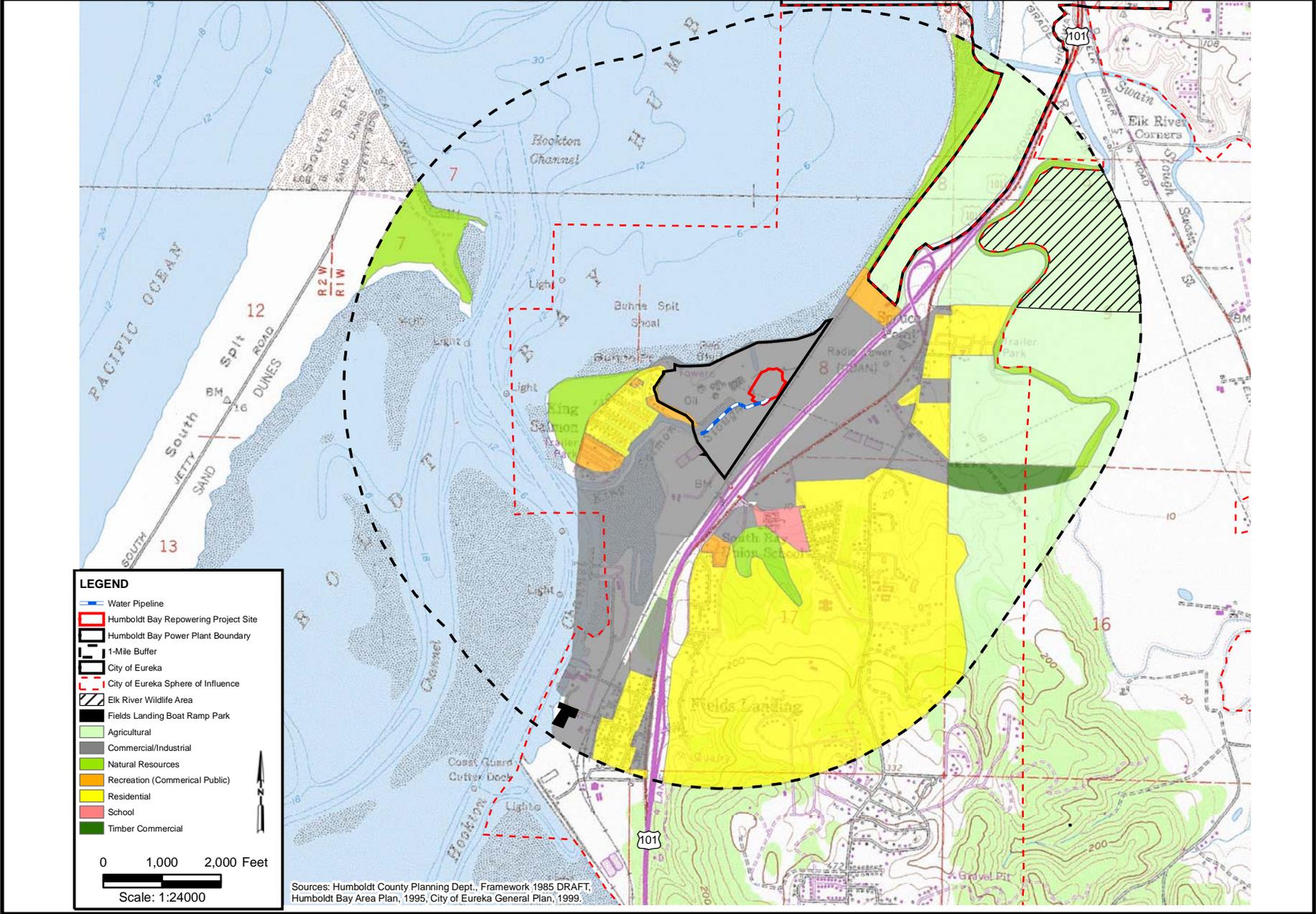
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MAY 2008

LAND USE

LAND USE - FIGURE 1
Humboldt Bay Repowering Project - Project location and surrounding land use



LEGEND

- Water Pipeline
- Humboldt Bay Repowering Project Site
- Humboldt Bay Power Plant Boundary
- 1-Mile Buffer
- City of Eureka
- City of Eureka Sphere of Influence
- Elk River Wildlife Area
- Fields Landing Boat Ramp Park
- Agricultural
- Commercial/Industrial
- Natural Resources
- Recreation (Commercial Public)
- Residential
- School
- Timber Commercial

0 1,000 2,000 Feet
Scale: 1:24000

Sources: Humboldt County Planning Dept., Framework 1985 DRAFT, Humboldt Bay Area Plan, 1995, City of Eureka General Plan, 1999.

NOISE AND VIBRATION

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff concludes that the Humboldt Bay Repowering Project (HBRP) can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards (LORS) and in a manner that will cause no significant adverse noise impacts on sensitive receptors. With the adoption of the conditions of certification proposed below, noise from construction and operation of the project would be limited to levels that would produce no significant adverse noise impacts directly, indirectly, or cumulatively.

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and volume of this noise, the times of day or night when it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, power plant construction practices, such as blasting or pile driving, may produce vibration, as may plant operation. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is threefold:

1. to identify and examine the likely noise and vibration impacts from the construction and operation of the HBRP;
2. to recommend procedures to ensure the resulting noise and vibration impacts would be adequately mitigated to comply with applicable LORS; and
3. to avoid creation of significant adverse noise or vibration impacts.

For an explanation of technical terms and acronyms employed in this section (**NOISE AND VIBRATION, Table A1**).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

**NOISE AND VIBRATION Table 1
Laws, Ordinances, Regulations, and Standards (LORS)**

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 Humboldt County General Plan, §3240 - Noise: Land Use/Noise Compatibility Standards	Establishes L_{dn} values for exterior exposure of single-family residential and mobile homes. Levels up to 60 dBA are considered clearly acceptable; up to 65 dBA normally acceptable.
Humboldt County Zoning Regulations, Industrial Performance Standards, §313-103.1.3	Requires all noise generating operations be mitigated to not exceed exterior ambient noise level in residential zones by more than 5 dBA (§313-103.1.3.1). Prohibits perceptible vibrations off the site (§313-103.1.3.4).
Humboldt County Zoning Regulations, Industrial Performance Standards, §313-103.1.4	Requires all noise generating operations be mitigated so noise in nonresidential zones does not exceed 70 dBA off the site (§ 103.1.4.1). Requires that vibrations not be permitted to interfere with adjacent non-residential land uses (§103.1.4.4)

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 United States Code (U.S.C.) §651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. §1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (**NOISE AND VIBRATION Appendix A, Table A4**). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

No federal laws govern off-site (community) noise.

The only guidance available for evaluation of power plant vibration are guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of ground-borne vibration associated with construction of rail projects. Other jurisdictions have applied these guidelines to assess ground-borne 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 ground-borne vibration. The FTA measure of the threshold of perception is 65 VdB,¹ which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

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

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§5095–5099) establishing employee noise exposure limits. These standards are equivalent to the federal OSHA standards (**Worker Safety and Fire Protection and NOISE AND VIBRATION Appendix A, Table A4**).

LOCAL

Humboldt County General Plan Noise Element

Section 3240 (“Noise”) in Chapter 3 (“Hazards and Resources”) of the Humboldt County General Plan (Humboldt 1984) requires the use of Figure 3-2, a noise compatibility matrix entitled “Land Use/Noise Compatibility Standards,” in establishing requirements for new projects. This matrix regards noise impacts at single-family residential and mobile home uses as Clearly Acceptable up to 60 dBA L_{dn} and Normally Acceptable up to 65 dBA L_{dn}.

Humboldt County Zoning Regulations

The Humboldt County Zoning Regulations (Humboldt 2000) establishes performance standards for industrial development. For development that impacts residential zones, noise emissions must be limited, so they do not exceed the exterior ambient noise level by more than 5 dBA (§103.1.3.1), and vibration must be limited so that no vibrations are perceptible off the site (§103.1.3.4). For development impacting non-residential zones, noise emissions must be limited to 70 dBA anywhere off the site (§103.1.4.1), and vibration must be limited, as to not interfere with adjacent land uses (§103.1.4.4).

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 such impacts be reduced to less than significant or mitigated

¹ VdB is the common measure of vibration energy.

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 **(NOISE AND VIBRATION Figure 1)**:

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 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, including those receptors that are considered minority population.

Staff considers it reasonable to assume 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 a case.

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

- the resulting combined noise level;
- the duration and frequency of the noise;
- the number of people affected;
- the land use designation of the affected receptor sites; and
- public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities is limited to daytime hours; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

SETTING

The HBRP would be located on 5.4 acres of the 143-acre Humboldt Bay Power Plant (HBPP) site on the southern shoreline of Humboldt Bay and would replace the HBPP. Surrounding land uses include rural residential, port-related industrial, agricultural and recreational uses. The land use designation of the project site is Industrial and Industrial-Resource Dependent, and the land is zoned MC (Industrial/Coastal Dependent). The project site lies in unincorporated Humboldt County, bounded on the north by Humboldt Bay, on the west by the unincorporated residential community of King Salmon, on the east by the Northwestern Pacific Railroad tracks, and on the south by King Salmon Avenue. East of the railroad tracks lie Highway 101, rural parcels, and some commercial development (Pacific Gas and Electric Company [PG&E] 2006a, Application for Certification [AFC] §§1.1, 2.0, 2.3, 8.7.2.1).

The existing HBPP consists of Units 1 and 2, a pair of 1950s-era steam boiler units producing 52 and 53 megawatts (MW) each, respectively, and two 15-MW trailer-mounted gas turbine Mobile Emergency Power Plants (MEPPs). Unit 3, a 63-MW nuclear power plant that went into operation in 1963 and was shut down in 1976, was decommissioned in 1984; its spent nuclear fuel is still stored in the unit. This spent fuel will be placed in long-term storage in an Independent Spent Fuel Storage Installation (ISFSI) to be constructed adjacent to Unit 3.

Nearby sensitive noise receptors include the community of King Salmon, 1,500 feet to the west; the Humboldt Hill neighborhood and the South Bay Union School, 2,000 feet to the east; and the Sea View Mobile Estates neighborhood, 2,500 feet to the south (**NOISE AND VIBRATION Figure 1**) (PG&E 2006a, AFC §§2.3, 8.7.2.1; CH2MHILL 2007a, Data Response 33).

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 two ambient noise surveys (PG&E 2006a, AFC §8.7.2.2 Tables 8.7-3, 8.7.4, 8.7-5 and Figure 8.7-1). The initial survey was performed from Monday, June 12 through Tuesday, June 13, 2006. The second survey was performed from Thursday, September 7 through Saturday, September 9, 2006, using acceptable equipment and techniques. The noise surveys monitored existing noise levels at the following locations:

1. Monitoring Location M1: A small dock at the eastern edge of the community of King Salmon, approximately 1,500 feet from the HBRP site, chosen to represent the nearest residential noise receptors. Continuous monitoring was performed June 12 through June 13, 2006, and September 7 through September 9, 2006.
2. Monitoring Location M2: A spot on the HBPP site, approximately 1,500 feet from the HBRP site and just west of a small hill that may shield some of the residences in

King Salmon from power plant noise. Continuous monitoring was performed June 12 through June 13, 2006, and September 8 through September 9, 2006.

3. Monitoring Location M3: On a chain link fence, approximately 2,000 feet south of the HBRP site, separating the South Bay Union School parking lot from the Humboldt Hill residential neighborhood. Continuous monitoring was performed June 12 through June 13, 2006, and September 8 through September 9, 2006.
4. Monitoring Location M4: On Sunshine Way in the Sea View Mobile Estates mobile home park, approximately 2,500 feet southeast of the HBRP site. Continuous monitoring was performed June 12 through June 14, 2006, and September 8 through September 9, 2006.
5. Monitoring Location M5: On Loma Avenue, in a commercial neighborhood adjacent to the east side of Highway 101, approximately 3,000 feet southwest of the HBRP site. A 20-minute sample was taken just after 1:00 a.m. on June 13, 2006.

The applicant's first noise monitoring survey was taken in June, when HBPP power output, and thus noise, was fairly low. The second survey was taken in September, when power output and noise levels were slightly greater (see PG&E 2006a, AFC Tables 8.7-3 and 8.7-4). Staff has elected to use data from Table 8.7-4 (September monitoring survey) as more representative of the existing noise regime. Since the power plant's neighbors are accustomed to this noise regime, this represents a reasonable basis of comparison for noise impacts from the proposed HBRP.

In general, the noise environment in the vicinity of the project site and in King Salmon is dominated by the HBPP and by traffic on Highway 101. The noise environment at the sensitive receptors across Highway 101 is dominated in the daytime by highway traffic, and in the nighttime by the HBPP.

NOISE AND VIBRATION Table 2 summarizes the ambient noise measurements.

**NOISE AND VIBRATION Table 2
Summary of Measured Ambient Noise Levels**

Measurement Sites	Measured Noise Levels, dBA			
	Average During Nighttime Hours ¹		Average During Daytime ²	L _{dn}
	L _{eq}	L ₉₀	L _{eq}	
M1 – Dock representing nearest King Salmon residences	48	45	53	56
M2 – Power plant property west of hill	47	44	49	54
M3 – Humboldt Hill residential neighborhood	45	40	54	55
M4 – Sea View Mobile Estates	39	34	49	50
M5 – Loma Avenue commercial district	52 ³	35 ³	—	N/A ⁴

Source: PG&E 2006a, AFC Tables 8.7-4, 8.7-5

¹ Staff calculations of average of four quietest consecutive hours of the nighttime.

² Staff calculations of average of all daytime hours for which data is available.

³ Results of 20-minute sample at 1:12 a.m. (from Table 8.7-5).

⁴ L_{dn} not available because monitoring did not encompass a 24-hour period.

DIRECT IMPACTS AND MITIGATION

Short-term construction activities, as well as normal long-term operation of the power plant, can create noise impacts associated with the project.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of the HBRP is expected to last 18 months, typical of other power plants in terms of schedule, equipment used, and other types of activities (PG&E 2006a, AFC §1.7.2).

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. In Humboldt County, no such ordinance exists. Nevertheless, the applicant has committed to limit noisy construction to the hours between 7:00 a.m. and 8:00 p.m., seven days a week, to minimize noise impacts on sensitive receptors (PG&E 2006a, AFC § 8.7.5.3). In the absence of any applicable LORS limiting the hours of noisy construction work, and in light of the minor impacts of construction noise (see below), staff agrees with this proposal. In order to ensure compliance with this restriction, staff proposes Condition of Certification **NOISE-6**, which would limit noisy construction to these hours.

CEQA Impacts

The applicant has predicted construction noise levels, which are summarized here in **NOISE AND VIBRATION Table 3**:

**NOISE AND VIBRATION Table 3
Predicted Construction Noise Levels**

Receptor	Highest Construction Noise Level ¹ (dBA L _{eq})	Measured Daytime Ambient ² (dBA L _{eq})	Cumulative (dBA L _{eq})	Change (dBA)
M1 – Dock near King Salmon	59	53	60	+7
M2 – Power plant property west of hill	59	49	59	+10
M3 – Humboldt Hill residential neighborhood	57	54	59	+5
M4 – Sea View Mobile Estates	55	49	56	+7
M5 – Loma Avenue commercial district	53	N/A³	—	—

¹ Source: PG&E 2006a, AFC Table 8.7-7 and staff calculations.

² Source: PG&E 2006a, AFC Table 8.7-4: average of daytime hours for which data is available.

³ Not available since only one 20-minute nighttime sample was taken.

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric. As seen in **NOISE AND VIBRATION Table 3** above, construction noise at the nearest sensitive receptors, the residences in King Salmon (M1), may reach 59 dBA. The ambient daytime L_{eq} level at this location, as seen in **NOISE AND VIBRATION Table 3** above, averages 53 dBA. The addition of construction noise to the ambient would result in 60 dBA, an increase of 7 dBA over the ambient level. As noted by the applicant (PG&E 2006a, AFC §8.7.3.2.1), the source figures used to produce the above construction noise estimates are from studies conducted 21 to 26 years ago. Construction equipment has grown noticeably quieter in the intervening years. Staff thus believes that the actual increase in the ambient noise level at this location would be considerably less than 7 dBA, or barely noticeable at these residences. Also, as explained above, noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if the construction activity is temporary and use of heavy equipment and noisy activities is limited to daytime hours. Because the HBRP construction noise is temporary in nature and noisy construction activities would occur only during daytime hours, the noise effect of plant construction on these nearest sensitive receptors is considered to be less than significant.

As seen in **NOISE AND VIBRATION Table 3**, the ambient noise level of 54 dBA at monitoring location M3 (Humboldt Hill residences), when combined with the predicted

HBRP construction noise level of 57 dBA L_{eq} at this location, would result in 59 dBA L_{eq} . This is 5 dBA above the ambient level. (As explained above, the actual increase would likely be less due to the quieter nature of modern construction equipment and shielding effects from intervening structures.) As described above (under Method and Threshold for Determining Significance), staff regards an increase of up to 5 dBA as a less than significant impact. Likewise, the ambient noise level of 49 dBA at monitoring location M4 (Sea View Mobile Estates), when combined with the predicted HBRP construction noise level of 55 dBA at this location, would result in 56 dBA, an increase of 7 dBA above the ambient. As at M1, staff regards such an increase as an insignificant impact.

As discussed above, the applicant has volunteered to limit noisy construction to the hours between 7:00 a.m. and 8:00 p.m., seven days a week, and to employ properly equipped and muffled construction equipment, to minimize noise impacts on sensitive receptors (PG&E 2006a, AFC §8.7.5.3). Staff agrees that this should prove to be adequate mitigation of construction noise. To ensure adherence to these conditions, staff proposes Condition of Certification **NOISE-6**.

In the event that actual construction noise should annoy nearby workers or residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Requirement and a Noise Complaint Process that requires the applicant to resolve any problems caused by construction noise.

Linear Facilities

No new offsite linear facilities will be constructed to serve the HBRP (PG&E 2006a, AFC §§1.1, 2.4, 2.5.6, 2.5.7.2, 2.7.3.1, 6.2, 7.1, 9.8.1, 9.8.2, 9.8.3). Electrical interconnection, natural gas supply, water supply, and wastewater disposal will all connect on site to existing facilities that currently serve the HBPP. All construction noise related to linear facilities will occur on site and has been accounted for in the applicant's estimates of construction noise (see above).

Pile Driving

Pile driving would be necessary for construction of the HBRP (PG&E 2006a, AFC §8.7.3.2.2). Since the application did not quantify likely pile driving noise impacts at sensitive receptors, staff issued a data request (CEC 2006b, Data Request 33). The applicant's response displayed projected pile driving noise impacts at nearby sensitive receptors (CH2MHILL 2007a, Data Response 33, Table DR33-1); see **NOISE and Vibration Table 4**.

**NOISE AND VIBRATION Table 4
Projected Pile Driving Noise Impacts**

Receptor	Pile Driving Noise Level (L _{eq})	Measured Daytime Ambient (dBA L _{eq}) ¹	Cumulative (dBA L _{eq})	Change (dBA L _{eq})	Pile Driving Noise Level (L _{max})
M1 – Dock near King Salmon	65	53	65	+12	72
M2 – Power plant property west of hill	65	49	65	+16	72
M3 – Humboldt Hill residential neighborhood	62	54	63	+9	69
M4 – Sea View Mobile Estates	60	49	60	+11	67
M5 – Loma Avenue commercial district	59	—	—	—	66

Source: CH2MHILL 2007a, Table DR33-1

1. Source: PG&E 2006a, AFC Table 8.7-4: average of daytime hours for which data is available.

Pile driving noise is projected to reach average levels of 65 dBA L_{eq} at the nearest residential receptors in King Salmon (M1) and peak levels up to 72 dBA. This represents an increase of 12 dBA over the daytime ambient noise level at that location, with momentary peaks up to 19 dBA above ambient levels. Pile driving noise would likewise reach levels of 62 dBA at the residences on Humboldt Hill (M3) and 60 dBA at the Sea View Mobile Estates (M4), increases over ambient of 9 and 11 dBA respectively. While this would produce a noticeable impact, staff believes its temporary nature and its limitation to daytime hours would result in impacts that are tolerable to residents.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. Vibration attenuates rapidly; it is likely that no vibration would be perceptible at any appreciable distance from the project site. Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (PG&E 2006a, AFC § 8.7.3.2.3). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise sources of the HBRP include the engine generators and their exhaust stacks, combustion air inlets, cooling radiator fans, electrical transformers, and various pumps and fans. Staff compares the predicted project noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Potential noise mitigation measures, if needed, could include the following equipment:

- engine hall ventilation treatment;
- increased combustion air inlet silencing;
- increased exhaust stack silencing;
- low noise radiator fans; and
- additional noise barriers.

Compliance with LORS

The applicant performed noise modeling to predict the project's noise impacts on sensitive receptors (PG&E 2006a, AFC § 8.7.3.3.3; Tables 8.7-10, 8.7-11, 8.7-12). Project noise levels at the nearest sensitive receptor, M1 (the dock near King Salmon), with the plant generating at maximum output, could reach 52 dBA L_{eq} (PG&E 2006a, AFC § 8.7.3.3.3).

As summarized above, applicable LORS include the Humboldt County General Plan and the Humboldt County Zoning Regulations.

The Humboldt County General Plan, § 3240, Land Use/Noise Compatibility Standards, allows exterior noise levels at residences up to 65 dBA L_{dn} . The predicted project noise level at M1 of 52 dBA L_{eq} , for a steady noise source such as a power plant (see below), would equate to 58 dBA L_{dn} . This exhibits compliance with the General Plan.

The Humboldt County Zoning Regulations, § 313-103.1.3.1, requires all noise generating operations to be mitigated to not exceed the exterior ambient noise level in residential zones by more than 5 dBA. Comparing the predicted maximum project noise level at M1 of 52 dBA L_{eq} to the ambient 24-hour average L_{eq} at M1 of 51 dBA (PG&E 2006a, § 8.7.3.3.3; Table 8.7-4) shows that the power plant noise is only one dB greater than the ambient level. Further, section 313-103.1.3.4 of the Regulations prohibits perceptible vibrations off the power plant site. Such will be the case; see "Vibration," below. This indicates compliance with this regulation.

The Humboldt County Zoning Regulations, § 313-103.1.4.1, requires all noise generating operations to be mitigated so noise in residential zones does not exceed 70 dBA off the site. As discussed above, the predicted project noise level of 52 dBA at M1 clearly meets this limit. Section 313-103.1.4.4 of this regulation further requires that vibration not be permitted to interfere with adjacent non-residential land uses. Such will be the case; see "Vibration," below. This indicates compliance with this regulation.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or eliminate the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Staff evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than the 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 level values to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts, as defined in CEQA, can be detected by comparing predicted power plant noise levels to the ambient nighttime background noise levels at the nearest sensitive receptors as shown above.

Noise emissions from the HBRP will differ from the existing HBPP, and from most other large power plants, in that noise levels from the plant will tend to drop steadily along with the electrical load on the plant. Power plant noise diminishes chiefly when a unit or units are shut down. When the load on a single unit is reduced, noise from the unit does not drop appreciably. Noise reductions from the HBPP, for example, occur only when each of the 15 MW gas turbine units is shut down, or when 52 MW Unit 1 or 53 MW Unit 2 is shut down, as load diminishes. Noise from the HBRP, however, would decrease at each 10 MW reduction in load.

The HBRP would consist of ten discrete 16.3 MW generating units operating in load following mode (PG&E 2006a, AFC §§ 1.4, 2.5.2, 2.5.16, 2.7.1, 9.3, 10.2.2). Further, the engine cooling radiators are to be equipped with variable speed fans. When the weather is cooler, as at night or during the winter, these fans run more slowly, thus producing less noise. The applicant has modeled plant noise emissions on a warm day, and at night or on a cool winter day, at full load and at various levels of reduced electrical load (PG&E 2006a, AFC § 8.7.3.3.3; Tables 8.7-11, 8.7-12). The modeled noise levels at the nearest sensitive receptor, M1, are summarized in **NOISE AND VIBRATION Table 5:**

**NOISE AND VIBRATION Table 5
Predicted Power Plant Noise Levels at M1**

Plant Electrical Load	Power Plant Noise at M1 (dBA L _{eq})	
	Daytime	Nighttime/Winter Day
100% (145-163 MW)	52.0	49.0
90% (129-144 MW)	51.5	48.5
80% (113-128 MW)	51.0	48.0
70% (97-112 MW)	50.5	47.5
60% (81-96 MW)	49.8	46.8
50% (65-80 MW)	49.0	46.0
40% (49-64 MW)	48.0	45.0
30% (33-48 MW)	46.8	43.8
20% (17-32 MW)	45.0	42.0
10% (8-16 MW)	42.0	39.0

Source: PG&E 2006a, AFC Table 8.7-11

Using these predictions, power plant noise impacts at night under full load at the various sensitive receptors can be projected; see **NOISE AND VIBRATION Table 6**:

**NOISE AND VIBRATION Table 6
Nighttime Power Plant Noise Impacts at Sensitive Receptors – Full Load**

Receptor	Measured Nighttime Ambient Level (dBA L ₉₀) ¹	Power Plant Noise Level (dBA L _{eq}) ²	Cumulative (dBA L _{eq})	Change (dBA)
M1 – Dock near King Salmon	45	49	50	+5
M3 – Humboldt Hill residential neighborhood	40	47	48	+8
M4 – Sea View Mobile Estates	34	44	44	+10

Source: PG&E 2006a, AFC § 8.7.3.3.3; Tables 8.7-4, 8.7-11, 8.7-12; and staff calculations

1. Staff calculations of average of four quietest consecutive hours of the nighttime
2. Nighttime estimates from PG&E 2006a, AFC Table 8.7-11 and staff calculations

As seen in **NOISE AND VIBRATION Table 6**, power plant noise causes impacts at receptors M3 and M4 that could be considered significant, raising the nighttime ambient noise levels by eight to ten dBA. The applicant points out, however, how rare it is for the power plant to run at full load at night. A survey of historical operating data from the existing HBPP for the years 2003 through 2005 shows that plant load exceeded 49 MW (equivalent to four of the HBRP gensets running) only ten percent of nighttime hours, and 79 MW (equivalent to five HBRP gensets running) only 0.7 percent of nighttime hours (PG&E 2006a, AFC § 8.7.3.3.3). The HBPP exceeded 80 MW only one percent of the nighttime hours during the survey. **NOISE AND VIBRATION Table 7** shows what power plant noise levels could actually be expected at the sensitive receptors:

NOISE AND VIBRATION Table 7
Power Plant Noise Impacts at Sensitive Receptors – Likely Nighttime Load

Receptor	Plant Load	Measured Nighttime Ambient Level (dBA L ₉₀) ¹	Power Plant Noise Level (dBA L _{eq}) ²	Cumulative (dBA L _{eq})	Change (dBA)
M1	49 MW	45	45	48	+3
	79 MW		46	49	+4
M3	49 MW	40	43	45	+5
	79 MW		44	45	+5
M4	49 MW	34	40	41	+7
	79 MW		41	42	+8

Source: PG&E 2006a, AFC § 8.7.3.3.3; Tables 8.7-4, 8.7-11, 8.7-12; and staff calculations

1. Staff calculations of average of four quietest consecutive hours of the nighttime

2. Nighttime estimates from PG&E 2006a, AFC Tables 8.7-11, 8.7-12; and staff calculations

Likely power plant noise impacts on the nearest receptors, residences in King Salmon, are only three to four dBA; and on homes in the Humboldt Hill neighborhood, only five dBA. Such increases are just noticeable, and generally unlikely to prompt complaints. Staff typically considers such increases as insignificant impacts. Noise impacts at the Sea View Mobile Estates may reach seven to eight dBA; such increases could be considered significant in some circumstances. The survey of historical operating data showed that the instances of relatively high output (79 MW) occurred during the months of November and December. It is highly likely that people in the affected residences are sleeping with their windows closed at these times of the year, thus reducing noise impacts even further (PG&E 2006a, AFC § 8.7.3.3.3). For this reason, staff believes that noise from operation of the HBRP would constitute an insignificant impact on all affected residential receptors.

Two further noise receptors are the South Bay Union School, located at M3, and the Loma Avenue commercial district, at M5. Neither of these receptors is expected to be sensitive to nighttime noise levels; school classes and work occur during the daytime. To evaluate impacts on these receptors, staff typically compares power plant noise to daytime ambient L_{eq} levels. **NOISE AND VIBRATION Table 8** shows likely daytime impacts at M3 and M5:

NOISE AND VIBRATION Table 8
Power Plant Noise Impacts at Daytime Receptors – Full Load

Receptor	Measured Daytime Ambient (dBA L _{eq}) ¹	Power Plant Noise Level (dBA L _{eq}) ²	Cumulative (dBA L _{eq})	Change (dBA)
M3 – South Bay Union School	54	47	55	+1
M5 – Loma Avenue commercial district	N/A	44	—	—

1. Source: PG&E 2006a, AFC Table 8.7-4; average of daytime hours for which data is available

2. Source: PG&E 2006a, AFC Table 8.7-12 and staff calculations

Power plant noise at M3, the school, will raise daytime noise levels only one dBA, an imperceptible amount. The power plant can thus be expected to be nearly inaudible at the school. While daytime ambient noise levels are not available at M5, the Loma Street commercial neighborhood, staff believes they are likely as high as at M3, and perhaps higher due to proximity to Highway 101. Power plant noise impacts at M5 are thus likely to be even less than at the school; the plant should be inaudible at M5.

To ensure that noise from the HBRP does not, in fact, exceed these projected levels, staff proposes Condition of Certification **NOISE-4**.

Tonal Noises

One possible source of annoyance 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. It is possible that some noise sources within the plant could produce tonal noises. The applicant plans to address overall noise in design, and to take appropriate measures, as necessary, to eliminate tonal noises as possible sources of annoyance (PG&E 2006a, AFC § 8.7.3.3.4). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

All water and 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 sensitive receptors.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration), and through the air (airborne vibration).

The operating components of the HBRP would consist of low-speed reciprocating engine generator sets and various fans and pumps. All of these pieces of equipment must be carefully balanced in order to operate. The applicant explains that the Wärtsilä engines to be employed in the HBRP are mounted to their foundations with spring packs to isolate engine vibration. The resulting vibration is typically less than 0.02 inches/second (PG&E 2006a, AFC § 8.7.3.3.5). As explained above, a peak particle velocity of approximately 0.002 inches/second typically represents the threshold of perceptible vibration, while a peak particle velocity of 0.2 inches/second represents the threshold of architectural damage for conventional sensitive structures. The applicant maintains that groundborne vibration from the HBRP would attenuate rapidly enough that it would be imperceptible at the site boundaries. Energy Commission staff agrees with this conclusion, and agrees with the applicant that groundborne vibration from the HBRP 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. The HBRP's chief source of airborne vibration would be the engines' exhaust. In a power plant such as the HBRP, however, the exhaust must pass through the selective catalytic reduction (SCR) units, the carbon monoxide (CO) catalysts and the stack silencers before it reaches the atmosphere.

These devices act as efficient mufflers; the combination of SCR units, CO catalysts and stack silencers makes it highly unlikely that the HBRP 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 (PG&E 2006a, AFC § 8.7.3.3.1). 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 a hearing conservation program would be implemented. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**.

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.

Nearby projects that could contribute to cumulative noise impacts include:

- decommissioning and removal of the existing HBPP Units 1 and 2 and the two MEPPs;
- construction of the ISFSI; and
- completion of decommissioning of the existing HBPP Unit 3.

Decommissioning and Removal of Units 1 and 2 and the MEPPs

This would consist of essentially construction work. Noise emissions would be similar to those during construction of the HBRP, with the exception that no exceptionally noisy work such as pile driving would be necessary. Like construction work, decommissioning and removal would be expected to take place during the daytime, thus not creating impacts at night, when nearby residents are sleeping. Note that, during this phase, while the HBRP would be operating, Units 1 and 2 and the MEPPs would not be operating; their noise would have ceased. Therefore, noise of removal of Units 1 and 2 and the MEPPs plus HBRP operational noise would be similar to, but not likely greater than, the noise of HBRP construction while Units 1 and 2 and the MEPPs operated. These noise impacts have been evaluated (see above) and found not significant.

Construction of the ISFSI

This work is scheduled to begin in Spring 2007 (PG&E 2006a, AFC § 2.2.1); it should be essentially complete before construction of the HBRP begins. There would thus be no cumulative noise impacts. Should the construction work of these projects overlap, it is highly unlikely that noise impacts would aggregate to significant levels. Construction noise varies constantly, thus is less likely to aggregate to annoying levels. Further, since this noise occurs during the daytime, nearby residents are unlikely to be annoyed.

Therefore, staff believes there is no likelihood that construction of the ISFSI would create significant noise impacts.

Decommissioning of Unit 3

Like decommissioning of Units 1 and 2 and the MEPPs, decommissioning of the nuclear unit would take place during the daytime, and would be unlikely to create significant noise impacts.

The existing Units 1 and 2 and the MEPPs will continue to operate during construction and commissioning of the HBRP. Noise emissions from the existing power plant units have been considered in this analysis as part of the ambient noise regime; they need not be regarded separately as cumulative impacts.

FACILITY CLOSURE

In the future, upon closure of the HBRP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the HBRP 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.

AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the HBRP can be built and operated in compliance with all applicable noise and vibration LORS, and in a manner that will cause no significant adverse noise impacts on sensitive receptors. With the adoption of the conditions of certification proposed below, noise from construction and operation of the project would be limited to levels that would produce no significant adverse noise impacts, 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 three-quarter mile of the site, 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 the HBRP, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; 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 3-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 operation of the project will not cause noise levels due to full load plant operation during the quietest four hours of the nighttime to exceed an average of 49 dBA L_{eq} measured at monitoring location M1 in the community of King Salmon, an average of 47 dBA L_{eq} measured at monitoring location M3 on Humboldt Hill, or an average of 44 dBA L_{eq} at monitoring location M4 at the Sea View Mobile Estates. No new pure-tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

The 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 residential locations to determine the presence of pure tones or other dominant sources of plant noise.

- A. When the project first achieves a sustained output of 95 percent or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring locations M1, M3 and M4, or at closer locations acceptable to the CPM. This survey shall be performed during power plant full load operation or some other level of operation deemed feasible and acceptable to the CPM, and shall also include measurement of one-third octave band sound pressure levels to determine whether new pure-tone noise components have been caused by the project.
- B. If the results from the noise survey indicate that the power plant average noise level (L_{eq}) at any affected receptor site exceeds the above value, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.
- 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 95 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.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project first achieving a sustained output of 95 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.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Any day	7 a.m. to 8 p.m.
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Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Humboldt Bay Repowering Project (06-AFC-7)		
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

CEC 2006b — California Energy Commission/J. Kessler (tn: 38581). Staff's Data Requests 1-57 dated 12/8/2007.

CH2MHILL 2007a — CH2MHill/D. Davy (tn: 38912). Applicant's Responses to CEC Staff's Data Requests 1-57. 1/12/2007.

Humboldt (Humboldt County) 1984 — Humboldt County General Plan. Adopted December 10, 1984.

Humboldt (Humboldt County) 2000 — Humboldt County Zoning Regulation. Adopted June 6, 2000.

PG&E (Pacific Gas and Electric Company) 2006a — PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC Vol. 1 & 2. 9/29/2006.

PG&E 2007b – Humboldt Bay Repowering Project (tn: 43660). PG&E's Initial Comments on the PSA for the HBRP as transmitted by Galati/Blek LLP, counsel for PG&E. 12/7/2007. Rec'd 12/7/2007.

NOISE AND VIBRATION 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 and Vibration Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise and Vibration Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise and Vibration 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 and Vibration Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970)

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

Noise and Vibration Table A3 Addition of Decibel Values	
When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

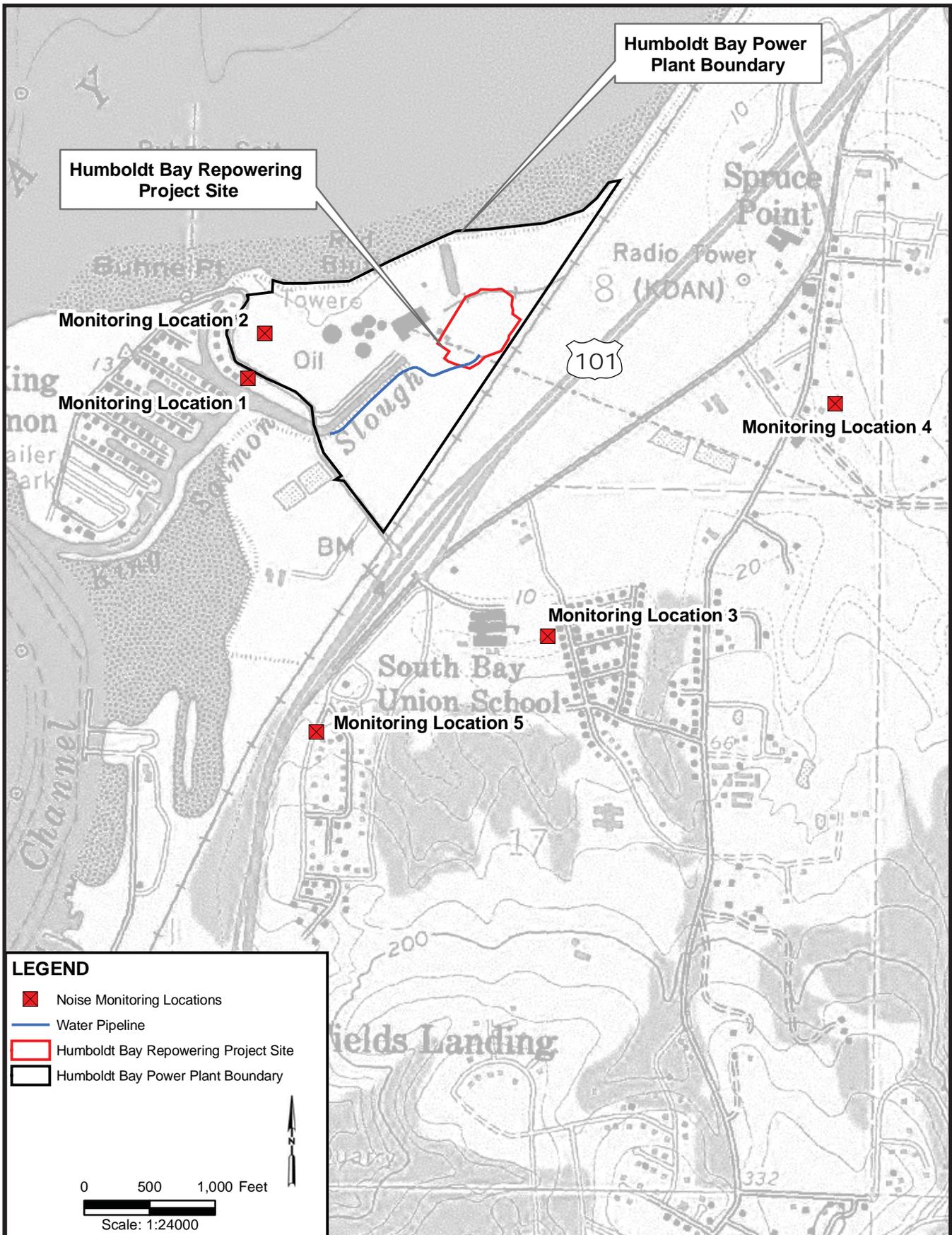
OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

**Noise and Vibration Table A4
OSHA Worker Noise Exposure Standards**

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.95

NOISE AND VIBRATION - FIGURE 1
Humboldt Bay Repowering Project - Noise Monitoring Locations



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2008
SOURCE: 06 - AFC - 7 - Figure 8.7-1

PUBLIC HEALTH

Testimony of Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the proposed Humboldt Bay Repowering Project. The ten Wärtsilä internal combustion engines driving the generators would normally use fuel consisting of natural gas with a diesel pilot. However, the power plant would use 100 percent diesel fuel in the event natural gas supplies were curtailed or interrupted. Consistent with past practices, staff and the applicant relied on information found in the California Air Resources Board Toxic Emission Factors (CATEF) database for the rate of emissions of toxic air contaminants from the ten engines. Air dispersion models approved by both the United States and California Environmental Protection Agencies (U.S. EPA and Cal-EPA) were used to estimate the airborne concentration of toxic air contaminants that would occur in the vicinity of the project. The air dispersion modeling results were then used to conduct a human health risk assessment to determine the potential for a significant human health hazard resulting from either an acute (short-term), chronic (long-term) non-cancer health impacts and the risk of cancer.

Because of concerns identified by staff regarding the potential cancer risk associated with diesel use by the project as originally proposed, the applicant proposed several project modifications that reduced the health risks to below levels of significance. These modifications included raising the exhaust stack heights to improve air dispersion characteristics and reducing by the hours of operation when using only diesel fuel. The applicant also found that its assumptions regarding operation in diesel mode for performing annual emission testing could be less than originally proposed and reduced the testing requirements. In addition, the applicant provided evidence that diesel particulate matter - the major contributor to health risks - would be reduced by the proposed oxidation catalyst treatment of exhaust from the engines.

Staff found that the applicant's air dispersion modeling and health risk assessment methodology are consistent with the Cal-EPA Office of Environmental Health Hazard Assessment guidance for the preparation of human health risk assessments when complex (elevated) terrain is present and accepts the applicant's results. Therefore, staff and the applicant have concluded that the project as currently proposed would not result in a significant human health risk or hazard. No acute or chronic non-cancer hazard was found to exist due to emissions when using natural gas or diesel fuel. The potential cancer risk was estimated by the applicant to be 9.8 in one million, which is less than the level of significance (10 excess cancers in one million with the use of Toxics-Best Available Control Technology -- T-BACT).

With the implementation of appropriate mitigation measures identified by the applicant, and with the adoption of staff's proposed conditions of certification, staff concludes that the risk of cancer is less than significant. Staff also concludes that no acute (short-term) or chronic (long-term) non-cancer health impacts would be expected to occur to any members of the public including low income and minority populations.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if toxic emissions from the proposed Humboldt Bay Repowering Project (HBRP) would have the potential to cause significant adverse public health impacts or violate standards for public health protection. If potentially significant health impacts are identified, staff evaluates mitigation measures that could reduce such impacts to less than significant levels.

Although staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this PSA, **Public Health Appendix A** at the end of this section provides information on the health effects of such pollutants. Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

LAWS, ORDINANCES, REGULATIONS, 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 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.”
CA Health & Safety Code §40001	Prohibits emissions and other discharges (such as smoke and odors) from specific sources of air pollution in excess of specified levels.
CARB Air Toxics Control Measure (ATCM) for Compression Ignition Nonroad Engines PRC Title 17 section 93115	Regulates potential cancer risk and noncarcinogenic chronic health hazards of compression ignition nonroad engines.
Health and Safety Code 25249.5 et seq	These regulations implement Proposition 65, the statute that requires that notice be given to the public if exposure to chemicals known to cause cancer or reproductive toxicity exceed threshold levels.
Health and Safety Code Sections 44360 to 4366 (Air Toxics “Hot Spots” Information and Assessment Act—AB 2588)	Requires the preparation of a human health risk assessment that addresses public exposure to toxic air contaminants emitted from stationary sources and requires notification to the public and risk reduction measures identified by the local air district.
Local	none

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 emissions plume from a facility may affect elevated areas before lower terrain areas, due to 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 influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination. Surrounding land uses to the HBRP include rural residential, port-related industrial, agricultural, and recreational uses (PG&E 2006a, Section 1.1).

SITE AND VICINITY DESCRIPTION

The 5.4-acre HBRP site is within 143 acres owned by Pacific Gas and Electric Company (PG&E), in the unincorporated area of Humboldt County. The proposed HBRP site is situated on property that houses the existing Humboldt Bay Power Plant. The site is located on Buhne Point, which is a small peninsula along Humboldt Bay. The City of Eureka is three miles north of the HBRP site and is the largest city in Humboldt County. There are several small residential communities within five miles of the HBRP site, including King Salmon, Humboldt Hill, and Fields Landing.

There are two sensitive receptors within a one-mile radius of the HBRP: (1) The South Bay Elementary School at 6077 Loma Avenue, Eureka, is within a half-mile; and (2) a senior home, the Sun Bridge Seaview Care Center, 6400 Purdue Drive, Eureka, is within a mile. Both are to the southeast of the project site. Two churches are within one mile northeast and south of the project site. These are the Redwood Christian Center, 6000 Humboldt Hill Road, Eureka, and the Calvary Community Church, 510 South Bay Depot Road, Fields Landing. A summary of sensitive receptors within a six-mile radius may be found in Appendix 8.9A of the AFC.

The terrain in the vicinity of the Humboldt Bay Power Plant rises rapidly from the bay on the north side to an elevation of approximately 69 feet mean lower low water (MLLW) at Buhne Point peninsula. Terrain to the north and east of the site is generally flat. To the south and east, the terrain rises rapidly, forming Humboldt Hill, which reaches an elevation of over 500 feet within two miles of the project and is the site of several small neighborhoods. Humboldt County is mostly mountainous except for the level plain that surrounds Humboldt Bay. The coastal hills surrounding Humboldt Bay greatly modify the rainfall and temperatures of the region by creating a rain shadow and sheltering the region from the brunt of the heavier rainfall and temperature extremes (PG&E 2006a, Section 8.1.1.1).

CLIMATE AND 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 be increased.

The overall climate at the project site is dominated by the semi-permanent eastern Pacific high pressure system centered off the coast of California. In the summer, the high pressure system moves to its northernmost position, which results in strong northwesterly flows and light precipitation. In the winter, the high pressure system moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. As winter storms move in from the Pacific and Gulf of Alaska, the prefrontal winds are generally from the southeast to southwest, effectively directing exhaust plumes away from residences and out towards the bay and ocean. Over the Humboldt Bay area, the hills generally deflect these winds south to southeast. After frontal passage, the winds are generally from the north to northwest. During the rainy season, generally November through March, Eureka receives 75 percent of its average rainfall, with most of the rain falling during December and January. The average annual rainfall over the 100-year period of record is 38.87 inches. This is one of the lowest averages in northwest California and is caused by a rain shadow due to the surrounding hills and minimal uplifting along the immediate west-facing beaches. Colder, more stagnant conditions during this time of the year are conducive to the buildup of particulate matter (PM), including the formation of secondary ammonium nitrate. In addition, increased emissions from residential fireplaces and wood stoves during this time of year contribute to increased direct particulate emissions (PG&E 2006a, Section 8.1.1.2). Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD). By examining average toxic concentration levels from representative air monitoring sites in the project vicinity 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 in the United States is about 1 in 4, or 250,000 in one million.

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 toxics and associated cancer risk in the state during the past few years.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The Public Health section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone. Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- Identify the types and amounts of hazardous substances that HBRP could emit to the environment;
- Estimate worst-case concentrations of project emissions in the environment using US EPA approved air dispersion modeling;
- Estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the California Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case risks, and then using those conditions in the study. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model that predicts the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- Assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The standard risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer health 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 arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from twelve to one hundred percent of a lifetime, or from eight to seventy years (OEHHA 2003, p. 6-5). 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 (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population such as infants, the aged, and people suffering from illness or disease that makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the REL. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose 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 conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs 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 chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called “potency factors”, and established by the California Office of Environmental Health Hazard Assessment - OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions or alternative EPA-approved modeling techniques would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a “hazard index.” A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant non-cancer project-related public health impacts.

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 to determine a cancer risk significance level. Title 22, California Code of Regulations, section 12703(b) states 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 level of risk is equivalent to a cancer risk of ten in one million, or 10×10^{-6} . An important distinction 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. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by several Air Quality Management Districts (AQMD) in the state, including the two largest, the Bay Area AQMD and the South Coast AQMD. The North Coast Unified Air Quality Management District has not adopted a toxic air contaminant regulation.

Staff’s analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants and any minority or low income populations that are likely to be disproportionately affected by impacts (because these populations often have a greater incidence of pre-existing medical conditions). In order to accomplish this goal, staff utilizes the most current acceptable public health exposure levels (both acute and chronic) set by OEHHA or U.S. EPA to protect the public from the effects of airborne toxics. When a screening analysis shows 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, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce the risk to less than significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff’s **Air Quality** analysis.

Site disturbances occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust

contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by CARB as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of $5 \mu\text{g}/\text{m}^3$ and a cancer unit risk factor of $3 \times 10^{-4} (\mu\text{g}/\text{m}^3)^{-1}$ (SRP 1998, p. 6). The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by CARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based. The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, CARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

The initial construction of the HBRP is expected to last approximately 21 months, including one month of road construction, two months of site clearing and 18 months of project construction. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A dispersion modeling analysis was conducted based on these emissions. A detailed analysis of the emissions and ambient impacts is included in the **Air Quality** section of this PSA.

Impacts from exposure to diesel particulate matter (DPM) generated during project construction have also been evaluated. The carcinogenic risk due to exposure to DPM during construction activities is expected to be between approximately 5 and 8 in 1 million. These risk estimates are less than the significance level of 10 in 1 million. The area in which the risk may exceed 1 in 1 million (DPM impact greater than or equal to approximately $0.1 \mu\text{g}/\text{m}^3$) extends only about 700 meters beyond the facility fence line and does not include any residences (PG&E 2006a, Section 8.1.2.10).

The applicant estimated worst-case hourly dust emissions of 3.8 lb/day of particulate matter less than 10 microns (PM10) and .8 lb/day of particulate matter less than 2.5 microns (PM2.5). Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Staff's modeling of construction activities including impacts of fugitive dust over a 12 month period resulted in a predicted annual average concentration of $3 \mu\text{g}/\text{m}^3$ of PM10

and ~1.0 µg/m³ PM_{2.5} at any location (see staff **Air Quality** section of this PSA). Mitigation measures are proposed by both the applicant and Air Quality staff to reduce the maximum calculated PM₁₀ as well as PM_{2.5} concentrations. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in 90 percent reductions of emissions.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Air Quality staff recommends Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92 percent. Such filters would reduce diesel emissions during construction and reduce any potential for significant health impacts. (See Condition of Certification AQ-SC5 for staff's proposal to control particulate matter.)

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed HBRP site include ten (10) reciprocating internal combustion engines, an emergency diesel generator, and a diesel fire pump engine.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 8.1A-8 of the AFC lists non-criteria pollutants that may be emitted from the HBRP turbines as combustion byproducts, along with their anticipated amounts (emission factors). Table 8.1A-4 lists emission rates from emergency diesel generator emissions. Table 8.1A-5 lists emission rates from diesel fire pump engine emissions. Emission factors are from the California Air Toxics Emission Factors (CATEF II) database (CARB 2001). Table 8.9-3 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include RELs, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health Table 2** lists toxic emissions and shows how each contributes to the health risk assessment. For example, the first row shows that oral exposure to acetaldehyde is not of concern, but if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

PUBLIC HEALTH Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions*

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✓	✓	
Acrolein				✓	✓
Ammonia				✓	✓
Arsenic	✓	✓	✓	✓	✓
Benzene			✓	✓	✓
1,3-Butadiene			✓	✓	
Cadmium		✓	✓	✓	
Chromium VI		✓	✓	✓	
Copper				✓	✓
Diesel Exhaust			✓	✓	
Ethylbenzene				✓	
Formaldehyde			✓	✓	✓
Hexane				✓	
Lead	✓		✓		
Mercury		✓		✓	✓
Napthalene		✓	✓	✓	
Nickel		✓	✓	✓	✓
Polynuclear Aromatic Hydrocarbons (PAHs)	✓	✓	✓	✓	
Propylene				✓	
Propylene oxide			✓	✓	✓
Toluene				✓	✓
Xylene				✓	✓
Zinc				✓	

*Source: OEHHA 2003 Appendix L

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant's screening analysis was performed using the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program with a modification described in Amended AFC Appendix 8.1-C, Section 1.2. Staff used the AERMOD/HARP model in its HRA. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which

people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above methods of assessing health effects are consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Impacts

The applicant's health risk assessment for the project, including combustion and non-combustion emissions, resulted in a maximum acute hazard index of 0.57 and a maximum chronic hazard index of 0.09. **Public Health Table 3** shows, both acute and chronic hazard indices are under the level of significance of 1.0, indicating that no short- or long-term adverse health effects are expected.

PUBLIC HEALTH Table 3
Applicant's Estimate of Operations Risk and Hazard at Point of Maximum Impact

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer Natural gas/diesel pilot	0.57	1.0	No
Acute Noncancer 100% Diesel firing for 510 hrs/year	0.11	1.0	No
Chronic Noncancer Natural gas + 510 hrs/yr diesel	0.09	1.0	No
Individual Cancer Natural gas + 510 hrs/yr diesel	9.8 in 1 million	10 in 1 million	No

Source: PG&E 2008c

As shown in **Public Health Table 3**, total worst-case individual cancer risk was calculated by the applicant to be 9.8 in one million. The calculated risk is based on the project operating normally using natural gas with a diesel pilot other than when fueled by 100% diesel for 510 hours/year combined for all ten units.

Staff conducted an independent analysis of cancer risks and acute and chronic hazards due to emissions from a combination of engines operating 510 hours/year on diesel fuel.

Staff's quantitative analysis of facility operations included the following:

- Emissions from the 10 dual-fuel reciprocating engine generators, the emergency diesel generator, and the diesel fire pump engine were included in the analysis.
- Each of the 10 dual-fuel reciprocating engines was modeled as a separate stack, 100 feet in height.
- Exposure pathways assessed in the analysis include inhalation, dermal absorption, soil ingestion and mother's milk.

Air dispersion modeling was conducted by staff using AERMOD with five years of local meteorological data. (Please refer to the **Air Quality** section of this PSA under the heading “*Modeling Methodology for HBRP*” for a more detailed discussion of the modeling protocol.) The results are presented in **Public Health Table 4**.

Public Health Table 4
Staff’s Air Dispersion Results (Chi/Q) Using AERMOD

Emission Source	Annual Chi/Q At the Point of Maximum Impact (PMI) (ug/m ³ per g/sec per facility)	Location of PMI
Internal combustion engines 10 split stacks Mode = 1G	0.67058	UTM E: 398,075 m UTM N: 4,508,575 m Elev: 89.94 m
Emergency generator	1.03922	At location shown above
Fire pump engine	0.37459	At location shown above

The emission factors used in staff’s analysis of cancer risk and chronic hazard are listed in **Public Health Table 5**. Emission factors for natural gas and diesel emissions were based on 510 hours/year of liquid fuel (diesel) firing and are presented in Applicant’s Table 8.1A-8A of Sierra Research’s Revised Health Risk Assessment (SR 2007i) . Annual facility emissions in units of tons/year are converted to units of g/sec/facility for this analysis. Emissions are given in units of pounds/year/engine for individual engines (see **Public Health Table 5**). These values are listed in units of pounds per year per engine and in units of pounds/year/facility (for all 10 engines). Emissions are then converted to units of g/sec/facility. Ground level concentrations (GLCs) at the Point of Maximum Impact (PMI) of substances emitted from the engines were determined by multiplying the g/sec/facility emission factor (the sum of emissions from all ten stacks) for each substance by the predicted airborne concentration normalized to a one gram per second emission rate (termed Chi/Q) value at the PMI. The GLC for diesel from the emergency generator and the fire pump were determined in a similar manner. The diesel GLC is the sum of the GLCs determined for the 10 engines, the emergency generator and the fire pump. The estimated average annual duration of diesel operation for various purposes has been estimated by the applicant (as stated during the January 16, 2008 PSA Workshop) to be about 45 – 60 hours/year for annual compliance testing (assuming 15 hours/engine for 3 or 4 units per year) plus the less predictable periods for natural gas curtailments and emergency (such as if the service from the natural gas supply line were to be interrupted). Initial commissioning activities (prior to commercial operation) are expected to range from about 10 – 20 hours per engine, while initial emission testing following commercial operation is expected to average 45 hours per engine.

**Public Health Table 5.
Emission Factors and Staff's Estimate of Ground Level Concentrations Used in
the Cancer Risk and Chronic Hazard Analysis
(based on fuel consisting of natural gas/diesel pilot under normal conditions and
510 hours/year of diesel fuel firing)**

	Facility Annual Emissions	Facility Annual Emissions	Ground Level Conc's At PMI
Substance	tons/yr (Table 8.1A-8A)	g/sec/facility (converted from tons/yr/facility)	ug/m ³ (g/sec x Chi/Q)
INTERNAL COMBUSTION ENGINES			
1,3-Butadiene	9.92E-01	2.86E-02	1.92E-02
Acetaldehyde	1.43E+00	4.12E-02	2.76E-02
Acrolein	1.60E-01	4.59E-03	3.08E-03
Ammonia	6.34E+01	1.83E+00	1.22E+00
Anthracene	3.22E-04	9.26E-06	6.21E-06
Benzene	5.89E-01	1.70E-02	1.14E-02
Benzo(a)anthracene	1.59E-04	4.58E-06	3.07E-06
Benzo(a)pyrene	7.30E-06	2.10E-07	1.41E-07
Benzo(b)fluoranthene	1.11E-04	3.18E-06	2.13E-06
Benzo(k)fluoranthene	2.12E-05	6.10E-07	4.09E-07
Chrysene	3.87E-05	1.11E-06	7.46E-07
Dibenz(a,h)anthracene	7.30E-06	2.10E-07	1.41E-07
Diesel PM ¹	1.42E+00	4.08E-02	2.76E-02
Ethylbenzene	1.92E-01	5.53E-03	3.71E-03
Formaldehyde	1.06E+01	3.06E-01	2.05E-01
Hexane	3.06E+00	8.80E-02	5.90E-02
Indeno(1,2,3-cd)pyrene	1.94E-05	5.58E-07	3.74E-07
Naphthalene	6.79E-02	1.95E-03	1.31E-03
Propylene	1.45E+01	4.19E-01	2.81E-01
Toluene	6.46E-01	1.86E-02	1.25E-02
Xylene (Total)	1.75E+00	5.03E-02	3.37E-02
DIESEL ENGINES			
Diesel PM from Emergency generator	6.2E-03	1.79E-04	1.86E-04
Diesel PM from Fire pump	1.6E-03	4.61E-05	1.73E-05

¹ Total GLC for Diesel PM at the PMI is equivalent to 2.74E-02 ug/m³ from the internal combustion engines plus 1.86E-04 ug/m³ from the emergency diesel generator plus 1.73E-05 ug/m³ from the diesel fire pump, or 2.76E-02 ug/m³.

GLCs were then entered into the HARP program according to the protocol outlined in Topic 8 of the HARP How-to Guide (*"How to Perform Health Analyses Using a Ground Level Concentration"*). Cancer risk and chronic hazard index were determined under the Derived (OEHHA) and Average Point risk assessment methods. Results of staff's analysis are summarized in **Public Health Table 6** and are compared to the results

presented in the applicant's February 5, 2008 letter. Substance-specific risks are presented in **Public Health Table 7**. All cancer risks are calculated under the 70-year residential exposure scenario.

**Public Health Table 6
Results of Staff's Analysis and the Applicant's Analysis for Cancer Risk and Chronic Hazard**

Conditions/ Receptor	<u>Staff's Analysis</u>		<u>Applicant's Analysis</u>	
	AERMOD dispersion modeling and HARP risk analysis		AERMOD & CTSCREEN dispersion modeling and HARP risk analysis	
	Cancer Risk (per million)	Chronic HI	Cancer Risk (per million)	Chronic HI
510 hrs/yr diesel PMI	18	0.14	9.8	0.09

Discussion

Staff has analyzed potential public health risks associated with construction and operation of HBRP. Using the information currently available on the emission factors for the toxic air contaminants that would be emitted from the ten Wärtsilä engines when burning diesel fuel, staff's initial modeling results concluded that the risk of cancer would be above the level of significance (10 excess cancers in one million). This modeling also concluded that no acute (short-term) or chronic (long-term) non-cancer health impacts would be expected to occur to any members of the public including low income and minority populations.

Staff used a health-protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. And although staff believes that the lack of accurate emission factors for the Wärtsilä engines when using diesel fuel contributes greatly to the uncertainty of its health risk assessment, the applicant used the same emission factors yet arrived at a different theoretical maximum cancer risk that is ~50 percent lower. The difference between the applicant's and staff's results is most likely due to the different air dispersion models used. The applicant used both the AERMOD and CTSCREEN models while staff used the AERMOD model. Both models are EPA-approved and are approved for use by OEHHA in human health risk assessments when complex (elevated) terrain is present. Staff does not believe that the use of AERMOD alone for elevated terrain is a simplification of assumptions and treatment of elevated terrain, as suggested by the applicant. Nor does staff believe that the applicant's use of both AERMOD and the screening model CTSCREEN is less simple or more sophisticated. However, staff reviewed the applicant's use of the CTSCREEN model and found that it was used and applied correctly. Therefore, given that neither air dispersion model has a significant advantage over the other and thus neither is more precise than the other, staff agrees to

accept the applicant's modeling and concludes that the risk of cancer is below the level of significance. However, because the applicant's results are based upon in part a

Public Health Table 7
Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances

Risk per million	510 hrs/yr diesel	
	Derived (OEHHA) Method	Average Point Estimate
<u>Natural Gas Components</u>		
Formaldehyde	1.6	1.1
Benzo(a)pyrene	0.0056	0.0014
Dibenz(a,h)anthracene	0.0020	0.00049
Benzo(a)anthracene	0.012	0.0025
Benzene	0.43	0.30
Acetaldehyde	0.10	0.072
Naphthalene	0.059	0.041
Indeno(1,2,3-cd)pyrene	0.0015	0.00030
Benzo(b)fluoranthene	0.0085	0.0017
Benzo(k)fluoranthene	0.0016	0.00033
Chrysene	0.00030	0.000060
1,3-Butadiene	4.3	3.0
Risk due to Natural Gas from Wartsila Engines	6.6	4.5
Risk due to Diesel Particulate Matter from Wartsila Engines	11.3	7.8
Risk due to Diesel Particulate Matter from Emergency Generator	0.077	0.053
Risk due to Diesel Particulate Matter from Fire Pump	0.0071	0.0049
Total Risk (all sources)	18.0	12.4

reduction in emissions of diesel particulate matter due to the oxidative catalyst (a "mitigation" method) and to restricted hours of using diesel fuel, staff proposes conditions of certification that would restrict the use of diesel fuel to 510 hours per year (total from all 10 engines) and when routine discretionary testing could occur. These conditions would also require mitigation monitoring to ensure that the oxidative catalyst does indeed reduce emissions of DPM. Condition of Certification **PUBLIC HEALTH-1** would restrict operations of the Wartsila engines when utilizing diesel fuel to 510 hours per year until the mitigation monitoring (a source test) is performed as per **PUBLIC**

HEALTH-2. Additionally, **PUBLIC HEALTH-1** allows some or all routine discretionary source testing hours to not be counted towards the annual site limit of 510 hours if prevailing winds during testing are from the south or southeast because during periods when the wind is blowing offshore, it would disperse the emissions over the ocean and public exposure on land would not occur. However, given the proximity of the South Bay Elementary School, the condition prohibits diesel source tests when the school is in regular or summer session.

When the source tests have been conducted, the applicant may petition the CPM to change the number of hours diesel fuel may be used so long as the health risk remains below 10 in one million and the acute and chronic hazard indices remain less than 1.0. Or the CPM may reduce the hours of operation on diesel fuel if the source test shows that the risk or hazard is greater than the level of significance. **PUBLIC HEALTH-2** would require that a source test of the engines when using diesel fuel be conducted and the results of that source test be used to prepare a new health risk assessment.

CUMULATIVE IMPACTS AND MITIGATION

The maximum cancer risk for emissions from the HBRP (calculated by staff) is less than 10 in one million at a location east of the facility boundary. The maximum impact location occurs where pollutant concentrations from the HBRP would theoretically be the highest. At this location, emissions when diesel fuel is used would cause a significant change in lifetime risk to the public. Modeled facility-related residential risks would be lower at more distant locations but could also be above the level of significance at many of these locations. However, staff concludes that HBRP's contribution to a cumulative public health risk is less than significant with the adoption of staff's proposed public health conditions of certification.

The worst-case long-term (chronic) and short-term (acute) noncancer health impacts from HBRP as calculated by staff (0.14 and 0.11, respectively) are below the significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any incremental or cumulative health impacts to be the result of emissions from the proposed power plant. Long-term hazard would also be lower at all other locations.

The regional cumulative air quality impacts analysis presented in the Air Quality section of this PSA demonstrates that the cumulative impacts of the project would be no different than the direct impacts of the project itself.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies regarding public health issues.

Several public comments were made at staff workshops on health matters as follows:

Comment 1:

A representative of the school district voiced concern about the impact on children of diesel emissions during periods when diesel fuel would be used.

Response 1:

The restriction on the number of hours of diesel fuel use and the requirement to avoid annual compliance testing when school is in session at South Bay Elementary, both as recommended in Condition of Certification **PUBLIC HEALTH-1**, will ensure that the risk and hazard posed to school children and residents in the area will be less than significant.

Comment 2:

At the January 2008 workshop, Mr. Ed Cramer, a resident of Humboldt Hill, informed staff that his mother had been tracking the frequency of mortalities among residents of Humboldt Hill and had recorded 58 deaths, primarily from cancer. Mr. Cramer indicated that many of the occurrences were people who seemed to die prematurely.

Response 2:

Staff provided Mr. Kramer with the name of a physician who heads the Epidemiological Investigations Branch in the California Department of Public Health who could investigate this matter and determine if the number of cancer cases and deaths were above that expected in the general population. In addition, staff wishes to reiterate in this staff assessment that the project, as proposed by the applicant and with the mitigation proposed by both the applicant and staff, will not cause a significant risk of cancer incidence in the neighborhood.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the HBRP would be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of Public Health.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of Humboldt Bay Repowering Project (HBRP). Using information found in the California Air Resources Board Toxic Emission Factors (CATEF) database for the toxic air contaminants that would be emitted from the ten Wärtsilä engines when burning diesel fuel and using two of the EPA-approved modeling approaches (AERMOD and CTSCREEN along with the Air Resources Board Hotspots Analysis and Reporting Program (HARP), the applicant has estimated the potential cancer risk to be 9.8 in one million. This is less than the level of significance (10 excess cancers in one million with the use of Toxics-Best Available Control Technology -- T-BACT). The applicant has proposed to use oxidative catalysts to reduce the emissions of toxic air contaminants and the levels of diesel particulate matter. Staff found that the applicant's health risk assessment approach is consistent with U.S. EPA and Cal/EPA Office of Environmental Health Hazard Assessment guidance for the preparation of human health risk assessments when complex (elevated) terrain is present. With the appropriate mitigation measures identified by the applicant, staff accepts the applicant's modeling results and concludes that the risk of cancer is less than significant. Staff also

concludes that no acute (short-term) or chronic (long-term) non-cancer health impacts would be expected to occur to any members of the public including low income and minority populations.

Because the conclusions for avoiding a significant adverse impact are dependent on a reduction in emissions of diesel particulate matter due to the oxidative catalyst (a “mitigation” method) and to restricted hours of using diesel fuel, staff proposes two conditions of certification. **PUBLIC HEALTH-1** would restrict operations of the Wartsila engines when on diesel fuel to 510 hours per year (total from all 10 engines) until the mitigation monitoring (a source test) is performed as per **PUBLIC HEALTH-2**. At that time, the applicant may petition the CPM to increase the number of hours diesel fuel may be used so long as the health risk remains below 10 in one million and the acute and chronic hazard indices remain less than 1.0. Conversely, the CPM may reduce the hours of operation on diesel fuel if the source test shows that the risk or hazard is greater than the level of significance. **PUBLIC HEALTH-2** would require that a source test of the engines when using diesel fuel be conducted and the results of that source test be used to prepare a new health risk assessment. **PUBLIC HEALTH-1** would also require that annual emission compliance testing (the discretionary period of diesel operation) be conducted when South Bay Elementary School is not in session.

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall not operate the Wartsila engines on diesel fuel for a period exceeding 510 hours per year total for all 10 engines. Once the health risk assessment prepared pursuant to **PUBLIC HEALTH-2** is approved by the CPM, the CPM will notify the project owner of the total number of engine hours on diesel fuel the project may operate annually, as determined by what the health risk assessment shows as the maximum number of hours that achieve a theoretical maximum cancer risk at the point of maximum impact of less than 10 in one million and acute and chronic Hazard Indices of less than 1.0. The 510 total hours of operation for all engines using diesel fuel, and any subsequently adjusted number of hours, shall not include time needed for compliance testing required as per condition **AQ-167** if the testing is conducted when the wind direction is out of the east or south east. Compliance testing required per condition **AQ-167** shall also not occur between 7:30 am and 3:30 pm on days when the South Bay Elementary School is in session.

Verification: The project owner shall provide hourly logs of diesel fuel usage to the CPM in the Annual Compliance Report Summary. The log shall include the unit number, duration, purpose (annual compliance testing, natural gas curtailment or emergency), wind direction, and whether South Bay Elementary School is in session.

PUBLIC HEALTH-2 The project owner shall provide the results of a source test using diesel fuel on the number of engine exhaust stacks required below and a human health risk assessment (HRA) to the Compliance Project Manager (CPM). The source test and human health risk assessment shall be conducted according to protocols reviewed and commented on by the North Coast Unified Air Quality Management District and reviewed and approved by

the CPM, and shall be submitted to the CPM not less than 60 days after the date of starting commercial operations. The source test shall be consistent with and conducted at the same time as testing required under Condition of Certification **AQ-167**. The source test and HRA shall include the quantitative analysis and assessment of the following toxic air contaminants: diesel particulate matter in the exhaust stream both before and after the oxidative catalyst, acetaldehyde, acrolein, benzene, 1,3-butadiene, ethyl benzene, formaldehyde, propylene, toluene, and xylenes.

The number of engine exhaust stacks to be sampled shall be determined in the following manner:

1. Four (4) engines chosen randomly shall be tested first. If stack testing results for each contaminant described above on all four engines falls within two standard deviations of the arithmetic mean of each individual contaminant, no further engines need be tested.
2. If any contaminants measured in the stack test fall outside two standard deviations of the arithmetic mean for that contaminant, three (3) engines chosen randomly shall be tested for all contaminants that fell outside two standard deviations of the arithmetic mean. If stack testing results for each contaminant described above on all seven engines tested fall within two standard deviations of the arithmetic mean of each individual contaminant, no further engines need be tested. The project owner may request relief from this and further stack testing by providing the CPM a written request with documentation explaining that further testing would not result in a significant change in the health risk assessment results.
3. This process shall be continued until either the results for all engines tested fall within two standard deviations of the arithmetic mean of each individual contaminant for all engines tested or all ten (10) engines are tested.
4. The HRA described above shall be based on all data produced for all engines tested under this protocol.

This source testing shall be repeated three years after the initial source test and again after 10 years of commencing commercial operations.

Verification: Not less than sixty (60) days after the start of commercial operations, the project owner shall provide a copy of the source test and human health risk assessment protocols to the NCUAQMD for review and comment and to the CPM for review and approval. Not less than thirty (30) days after each group of source tests has been completed, the project owner shall provide the source test results to the NCUAQMD and the CPM. When the project owner has fulfilled the requirement for testing as described above, the project owner shall submit all test results and the HRA to the NCUAQMD for review and comment and to the CPM for approval within sixty (60) days of the date of the last test or not later than 270 days after the date of starting commercial operations, whichever is sooner.

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SOCIOECONOMICS

Testimony of Joseph Diamond Ph. D.

SUMMARY OF CONCLUSIONS

Staff has determined that the 163 MW Humboldt Bay Repowering Project (HBRP) would not cause a significant adverse direct, indirect or cumulative socioeconomic impact on the area's housing, schools, parks and recreation, police, emergency services, and hospitals. Gross public benefits from the project include capital costs, construction and operation payroll, property taxes and sales taxes, and the value of purchased materials and supplies.

INTRODUCTION

Staff's socioeconomic impact analysis evaluates the project induced changes on community services and/or infrastructure, and related community issues such as Environmental Justice (EJ). Staff discusses the estimated beneficial impacts of the construction and operation of the HBRP and related economic impacts.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

CALIFORNIA GOVERNMENT CODE, SECTIONS 65996-65997

These sections include provisions for school district levies against development projects. As Amended by Senate Bill (SB) 50 (Stats. 1998, ch. 407, sec. 23), these sections state that except for those fees established under Education Code 17620, public agencies at the state level may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

SETTING

The affected area for socioeconomic as defined by the applicant in the HBRP Application for Certification (AFC) and considered by staff is expected to be in the unincorporated area of Humboldt County near the City of Eureka.

Research shows that construction workers will commute as much as two hours one-way from their communities rather than relocate (Electric Power Research Institute 1982). Staff agrees with the applicant's conclusion that during construction one-third of the workers would potentially be drawn from Humboldt County. About two-thirds of the construction labor force would be from other parts of California and the Western US (PG&E 2006a). Therefore, staff utilized this labor market area for its evaluation of construction worker availability and community services and infrastructure impacts from construction of the HBRP.

Humboldt County was used as the study area by staff in identifying fiscal and non-fiscal (private sector) benefits and other potential socioeconomic impacts from the HBRP.

DEMOGRAPHIC SCREENING

The purpose of an environmental justice screening analysis is to determine whether a below poverty level and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the demographic screening in accordance with the “Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analysis” (Guidance Document) (EPA 1998). People of color populations, as defined by this Guidance Document, are identified where either:

- The minority population of the affected area is greater than fifty percent of the affected area’s general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.
- One or more census blocks in the affected area have a minority population greater than fifty percent.

In 1997, the President’s Council on Environmental Quality issued Environmental Justice Guidance that defines minority as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census’s Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).

Staff reviewed Census 2000 information that shows the minority population by census block (the smallest geographic unit for which the Census Bureau collects and tabulates data) is 18.29 percent and 17.53 percent which is less than staff’s threshold of greater than fifty percent within a six-mile and one-mile radius of the proposed HBRP (See **SOCIOECONOMICS Figure 1**). Census 2000 by census block group (a combination of census blocks and subdivision of a census tract) information shows that the below poverty population is 20.4 percent within the six-mile radius and 16.89 percent within the one-mile radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

ASSESSMENT OF IMPACTS

Staff reviewed the HBRP socioeconomics section of the AFC and other socioeconomic data. Staff used the socioeconomic data provided and referenced from various governmental agencies, trade associations and its own independent analysis to form the following socioeconomic analysis and conclusions.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may have a significant effect on population, housing and public services if the project will:

- induce substantial population growth in an area, either directly or indirectly;

- displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- adversely impact acceptable levels of service for fire and police protection, schools, parks and recreation, and other public facilities.

A socioeconomic analysis looks at beneficial impacts on local finances from property and sales taxes as well as potential adverse impacts on public services. In order to determine if a project would have any significant impacts, staff analyzes whether the current status of these community services and capacities can absorb the project related impacts in each of these areas. If the project's impacts could appreciably strain or degrade these services, staff considers this to be a significant adverse impact and would propose mitigation. A project's property taxes, sales tax or local school impact fees or development fees can help local governments to augment public services required to meet project needs.

In this analysis staff used fixed percentage criteria for environmental justice in evaluating potential impacts. For environmental justice, staff uses a threshold of greater than 50 percent for minority/below poverty population as a subset of the total population in the local area. Criteria for subject areas such as utilities, fire protection, water use and wastewater disposal are in the **Water Resources, Reliability, Safety and Fire Protection**, and **Waste Management** sections of this Final Staff Assessment (FSA). Education impacts are based on subjective professional judgement or determined with input from local and state agencies but are ultimately moot, as described later. Impacts on housing, parks and recreation, medical services, law enforcement, and cumulative impacts are based on subjective professional judgments or input from local and state agencies. Substantial employment of people who come from regions outside the study area has the potential to result in significant adverse socioeconomic impacts.

DIRECT/INDIRECT/INDUCED IMPACTS

Staff reviewed the HBRP AFC, Vol. I, Socioeconomics section (PG&E 2006a). Based on staff's use of the socioeconomic data provided and referenced from governmental agencies, trade associations and staff's independent analysis, staff completed the following socioeconomic analysis and derived the following conclusions.

Population and Employment

The 2000 U.S. Census shows that California had a total population of 33,871,648, with a minority (non-white and white-Hispanic) population of 18,054,858 (53.3 percent), and a white population of 15,816,790 or (46.7 percent). Humboldt County had a total population of 126,518 with 103,230 or 81.6 white non-hispanic (California Department of Finance 2000 and PG&E 2006a). By 2010, projections show a California population of 39,246,767 and 133,136 residents in Humboldt County (California Department of Finance 2000 and PG&E 2006a).

The unemployment rate for Humboldt County was 5.3 percent in August 2006 (not seasonally adjusted). This is not full employment for Humboldt County but close. Full employment has been defined as approximately 4 to 5 percent unememployment over

the last few decades. For California, the unemployment rate was 4.9 percent in August 2006 (State of California 2006).

Staff believes that construction workers travel to a job site on a daily basis that may involve as much as a one or two-hour commute. **SOCIOECONOMICS Table 1** shows that available labor, by skill, in Del Norte, Humboldt, Lake, and Mendocino counties, with annual averages for 2002 and a projection for 2012, is adequate when compared to the HBRP needs. It is largely (except for Lake County) within a two hour commute to the HBRP site, or construction workers can relocate to the site during the week and return to their families on the weekend. The applicant used the Humboldt and Del Norte Building Trade Council and information from the California Employment Development Division (EDD) presented in AFC Table 8.10-12 Available Labor Skill in Humboldt County, 2002 to 2012 (which is similar to staff's **SOCIOECONOMICS Table 1**) and concluded that the workforce in Humboldt County would be adequate to fulfill HBRP's labor requirements for construction (PG&E 2006a).

SOCIOECONOMICS Table 1
Available Labor in The North Coast Region (Del Norte, Humboldt, Lake, and Mendocino Counties) by Skill for Construction and Operations

Occupational Title	Annual Averages		Maximum Needed Per Month By HBRP
	2002	2012	
Carpenters	820	950	20
Cement Masons & Concrete Finishers	180	240	25
Painters, Construction & Maintenance	310	400	5
Sheet Metal Workers	110	150	10
Electricians	190	250	55
Iron Workers	N/AV*	N/A	20
Industrial Truck & Tractor Operators	660	730	2
Helpers, Laborers	160	190	55
Plumbers, Pipefitters, & Steamfitters	190	260	50
Labor	N/AV	N/AV	55
Plant & System Operators	460	550	18
Millwright	180	200	35
Teamster (Truck Drivers, Heavy and Tractor Trailer)	1,170	1,440	2
Insulation Worker	N/AV	N/AV	10

Source: PG&E 2006a and CAEDD 2007.

* Not Available (N/AV)

Project construction (power generation facility including the natural gas pipeline) is expected to occur over an 18-month period. The greatest number of construction workers (peak) would occur in the 11th and 12th month of construction. The number of construction workers would range from about four in the last month of construction to 236 workers at peak construction. The HBRP's peak construction activity (236 workers) represents about ten percent of the North Coast Region's labor market construction workforce of 2,300 (CAEDD 2006). There would be an average of 101 workers per month during construction.

During operation of the project, about 17 workers would be needed to maintain and operate the project. The operational workers are expected to come from Humboldt County. Staff estimates that this small increase in employment would have little effect on employment rates.

While it is anticipated that there is sufficient available labor supply to construct the HBRP from the North Coast Labor Region comprised of four counties as shown in **SOCIOECONOMICS Table 1** or Humboldt County as discussed earlier, the applicant has stated that about one-third of the labor force would come from areas nearby Eureka, Humboldt County, and surrounding areas. Two-thirds will be imported from other California and Western U.S. areas. This is a conservative scenario which staff views as useful and accepts. The operations workforce would come entirely from Humboldt County (PG&E 2006a).

The Impact Analysis for Planning (IMPLAN) model (an input-output model), used by the applicant to estimate employment and income impacts from the HBRP on the study area is acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects in California and the U.S. IMPLAN is a disaggregated type of model that divides the (regional) economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). Social Accounting Matrix (SAM)¹ multipliers were used for the applicant's economic impact analysis. These SAM multipliers are similar to Type II² multipliers because they also both include the indirect and induced effects (secondary impacts). IMPLAN multipliers were used to calculate direct, indirect, and induced jobs and expenditures in the regional economy.

The IMPLAN runs estimate total construction employment at 185 total jobs (84 secondary jobs) based on an average of 101 project-related construction jobs. The HBRP annual construction income of \$6.35 million would result in positive or beneficial secondary impacts of approximately \$2.35 million and positive or beneficial total impacts of approximately \$8.71 million. As reported by the applicant, the HBRP's construction employment multiplier is approximately 1.8 and the construction income multiplier is approximately 1.4

For HBRP operations, 17 direct operations jobs and 49 jobs as secondary impacts yield an estimated total of 66 jobs. \$2,100,000 annual operations expenditures yield a positive or beneficial secondary impact of approximately \$1,495,820 and a total income impact of approximately \$3,595,820 (PG&E 2006a and CH2MHILL 2007a). As reported by the applicant, the HBRP's operation employment multiplier is approximately 3.9 and the income multiplier is approximately 1.7.

¹ Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting and Type II multiplier effects (direct, indirect, and induced).

² A Type I multiplier is the ratio of the direct plus indirect change to the direct change resulting from a unit increase in final demand for any given sector. A Type II multiplier is the ratio of the direct, indirect, and induced change to the direct change resulting from a unit increase in final demand. The Type II multiplier takes into account the HBRP repercussionary effects of secondary rounds of consumer spending in addition to the direct and indirect inter-industry effects (Richardson 1972). Both multipliers can be of an income or employment type. Indirect changes are production changes in industries supplying the original industry (backward linkages). Induced changes are changes in regional household spending levels caused by regional employment impacts.

Staff finds the economic impact analysis reasonably consistent with the economic literature cited by many economists (Moss et al. 1994 and Mulkey et al. 2000) and therefore finds these projected beneficial economic impacts close enough to the benchmarks to be considered reasonable.

Economic changes on a net basis (the new HBRP replaces the old Humboldt Bay Power Plant (HBPP), which is Units 1 and 2) were provided by the applicant in response to staff's data request in Table DR36-2 (CH2MHILL 2007a). Some of the following net negative impacts are noted:

- The operational workforce is reduced by 27; secondary impacts within Humboldt County are reduced by 45 workers.
- Total expenditures for Operation and Maintenance drops by \$8,015,300.
- Annual local operations expenditures for Operation and Maintenance are reduced by \$4,700,000.
- Operational payroll drops by \$3,335,300 (CH2MHILL 2007a).

Net annual property taxes are estimated by staff at approximately \$2,559,916 (PG&E 2006c and PG&E 2007a).

It should be noted that the HBPP will shut down after the HBRP is operating and on-line but the workforce reduction would be phased in over several years (PG&E 2006a). A net calculation is for a point in time which may vary by indicator. The HBRP would be in operation for approximately 30 years or for the long-run.

Overall, the reduction of 27 workers represents less than one percent of the Humboldt County, August 2006 (not seasonally adjusted), labor force of 60,000 (State of California 2006).

Fiscal and Non-Fiscal Effects

Some fiscal (having to do with the public treasury) impacts (all dollars are 2006 for construction and 2009 for operations (PG&E 2006a and c)) of the HBRP include:

- Property taxes: \$2.8 million annually
- Construction total local sales tax: \$5.8 million
- Operation sales tax: \$377,000 annually
- School Impact Fee: None

Non-fiscal (private sector) impacts include:

- Total capital costs are estimated at \$250 million.
- The construction payroll is \$30 million over eighteen months. The operations payroll is \$2.1 million.

- Approximately \$2.6 million would be spent locally on construction materials and supplies and \$150,000 each operation year of the HBRP for locally purchased materials as part of an operation and maintenance budget within Humboldt County (PG&E 2006a&c).

Housing

As of January 1, 2006, there were approximately 58,739 housing units in Humboldt County. The vacancy rate for this housing averages approximately 8.35 percent (4,905 housing units) for Humboldt County which includes single family, multi-family and mobile homes. There were 12,162 units in the City of Eureka with a vacancy rate of 5.82 percent (PG&E 2006a).

In addition, for the non-local construction workers who relocate, there are 35 large hotel and motels with more than 1,500 rooms in the Eureka area (PG&E 2006a). These hotel/motels have an occupancy rate of 90 percent in July and August (150 available rooms) and from 50-60 percent (600 to 750 available rooms) in the winter (Smither 2006). Thirty hotel/motels are available in Crescent City (Cable 2008). Crescent City is about one and one half hours from the HBRP site which is within a two-hour one-way commute construction workers are willing to make. Peak construction is planned for summer or fall 2009. About 157 non-local workers may temporarily relocate to Humboldt County or the surrounding area during this two-month period and staff concludes that housing resources would be adequate.

Again, 33 percent of the average construction workforce or 34 workers are expected to come from Humboldt County and neighboring counties and 66 percent or 67 construction workers would be from other parts of California and the western US beyond a two hour commute distance and would be likely to relocate (PG&E 2006a). Staff concludes that the supply of permanent and temporary housing would be adequate to accommodate the estimated 67 average non-local construction workers who would relocate. Staff does not expect the HBRP to cause any housing to be displaced (moved) as a result of this project.

The entire permanent operational workforce is expected to commute from within Humboldt County (PG&E 2006a).

As a result of the discussion on housing, there are no significant adverse socioeconomic impacts related to housing resources as a result of the HBRP.

Schools

Humboldt County has 33 school districts and 19,244 students in 2005-2006. The South Bay Union School District (elementary school) and Eureka City Unified School District (junior high and high school) serves the HBRP site area. These schools are not considered overcrowded (PG&E 2006a). The average number of non-local construction workers over the HBRP's 18-month construction period would be approximately 67. Using the 2000 Census for Humboldt County, average family size of 2.95 (about one child per family) (Wikipedia 2006), staff and the applicant conservatively estimate 64 additional school children. This represents less than one percent increase in enrollment for the South Bay Union School District and Eureka City Unified District using 2005-06

enrollment estimates. The addition of 64 students for a period of 18 months is a minor short term impact in two school districts which are not considered overcrowded. Even so, this worst-case scenario is unlikely to occur since the non-local construction workers would not likely relocate family members for the relatively short duration of construction and would instead likely commute to work.

Seventeen workers would be required for operation of the HBRP and are expected to come from the Humboldt County labor force (PG&E 2006a). Since all employees are expected to be from Humboldt County and are expected to commute, there should be no significant adverse socioeconomic impacts.

Education Code section 17620 authorizes a school district to levy a fee against any construction within a district. State agencies are precluded from imposing additional fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools.

School impact fees to South Bay Union and Eureka City Unified School Districts are zero since these two districts do not assess fees on new development, only redevelopment (PG&E 2006a). Staff verified this point that there would be no school impact fees on HBRP and found that there was not a school impact fee structure in place for that location (part of Humboldt County) for neither South Bay Union Elementary nor Eureka City Unified School District (Riendeau 2007).

Staff concludes that there would be no significant adverse socioeconomic impacts on educational resources as a result of the HBRP.

Parks and Recreation

About two-thirds of the construction labor force for this project would be drawn from non-local non-commuting labor markets. Still the construction labor force that relocates is unlikely to bring dependents. Overall, short-term construction labor requirements for the HBRP (an estimated 157 peak workers in summer 2009 or fall 2009) and a small operational workforce of 17, (all local residents i.e., from Humboldt County), should not have a significant adverse socioeconomic impact on parks and recreation.

Law Enforcement

The main responsibility for law enforcement in Humboldt County is its Sheriff's Department. The HBRP would be served by the Eureka Main Station at 826 Fourth Street, Eureka. The Main Station Patrol unit has one lieutenant, six sergeants, and 21 deputy sheriffs, and one community services officer. This station provides law enforcement services to unincorporated areas of Humboldt County south of Arcata and this would include HBRP (PG&E 2006a). Staff estimates the Eureka Main Station is about five or six miles from the HBRP site. There are three other stations of the Humboldt County Sheriff's Department.

In addition, PG&E has its own security forces at the existing HBPP, who will continue service for construction and operation of HBRP. The facility would not need much if any law enforcement (criminal activity, traffic, and crowd control from a population perspective). This has been typical for law enforcement in siting cases before the

Energy Commission. Staff concludes that there would be no significant adverse socioeconomic impacts on law enforcement resources as a result of the HBRP because the likely impact will be small and there are adequate law enforcement resources.

Medical Services

Emergency response to the HBRP site is provided by the Humboldt Fire District #1. All firefighters are trained to the level of Emergency Medical Technician 1 and can provide basic life support services. Some staff members are trained to the paramedic level. The closest full staffed fire station that would provide emergency service for HBRP is Humboldt Fire District #1 (one of two full service fire stations). This is staffed on a 24-hour basis and has an average response time of four minutes (PG&E 2006a and Chief Zimmer 2006).

Two hospitals are located in the City of Eureka. These are St. Joseph's Hospital, with approximately 100 beds, and General Hospital with approximately 95 beds. St. Joseph's Hospital is the closest and is about six miles from HBRP (PG&E 2006a).

Worker Safety staff reports that construction and in particular power plant construction is hazardous relative to other workplaces. Over the last 20 or more years, significant injury in power plants licensed by the Energy Commission has been infrequent but has significant potential if safety is not a top priority. The number of construction and operation workforce is relatively small. Also, the need for prompt response for a heart attack within a few minutes is well documented in the medical literature. An on-site automatic cardiac defibrillator, as well as workers trained to use it, which would provide protection in the first few minutes of heart attack, would be required for this project. Staff notes that the closest EMS response time is within a few minutes for a heart attack and other injuries (i.e., four minutes), and the closest hospital, St Joseph's, is within six miles of the project site in Eureka with 100 beds and another hospital, General Hospital in Eureka with 95 beds is within approximately within a minute of St. Joseph's Hospital. Therefore, staff concludes that EMS and medical resources are adequate for the HBRP.

Finally, staff concludes that HBRP would not displace significant numbers of people or either directly or indirectly induce substantial population growth. Hence, there are no significant socioeconomic impacts that might trigger adverse physical impacts to emergency medical services. For additional discussion see the **Worker Safety** section of this FSA.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, section 15130.)

Cumulative impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by local labor, resulting in an influx of non-local workers and their dependents.

The HBRP would average 101 workers per month and 236 during the peak month, for 18 months, with construction occurring from approximately fall 2008-winter 2009 to winter-spring 2010. Again, peak construction would be from summer-fall 2009.

PG&E has applied for a permit from the Humboldt Bay Harbor, Recreation and Conservation District for removal of $\frac{3}{4}$ of a mile of fuel oil pipeline between Olson's Wharf and the HBPP's storage tanks (within the plant's property) in Humboldt County. This work is proposed to occur from July to September 2008 over ten weeks estimated at a cost of \$3.7 million. It includes construction time from crew mobilization to clean-up and site restoration (PG&E 2008b). PG&E provided an estimate of manpower requirements for the fuel oil pipeline removal project. It would use the following labor force classifications: superintendent, foreman, equipment operator, laborer, asbestos laborer, and truck driver. The local area (Humboldt County) hire goal is 10 percent with most of the work force to come largely from outside the local area. The first month would involve approximately 16 construction workers, the second month approximately 19 construction workers, and the third month approximately 26 construction workers (PG&E 2008c). An estimated worst-case scenario for the two projects might have an estimated 150 vacant Eureka area hotel/motels rooms for approximately 33 non-local construction workers who may temporarily relocate (in September 2008, $.66 \times 15 = 9.9$ construction workers for the HBRP + $.90 \times 26 = 23.4$ construction workers for the HBPP Pipeline Removal Project). The PG&E fuel oil pipeline removal from Olson's Wharf to the HBPP site would not coincide with the HBRP construction peak, have a very short-term construction period (three months), a relatively small peak of 26 construction workers in the third month, and would use a somewhat different labor force than the HBRP not requiring millwrights, power plant operators, and electricians. There would be no adverse socioeconomic cumulative impact from the PG&E fuel oil pipeline removal project and the HBRP.

Other projects licensed or planned in Humboldt County are:

- The Independent Spent Fuel Storage Installation (ISFSI) construction, which has been under construction from March to November 2007, adds an additional 20 workers to Humboldt County. This does not coincide with the start-up for construction of the HBRP, which is slated to start construction in March 2008 (PG&E 2006a).
- After the HBRP is constructed and operating, Units 1 and 2 will be closed and eventually demolished. Over time, the 44 workers currently employed will be phased out, gradually having a minor adverse socioeconomic impact (HBRP 2006a). According to the applicant, it is not possible to project average and maximum construction workforce levels or to schedule the time frame for demolition (CH2MHill 2007c). There is no cumulative labor force activity to report.
- Two Mobile Emergency Power Plants (MEPPS) and the Unit 3 (nuclear reactor) are expected to be removed as soon as the HBRP begins commercial operation. Planning the demolition of Unit 3 has not reached the point at which it is possible to project average and minimum construction workforce levels or to schedule the time frame for demolition (CH2MHill 2007c). There is no cumulative labor force activity to report.

Because the above projects would not occur at the same time as construction of the HBRP or in the case of the fuel oil pipeline removal project have little to no adverse socioeconomic cumulative impact, staff concludes that there would be no significant adverse cumulative socioeconomic impacts for the HBRP.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed under the fiscal and non-fiscal effects section are: capital expenditures, construction payroll, annual property taxes and sales taxes, and the value of locally purchased construction and operation equipment and materials.

AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or members of the public regarding socioeconomics.

CONCLUSIONS

Estimated gross public benefits from the HBRP include increases in property and sales taxes, employment, and income for Humboldt County. For example, there are estimated to be an average of 101 direct project-related construction jobs for the 18 months of construction. The HBRP is estimated to have total capital costs of \$250 million. The HBRP construction payroll is estimated at \$30 million for 18 months and the operation payroll is \$2.1 million annually. Property taxes are estimated at \$2.8 million annually for a project life of 30 years. The total sales and use tax during construction is estimated at \$5.8 million and during operation the local sales tax is estimated to be \$377,000 annually over the life of the project. An estimated \$2.6 million would be spent locally for materials and equipment during construction, and an additional \$150,000 would be spent annually for operations and maintenance budget.

Staff concludes that construction and operation of the HBRP would not cause a significant direct or cumulative adverse socioeconomic impact on the study area's housing, schools, law enforcement, emergency services, hospitals, and utilities.

The HBRP, as proposed, is consistent with applicable LORS.

Finally, the following **SOCIOECONOMICS Table 2** provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the HBRP Project.

**SOCIOECONOMICS Table 2
Data And Information**

Estimated Project Capital Costs	\$250 million
Estimate of Locally Purchased Materials	
Construction	\$2.6 million
Operation (Operation and Maintenance)	\$150,000 per year
Estimated Annual Property Taxes	\$2.8 million annually
Estimated School Impact Fees	Zero
Estimated Direct Employment	
Construction (average)	101 jobs (average per month)
Operation	17 jobs
Estimated Secondary Employment	
Construction	84
Operation	49 jobs
Estimated Local Secondary Income	
Construction	\$2,354,560
Operation	\$1,495,820
Estimated Payroll	
Construction	\$30 million
Operation	Average: \$2.1 million annually
Estimated Sales Taxes	
Construction	\$5.8 million
Operation	\$377,000 annually
Existing Unemployment Rates	Existing – 5.3 percent in August 2006, for Humboldt County (Not Seasonally Adjusted)
Percent Minority Population (6 mile radius)	18.29 percent
Percent Poverty Population (6 mile radius and beyond)	20.4 percent
Percent Minority Population (1 mile radius)	17.53 percent
Percent Poverty Population (1 mile radius)	16.89 percent

* Table 3 uses 2006 dollars for construction and 2009 for operations, construction is for 18 months and the projects life is planned for 30 years. Economic (non-fiscal and fiscal) impacts and unemployment is from Humboldt County, the study area. The results of the IMPLAN/Input-Output modeling are for Humboldt County and show secondary, indirect and induced impacts, as well as direct impacts. Population is for a six and one mile radius from the power plant except as noted.

CONDITIONS OF CERTIFICATION

None proposed.

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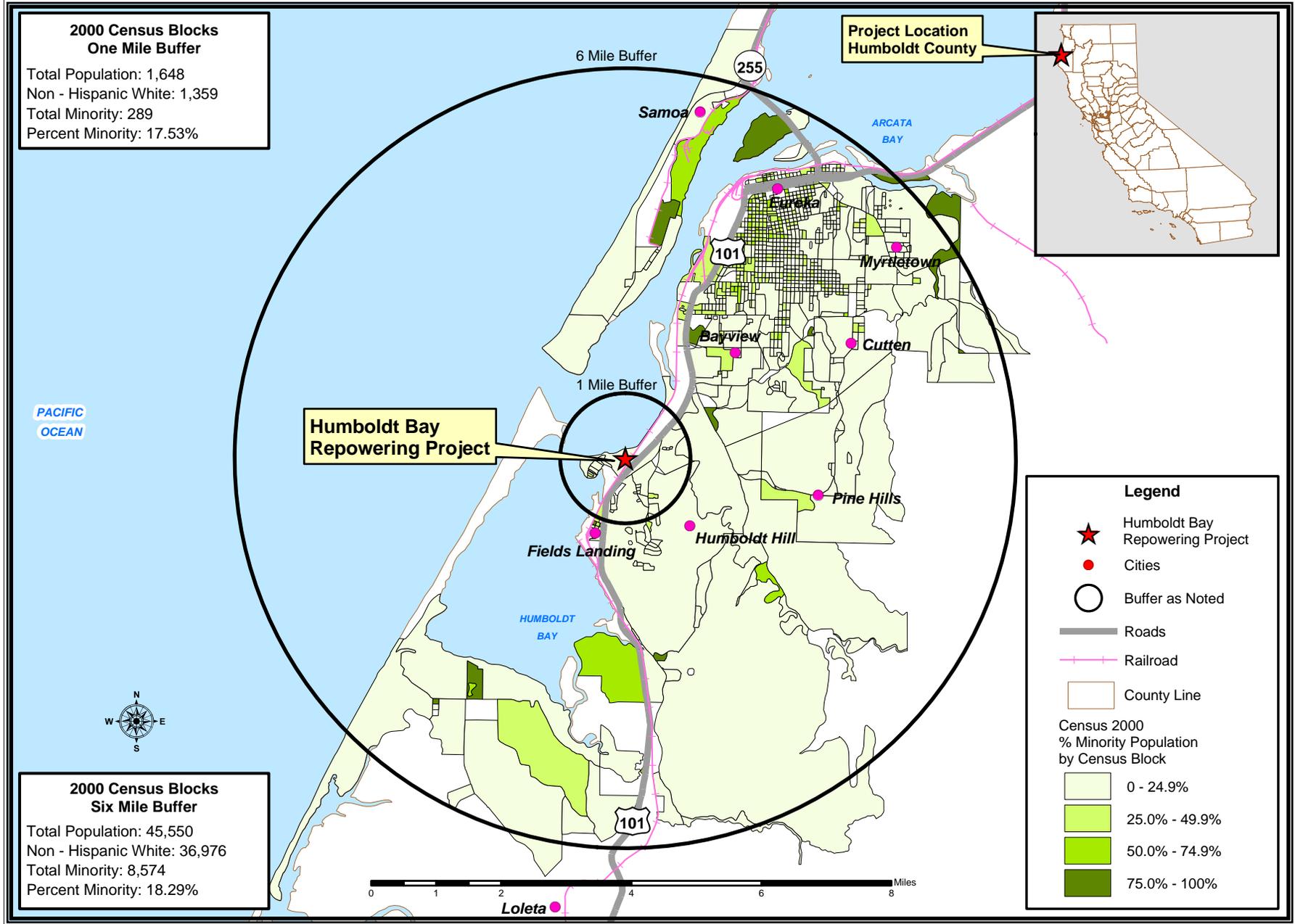
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SOCIOECONOMICS - FIGURE 1

Humboldt Bay Repowering Project - Census 2000 Minority Population by Census Block - One and Six Mile Buffer

MAY 2008

SOCIOECONOMICS



SOIL AND WATER RESOURCES

Testimony of Ellen Townsend-Hough and John Kessler, P.E.

SUMMARY OF CONCLUSIONS

Staff has determined the proposed project would not result in any significant impacts to soil and water resources. The Humboldt Bay Repowering Project (HBRP) would comply with all applicable soil and water resource laws, ordinances, regulations, and standards (LORS) including Section 30231 of the Coastal Act. Potentially significant impacts would be mitigated through the preparation of construction and operation plans and the use of Best Management Practices (BMPs) that would mitigate problems related to soil erosion, contamination to surface and groundwater, use of potable water supplies, or non-compliance with wastewater treatment and discharge requirements.

INTRODUCTION

In this section staff analyzed potential significant adverse impacts to soil and water resources associated with construction and operation of Humboldt Bay Repowering Project. This analysis focuses on the following items, and whether:

- the project's demand for water could affect surface or groundwater supplies or local groundwater quality;
- construction or operation could lead to accelerated wind or water erosion and sedimentation;
- the project's wastewater management practices would lead to degradation of surface or ground water quality;
- project construction or operation could lead to degradation of surface water quality or drainage;
- the project has taken precautions to avoid adverse surface water impacts during operations, i.e. from flooding; and
- the project would comply with all applicable laws, ordinances, regulations and standards.

Where the potential for impacts is identified, mitigation and Conditions of Certification have been proposed.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

**SOIL & WATER Table 1
Laws, Ordinances, Regulations, and Standards (LORS)**

Federal LORS	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of stormwater discharges during construction and operation of a facility. These are normally addressed through a general National Pollutant Discharge Elimination System (NPDES) permit. For HBRP, regulation of water quality is administered by the North Coast Regional Water Quality Control Board (NCRWQCB).
Resource Conservation and Recovery Act	The Resource Conservation Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
State LORS	
Water Code Section 13260	Requires filing with the appropriate Regional Board a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.
Coastal Act Section 30231	The biological productivity and the quality of coastal waters, streams, wetlands, estuaries and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.
Local LORS	
Humboldt County	Regulates all industrial activities in the County through review and approval of a Plan of Operation submitted to the Community Development Services Department. Flood Ordinance Section 335-4 regulates the construction of flood barriers, which will unnaturally divert flood waters, may increase flood hazards in other areas, and would require a Flood Plain Development Permit. The final Evaluation Certificate is based on the finished construction and is required to demonstrate compliance with Section 335-5.
State Policies and Guidance	
California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use, or unreasonable method of use of water is prohibited.
Title 23, California Code of Regulations, Chapter 15, Division 3	These regulations require that the Regional Water Quality Control Board (Regional Board) issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.

California Code of Regulations, Title 17	Title 17, Division 1, Chapter 5, addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15, requires that the Regional Board issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
SWRCB Water Quality Order 99-08	The SWRCB regulates stormwater discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under Order 99-08, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges associated with construction activity for which applicants can qualify if they meet the criteria and upon preparing and implementing an acceptable Storm Water Pollution Prevention Plan (SWPPP) and notifying the SWRCB with a Notice of Intent.
California Water Code Section 100	Requires the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.
California Water Code Section 100.5	Declares to be the established policy of the State that conformity of a use, method of use, or method of diversion of water with local custom shall not be solely determinative of its reasonableness, but shall be considered as one factor to be weighed in the determination of the reasonableness of the use, method of use, or method of diversion of water, within the meaning of Article X, Section 2 of the California Constitution.
California Water Code Section 13146	Requires that state offices, departments and boards in carrying out activities, which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the State Water Resources Control Board in writing their authority for not complying with such policy.
California Water Code Section 13247	Requires that state offices, departments, and boards, in carrying out activities which may affect water quality, shall comply with water quality control plans (i.e., Basin Plans) approved or adopted by the State Water Resources Control Board unless otherwise directed or authorized by statute, in which case they shall indicate to the appropriate Regional Water Quality Control Boards in writing their authority for not complying with such plans.
SWRCB Resolution 68-16	This resolution (the "Anti-Degradation Policy") declares that it is the State's policy for maintaining existing high quality waters to the maximum extent possible. The existing high water quality must be maintained until demonstrated to the State that any proposed change will be consistent with the maximum benefit to the people of the state and will not unreasonably affect present or future beneficial uses.

SWRCB Resolution 75-58	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Resolution 75-58 defines fresh inland waters as those “which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife”. In a May 23, 2002 letter from the Chairman of the SWRCB to Energy Commission Commissioners, the principal of the policy was confirmed ‘that the lowest quality cooling water reasonably available from both a technical and economic standpoint should be utilized as the source water for any evaporative cooling process utilized at these facilities.
SWRCB Resolution 88-63	Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must exceed 3,000 mg/l for it to not be considered suitable, or potentially suitable, for municipal or domestic water supply.
The California Safe Drinking Water and Toxic Enforcement Act	This Act (California Health & Safety Code Section 25249.5 et seq.) prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The Regional Water Quality Control Board administers the requirements of the Act.
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et esq.)	In the 2003 IEPR, consistent with State Water Resources Control Board Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be “environmentally undesirable” or “economically unsound.”

SETTING

The proposed HBRP project site is located at 1000 King Salmon Avenue, in an unincorporated area of Humboldt County, California. The HBRP is on Buhne Point, which is a small peninsula along Humboldt Bay South of the Eureka city limit. The proposed project would be built on 5.4 acres within a 143-acre parcel currently occupied by a 50-year old power plant. The existing power plant consists of two natural gas- and fuel oil-burning steam turbine generating units built between 1956 and 1958, an inoperable nuclear-powered boiling water reactor generating unit, and two diesel-fired Mobile Emergency Power Plant backup and peaking units consisting of combustion turbine technology (PG&E 2006a, Section 2.0).

The new project will be located within the existing 143-acre Humboldt Bay Power Plant (HBPP) complex. The HBRP will be a natural gas-fired, reciprocating engine, electrical generating facility. The project will consist of ten natural gas-fired reciprocating engine-generators, and an air radiator cooling system (closed loop) consisting of a 40-unit radiator array, air emission control catalyst systems and other associated plant infrastructure.

SOIL

Soils of Hookton silty clay loam comprise the majority of the proposed HBRP site. Some areas of the Hookton silty clay loam are overlain by Bayside silty clay loam deposits. Approximately 35 percent of the water pipeline is overlain by Bayside silty clay loam deposits (PG&E 2006a Figure 8.11-1). This soil occurs on the gently sloping dissections of the Hookton formation. The Hookton formation consists of interbedded shallow-water marine, estuarine, and fluvial deposits of sand, silty sand, chert-rich gravel, and clay that is about 1,100 feet thick below the site. Bayside soils are imperfectly to poorly drained, fine-textured basin soils, developed in sedimentary alluvium from the Franciscan and Wildcat formations in the North Coast Range Mountains. They occur at elevations from sea level to above 50 feet within about a 10-mile perimeter of Humboldt Bay. Silty clay loam has a slight to moderate potential for water erosion. The HBRP is not located on prime farmland. (PG&E 2006a, Section 8.11 & Figure 8.11-2).

SURFACE HYDROLOGY AND FLOODING

The HBRP site is located within the Humboldt Bay Watershed, encompassing a drainage area of approximately 223 square miles in area. (HBWAC 2005, Figure 8.15-1). Annual precipitation in Humboldt County averages about 39 inches, and can vary significantly depending on local conditions. Within the basin are the ancient redwoods of the Headwaters Forest, highly productive industrial timberlands, prime agricultural lands and functioning streams and wetlands, all of which are connected to the bay and tidal marshlands (HBWAC 2005).

The HBRP site is currently located in a 100-year flood zone (Zone A) area per the Federal Emergency Management Agency (FEMA) (PG&E 2006a, Figure 8.15-3). The site would be built up to an elevation of 11 feet – 12 feet, with foundations for power plant equipment built to an elevation of 13 feet.

The HBRP site lays within the potential tsunami inundation zone and tsunami are a recognized hazard. A tsunami is an ocean wave produced by a sub-marine earthquake, landslide, or volcanic eruption. Tsunamis have been recorded at the south end of Humboldt Bay, and have previously inundated the lower areas around Buhne Hill including the HBRP site (PG&E 2006a Section 8.4.1.1.1).

GROUNDWATER

HBRP would be located on the Eureka Plain Groundwater Basin. This basin extends over an area of approximately 37,400 acres (PG&E 2006a, Figure 8.15-2). The Eureka Plain Groundwater Basin is bounded by the Little Salmon Fault to the south, Humboldt Bay and Arcata Bay to the west and northwest, and by Wildcat series deposits to the east. The Wildcat series is a group of five formations ranging in age from the Miocene to Pleistocene eras consisting of sandstone, marine siltstone, and claystone deposits. Humboldt Bay separates the primary basin deposits from dune sand deposits to the west. (PG&E 2006a, Section 8.15.1.2).

Estimates of groundwater extraction from the basin for agricultural and municipal/industrial uses are 4,800 and 1,300 acre-feet per year (AFY) respectively.

Deep percolation from applied water is estimated to be 1,700 AFY. Groundwater in the basin is rich in calcium and magnesium. Total dissolved solids range from 97 to 480 milligrams per liter (mg/L), averaging 177 mg/L. Groundwater impairments include localized high boron, iron, manganese, and phosphorus (PG&E 2006a, Section 8.15.1.2). Groundwater is encountered at depths of five to six feet during relatively dry times of the year. Seasonal groundwater may rise close to the existing site surface during periods of wet weather and high tides. (CH2MHILL 2007a, Data Response 28).

WATER SUPPLY

Raw water for HBRP process needs would be supplied from Pacific Gas and Electric Company's (PG&E's) well No. 2 via an existing 6-inch raw water supply pipeline located within the project site. The HBRP facility operations would require plant process water for maintenance of the engine cooling systems (air radiators), closed cooling water system for auxiliary equipment, preheating for jacket water, and engine turbocharger washing (PG&E 2006a Section 7.1). Two 2,600-gallon maintenance water tanks will be used to store engine coolant, consisting of a solution of water and propylene glycol. The engine coolant systems are filled from the isolated maintenance water tanks. The project's annual demand for process water would average 2.7 AFY based on an annual operation of 8,760 hours per year at full plant output.

Potable water supplied from the Humboldt Community Services District (HCSD) will service sinks, toilets, showers, fountains, eye-washes and safety showers. The estimated domestic use for the project is 0.182 AFY. The firewater tank will be filled with both raw water and potable water sources. The potable water will be supplied by a new 1,200-foot long, 4-to 6-inch water supply pipeline. The new potable water pipeline will connect to an existing HCSD pipeline near the entrance to HBRP at King Salmon Avenue (PG&E 2006a Section 7.1).

The HBRP water demands are as shown in **SOIL & WATER TABLE 2**. The quality of the process water, as would be supplied to HBRP from PG&E's well No. 2 is characterized in **SOIL & WATER TABLE 3**.

SOIL & WATER RESOURCES TABLE 2
HBRP Water Demands (average and peak are equivalent)

Description	Instantaneous Rate Gallons per Minute (gpm)	Annual Volume AFY
Construction – Compaction & Dust Suppression	50 – 200 gpm	6 AFY
Operations - Process Water	1.66 gpm	2.7 AFY
Operations - Potable Water	0.11 gpm	0.182 AFY

(PG&E 2006a, Sections 7 and 8.15)

**SOIL & WATER RESOURCES TABLE 3
PG&E Well No. 2 Water Quality**

PARAMETER	CONCENTRATION(milligrams/liter, mg/L)
Alkalinity (asCaCO ₃)	56
Total Dissolved Solids	130
Turbidity	0.15
Arsenic	2.2
Boron	ND
Cadmium	ND
Calcium	5.7
Chloride	32
Chromium	1.7
Copper	ND
Fluoride	0.12
Iron	27
Lead (at tap)	ND
Magnesium	8.6
Manganese	13
Mercury (inorganic)	ND
Silver	ND
Sodium	14
Sulfate	8.4
Zinc	ND

Source: (PG&E 2006a, TABLE 7.2-1)

WASTEWATER

Wastewater leaving the HBRP would be comprised of waste process water and waste domestic water. Leaks from process water uses in engine cooling and seals, condensate from compressors, and area wash downs will be collected in a system of floor drains, hub drains, and piping routed to two water collection sumps located outside of the engine house. The sumps would drain to the oil water separator. The clean water will be discharged to the sanitary sewer system. Sanitary wastewater will be collected by gravity and discharged to an existing sewer via a 4-inch diameter piping system that serves the project site (PG&E 2006a 7.4).

**SOIL & WATER RESOURCES TABLE 4
Annual Wastewater Discharge Rates**

Waste Discharge Stream	Discharge Location	Average Annual Discharge (gpm)
Engine closed loop cooling system	Oily Water Collection Pit	0.17
Service Use (Power House and Plant Uses including general plant drains)	Oily Water Collection Pit	0.32
Domestic wastewater	Sanitary sewer system	0.11
TOTAL		0.60

Source PG&E 2006a Table 8.15-3

The sewer system is subject to the regulations of, and permitting by, HCSD under the National Pollutant Discharge Elimination System (NPDES) program of the Clean Water Act for the treatment and disposal of wastewater. HCSD's applicable wastewater quality requirements for the project have been adopted based on the City of Eureka's requirements. HBRP's waste stream would generally be the same composition as the well water for most constituents (CH2MHILL Data Responses 40 and 41).

STORMWATER

Stormwater runoff from the 5.4-acre portion of the HBPP property proposed for siting HBRP currently drains overland into Buhne Slough. During construction and operation of HBRP, stormwater would continue to drain into Buhne Slough. Stormwater runoff from most of the remaining HBPP site drains into the cooling water intake and discharge channel.

There are two types of stormwater surface runoff associated with HBRP: (1) contact areas where stormwater from project tanks, equipment or hazardous materials handling activities could potentially have oil or chemical contamination, requiring treatment prior to discharge; and (2) non-contact areas where stormwater from plant areas are not subject to contamination. Stormwater discharges from the existing HBPP will continue to discharge at current locations.

The proposed system for the contact area includes four water collection sumps that capture stormwater from the lubricating oil and diesel tank areas. The sump water will be checked for level and contamination and pumped to the oil water separator when the water is contaminated. Sludge will be removed by a licensed hazardous waste transporter and taken to a permitted recycling facility or hazardous waste disposal site. Non-contaminated sump water will be discharged to the plant stormwater drainage system. Clean water from the oil water separator will be discharged to the sanitary sewer system.

Stormwater from non-contact areas will drain into a separate stormwater collection and treatment system from the contact areas. The non-contact drainage system will collect stormwater in areas on the HBRP site, which do not have equipment, tanks, or loading

areas for oil or chemicals (CH2MHILL 2006a Data Responses 42). The storm drainage system will have catch basins for collecting stormwater and an underground piping system with manholes at all junction points and turns. An in-ground separator will treat stormwater runoff prior to discharge. The new stormwater drainage system's point of discharge will be southeast of the project into Buhne Slough.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This project was analyzed to determine if it complies with LORS, meets CEQA standards, and will not result in a significant adverse impact. The threshold of significance is based upon the ability of the project to be built and operated without violating erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards. The adequacy of BMPs as normally employed to conform with the LORS presented in **Soil & Water Table 1** were used to determine the threshold of significance for this AFC proceeding. The following LORS and policies are of particular relevance to the HBRP. For those impacts that exceed the published standards, or do not conform to established practices, mitigation will be proposed by staff to reduce or eliminate the impact.

- The Clean Water Act requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water.
- The Resource Conservation Recovery Act of 1976 seeks to prevent surface and groundwater contamination.
- Humboldt County Flood Ordinance Section 335-4 regulates the construction of land barriers.

IMPACTS AND MITIGATION

Impact and mitigation discussion presented below is divided into a discussion of impacts related to construction and operation. For each potential impact discussed, the applicant's proposed mitigation is presented and staff's determination of the adequacy of the proposed mitigation is analyzed. Staff refers to specific conditions of certification related to a potential impact and the required mitigation measure(s).

Construction Impacts and Mitigation

Construction of the HBRP facility will include soil excavation, grading, and installation of necessary connections to linear facilities for the HBRP site. Potential impacts evaluated include the potential for increased runoff flow rates and volumes discharged from HBRP, and whether this could increase flooding downstream of the HBRP site. Potential construction related impacts to soil, stormwater, groundwater, wastewater and water quality, including proposed mitigation measures, are discussed below.

Soils

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of saturated soils

if proper drainage, erosion, and sediment control measures, or BMPs, are not implemented. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion would result in the loss of topsoil and increased sedimentation of surface waters downstream of the HBRP. The magnitude, extent and duration of these impacts would depend on several factors, including the proximity of the HBRP site to surface water, the soils affected, and the method, duration, and time of year of activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can result in on-site erosion, eventually increasing the sediment load within nearby receiving waters. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. Implementing appropriate erosion control measures will help conserve soil resources, maintain water quality, protect property from erosion damage, prevent accelerated soil loss, and protect air quality.

The HBRP construction would occur on the existing site surrounded by a well developed area where a separate supporting drainage infrastructure exists. The site is relatively flat and encompasses an area of about 12.4 acres including 5.4 acres for the HBRP footprint, two acres of construction laydown area, three acres of access road, and two acres of construction parking (PG&E 2006a, Section 8.11.2.3). The greatest potential for soil loss would be from erosion of the Silty Loam, because it has less cohesion than the Hookton clayey soils. This is also the predominant soil type in the areas to be disturbed. The applicant estimated that during construction uncontrolled water runoff and erosion could result in offsite transport of approximately 56.4 tons of soil.

The Draft Construction Drainage, Erosion, and Sediment Control Plan/Stormwater Pollution Prevention Plan (DESCP/SWPPP) submitted by the applicant provides erosion control BMPs to address soil erosion during construction and operation (CH2MHILL 2007a). With the implementation of BMPs to limit erosion and trap eroded sediments, the applicant estimated that the soil loss from the HBRP site due to water erosion would be reduced to approximately 1.1 tons (PG&E 2006a, Section 8.11.2.4.1, and Table 8.11-2).

Staff believes that implementation of an approved DESCP will limit erosion in conformance with Condition of Certification **Soil & Water-1**. The applicant will also prepare a SWPPP for Construction Activity for control of erosion from runoff at the HBRP site in conformance with Condition of Certification **Soil & Water-2**. Staff believes adequate sedimentation control measures would be installed at locations where offsite drainage is possible, as well as controls within the project area for various stages of construction. Primary earth-disturbing activities during construction would be scheduled during spring through fall, when rain and erosion potential from stormwater runoff conditions are the least. The construction BMPs would include implementing silt fences, sand bags, hay bales, geotextiles, fiber rolls, dust control, and stockpile management. The laydown area would be covered with gravel to accommodate all-weather use and to protect the ground surface, and would be left in this condition during the operation phase of the project until Humboldt Bay Repowering Project elects to otherwise develop this area.

Wind erosion can lead to adverse soil impacts through the loss of topsoil, and fugitive dust, degrading air quality. The applicant proposes to employ BMPs including watering the HBRP site daily and to enclose, cover, water, or treat soil stock piles to limit soil loss due to wind erosion, consistent with Condition of Certification **Soil & Water-1**. Staff believes that these recommendations are sufficient to mitigate soil loss due to wind erosion.

Staff believes the proposed construction scheduling and methods for erosion and drainage control, including the development of a Final DESCP consistent with Condition of Certification **Soil & Water-1** and a SWPPP for Construction Activity in accordance with Condition of Certification **Soil & Water-2** will avoid significant adverse impacts from soil loss and erosion during HBRP construction.

Surface Hydrology and Flooding

The HBRP is within Zone A (100-year flood zone), an area of special flood hazard and requires procurement of a Flood Plain Development Permit from Humboldt County before construction begins. The Flood Plain Development Permit would be in accordance with Section 335-4 of the Humboldt County Flood Ordinance. During site grading and preparation, the site will be built up to an elevation ranging from 11-12 feet with equipment foundations set at 13 , thereby removing the site of the 100-year flood zone (PG&E 2006a Section 8.15.1.3). Following construction, PG&E must secure a Flood Elevation Certificate (FEMA Form 81-31) based on as-built construction drawings and demonstrate compliance with Section 335-5 of the Humboldt County Flood Ordinance (CH2MHILL 2007a, Data Responses 43 and 44).

A County Building Official confirmed that six feet above sea level is the base elevation for Zone A. The HBRP plant grade is 11 to 12 feet. The finished floor elevations will be at 13 feet. Therefore, the HBRP will be above the 100-year Flood level.

The FEMA Elevation Certificate is used to rate post Flood Insurance Rate Map buildings located in Zone A. The certificate is also used to provide elevation information necessary to ensure compliance with community flood plain management ordinances and support a request for a Letter of Map Amendment. The final Elevation Certificate will be based on finished construction and certified by a registered professional surveyor, engineer or architect. Condition of Certification **Soil & Water 4** would require PG&E to obtain a Flood Plain Development Permit from Humboldt County before construction begins.

HBRP site construction would not alter the existing drainage patterns and not result in increased runoff volumes. Because the HBRP site would discharge stormwater runoff during construction, the project must comply with the General NPDES Permit for Construction Activity. The NPDES Permit regulates stormwater effluent limitations, specifies monitoring and reporting requirements, and requires preparation and implementation of a SWPPP for construction activities. Staff does not believe that construction will have an adverse impact on surface water hydrology or exacerbate flooding, if a DESCP consistent with Condition of Certification **Soil & Water-1** and a SWPPP for Construction Activity in accordance with Condition of Certification **Soil & Water-2** are implemented.

Groundwater

The construction phase of HBRP will likely require groundwater removal (dewatering) within excavated areas (PG&E 2006a Section 8.15.2.4). Geotechnical investigations for HBRP have encountered groundwater at depths of five to six feet, and seasonally near the ground surface (CH2MHILL 2006a Data Response 28). Previous trenching has shown that groundwater will emerge at the time of trenching, but will recede in 24 hours. The subsurface drainage would be discharged into the HCSD sanitary sewer system or discharged over land into Buhne Slough under a Low Threat Discharge Permit that would be obtained from the North Coast Regional Water Quality Control Board (CH2MHILL 2007a Data Response 42). Condition of Certification **Soil & Water-6** would require the project owner to file an Application/Report of Waste Discharge and obtain an NPDES Permit from the North Coast Regional Water Quality Control Board to assure the discharge of groundwater associated with dewatering site excavations would not impair the quality of surface water in Buhne Slough. As an alternative and if applicable, the project owner may provide documentation from the North Coast RWQCB that HBRP's discharge of groundwater and stormwater to Buhne Slough would be permitted under the General NPDES Permits that would be utilized in accordance with Conditions of Certification **Soil & Water-2 and -3**. Staff believes that there will not be a significant adverse impact on groundwater associated with construction of the HBRP if dewatering is conducted in compliance with the NPDES Permit.

Water Supply

During construction, HBRP proposes to use about 6 acre-feet of potable water supplied by the HCSD, primarily for dust control (PG&E 2006a Section 8.15.2.1.4). Although the use of 6 AF of potable water during construction is not expected to cause a significant impact on HCSD's water supply, staff is recommending that the applicant use raw water from PG&E's well no. 2 in order to conform to state water policies aimed at conserving the highest quality water whenever possible. Condition of Certification **Soil & Water-5** specifies that the applicant is to use raw water from PG&E's well no. 2 during construction for all non-potable purposes including compaction and dust suppression.

Wastewater

Construction wastewater generated onsite may include stormwater runoff, groundwater from dewatering, vehicle and equipment washdown water, and water from pressure testing the service utilities. Improper handling or lack of containment of construction wastewater could cause a broader dispersion of contaminants to soil, groundwater or surface water.

Construction wastewater and stormwater runoff will be managed to maintain compliance with the required Drainage, Erosion and Sediment Control Plan and Construction SWPPP, consistent with Conditions of Certification **Soil & Water-1** and **Soil & Water-2**. The discharge of any non-hazardous or hazardous wastewater during construction other than stormwater must comply with regulations for discharge. Staff believes that no significant impact to soil, groundwater, or surface water would occur if the above mentioned mitigation measures are implemented.

Stormwater

The HBRP site construction could disturb about 12.4 acres including 5.4 acres for the HBRP footprint, two acres of construction laydown area, three acres of access road and two acres of construction worker parking (PG&E 2006a Section 8.11.2.3). Stormwater drainage of these relatively flat areas disturbed during construction would be directed to separate sedimentation basins. Grading of the HBRP power plant and construction laydown areas and the temporary access road will result in stormwater draining in an overall west to east direction. The perimeter swales will collect and convey the stormwater surface drainage into the sedimentation basins. The sedimentation basins will serve to clarify the stormwater before it is discharged into Buhne Slough. The sedimentation basins for serving construction needs would be sized according to the General NPDES permit requirements requiring 3,600 cubic feet of storage per acre draining into the basin (PG&E 2006a Section 8.15.2.4).

Primary earth-disturbing construction activities coinciding with when erosion potential is highest, would be scheduled during summer through fall, when precipitation and stormwater runoff is lowest, and the need for erosion and drainage control BMPs is minimized. In addition to perimeter swales and the sedimentation basins, construction BMPs would include installing silt fences, crushed stone surfacing over geotextile fabric, fiber rolls, and dust control, covering and containing construction materials and waste, and stockpile management. The laydown area would be covered with gravel to accommodate all-weather use and to protect the ground surface. Hazardous materials used during construction would be properly stored and contained, and any spills occurring during handling, would be promptly cleaned-up to avoid spread of contamination from stormwater runoff.

Condition of Certification **Soil & Water-6** would require the project owner to file an Application/Report of Waste Discharge and obtain an NPDES Permit from the North Coast Regional Water Quality Control Board to assure the discharge of groundwater associated with dewatering HBRP site excavations during construction, and for discharge of stormwater during both construction and operation, to assure that such discharge would not impair the quality of either groundwater or surface water in Buhne Slough. As an alternative and if applicable, the project owner may either provide documentation from the North Coast RWQCB that HBRP's discharge of groundwater and stormwater to Buhne Slough would be permitted under the General NPDES Permits that would be utilized in accordance with Conditions of Certification **Soil & Water-2 and -3** or has obtained a permit from the Humboldt Community Services District for disposal. Staff believes that there will not be a significant adverse impact on either groundwater or surface water associated with construction of the HBRP if dewatering and stormwater management is conducted in compliance with the NPDES Permit. Staff also believes the proposed construction scheduling and methods for erosion and drainage control, including the development of a Final DESCPC consistent with Condition of Certification **Soil & Water-1**, and a SWPPP for Construction Activity in accordance with Condition of Certification **Soil & Water-2**, will avoid significant adverse impacts from stormwater during HBRP construction.

Operation Impacts and Mitigation

Operation of the HBRP should not significantly impact soil, stormwater runoff, water quality, water supply, and wastewater, if staff's proposed conditions of certification are implemented. Water quality and soils would not be impacted by the discharge of hazardous materials released during operation because secondary containment structures associated with hazardous materials located at the site would preclude contact with soils, groundwater, and surface water. Water supply for plant processes and cooling would not lead to impacts to existing water sources. Wastewater discharge would not lead to potential impacts since HBRP would discharge wastewater with constituent concentrations below discharge limits. Potential impacts related to the operation of the HBRP including the applicant's proposed mitigation measures and staff's proposed mitigation measures are discussed below.

Soils

During operation of the HBRP, the HBRP site would be primarily covered with paving and gravel, or landscaped so that soil exposure to wind and water is minimized. Further protecting the limited exposure of soils would be the implementation of stormwater drainage BMPs, as the project owner would need to comply with the requirements of the DESCP as specified in Condition of Certification **Soil & Water-1** and the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Industrial Activity. Under the NPDES permit as specified in Condition of Certification **Soil & Water-3**, the project owner would develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of the entire HBRP site (Operational SWPPP). Staff believes adverse impacts to soil, and the potential for soil erosion, would not be significant during HBRP operation.

Surface Hydrology and Flooding

HBRP operation would not alter the existing drainage patterns and not result in increased runoff volumes. Because HBRP would discharge stormwater runoff, it must comply with the Humboldt County General NPDES Permit and Stormwater Management Plan. The NPDES Permit regulates stormwater effluent limitations, specifies monitoring and reporting requirements, and requires preparation and implementation of a SWPPP for industrial activities. Staff does not believe that HBRP operation will have an adverse impact on surface water hydrology or exacerbate flooding, if a SWPPP for Industrial Activity in accordance with Condition of Certification **Soil & Water-3** is implemented. Humboldt County has established the 100-year base flood elevation to be +6 feet in the vicinity of the project. The existing HBRP site varies in elevation from 8 to 12 feet. The HBRP site will be graded to an elevation of 11 to 12 feet, with major equipment foundations at elevations of approximately 13 feet. The HBRP site will not be within the 100-year flood hazard area once the site is built according to plans, and thus will not impede or redirect flood flows.

The site is in a moderate to high tsunami danger zone. The potential elevation of a tsunami was evaluated by PG&E in association with plans for the Independent Spent Fuel Storage Installation (ISFSI) project and was estimated to vary according to tidal conditions in Humboldt Bay. After considering wave runup over land, the maximum wave runup could range from about 23 feet at mean lower low water to about 50 feet at

mean higher high water. All major structures will be adequately anchored to prevent major damage from wave action and displacement due to buoyancy as a result of the potential for tsunami hazard (PG&E 2006a Section 8.15.1.3). Staff does not believe operation of HBRP would cause any significant adverse impact to surface hydrology or exacerbate flooding. In association with the existing HBPP operation, PG&E has an evacuation plan to assure the safety of their employees in the event of a tsunami.

The applicant has proposed to mitigate the project's impacts to wetland habitats through its on-site wetland creation, restoration and enhancement plans in accordance with their Buhne Point Wetlands Preserve that would be applied in the western portion of the HBPP site. Please see the **Biology** section of the FSA for discussion regarding project effects to wetlands and the status of agency determinations and required permits.

Groundwater

The project will use groundwater as process supply water for radiator makeup, equipment washdown, and other industrial uses. The groundwater will be supplied through an existing water supply pipeline from PG&E's Humboldt Bay Power Plant well no. 2. Because the Wartsila 18 V50DF internal combustion engines are air radiator-cooled, they use very little water for cooling. The total annual process water demand, including makeup water for the closed loop air radiator cooling system is only 2.7 AFY. Therefore, staff believes that there will not be a significant adverse impact on groundwater, as a result of operation of the HBRP.

Water Supply

The HBRP facility operations would require raw process water from PG&E well no. 2 from the existing 6-inch raw water supply pipeline located within the project site. Process water is required for radiator makeup, equipment washdown, and other industrial uses. Domestic water required for sinks, toilets, showers, drinking fountains, and eye wash/safety showers will be provided from a new 1,200-foot 4- to 6-inch water supply pipeline from the Humboldt Community Services District (HCSD) main in King Salmon Avenue. This pipeline will be constructed under the temporary construction access road and will interconnect to the HCSD pipeline in King Salmon Avenue (PG&E 2006a Section 8.15.2.1). The project's annual volume of water use would average about 2.7 AFY based conservatively on an annual operation of 8,760 hours per year at full plant output. Domestic water demands for uses other than plant and industrial processes are estimated at average 0.11 gpm, less than 0.182 acre-feet per year (PG&E 2006a Figure 7.11-1). HCSD has issued a Will Serve Letter to HBRP dated July 18, 2006 (PG&E 2006a Appendix 7A).

HBRP would use potable water delivered from HCSD to supply domestic uses, and to serve as a back-up water supply for the process needs. Historically, significant unscheduled outages have been infrequent. HCSD can support HBRP up to an additional estimated use of 3.0 gpm, which is substantially more than 0.11 gpm anticipated for HBRP domestic needs. The HCSD has never had a shutdown of the domestic water system (CH2MHILL 2007a, DR37). Staff recommends Condition of Certification **Soil & Water-7** to require the project owner to secure a Water Supply Service Agreement for potable water service from HCSD.

If the HBRP were approved by the Energy Commission, staff would propose that HBRP be required to verify actual water use consistent with the proposed project. Therefore, staff recommends the project owner be required to submit water use data in accordance with Condition of Certification **Soil & Water-5**. In order to complete this task, the HBRP project owner would install and maintain metering devices as part of the water supply and distribution system to separately monitor and record use of groundwater from the PG&E well no. 2, and potable water supplied by HCSD. An annual summary of water use by the HBRP would be submitted to the Energy Commission's Compliance Project Manager (CPM) in the Annual Compliance Report.

Staff believes that if the recommended conditions of certification are implemented, HBRP's operational use of groundwater with potable water as an emergency backup supply will not result in a significant adverse impact.

Wastewater

During project operations, sanitary wastewater and effluent from the oil/water separator would be discharged into the sanitary sewer operated by Humboldt Community Services District at an average rate of 0.60 gpm. HCSD has indicated in their July 18, 2006 letter to PG&E, that the project's rate of wastewater discharge could easily be absorbed into their system (PG&E 2006a, Appendix 7A). No significant adverse impacts are expected from any HBRP wastewater discharge after adoption and implementation of staff's recommended Condition of Certification **Soil & Water-8**, and if the project is operated in compliance with other applicable LORS. **Soil & Water-8** would require the project owner to obtain a Permit for Industrial Wastewater Discharge and comply with the wastewater discharge limitations, pretreatment requirements, peak flow restrictions, dewatering discharges, payment of fees, and monitoring and reporting requirements of Humboldt Community Services District.

Stormwater

During operation of HBRP, most of the stormwater would continue to drain into Buhne Slough. Stormwater surface runoff associated with HBRP would be separated into systems for draining contact areas where stormwater may be contaminated from hazardous materials, and from non-contact areas where stormwater from plant areas is not subject to contamination.

The proposed system for contact areas has four water collection sumps that receive stormwater from the lubricating oil and diesel tank areas. The sump water will be checked for level and contamination and pumped to the oil-water separator when the water is contaminated. Sludge will be removed by a licensed hazardous waste transporter and taken to a permitted recycling facility or hazardous waste disposal site. Non-contaminated sump water will be discharged to the plant stormwater drainage system. Clean water from the oil-water separator will be discharged to the sanitary sewer system.

Stormwater from non-contact areas will drain into a separate stormwater collection and treatment system from the contact areas. The non-contact drainage system will collect stormwater in areas on the HBRP sites, which do not have equipment, tanks, or loading areas for oil or chemicals (CH2MHILL 2006a Data Responses 42). The storm drainage

system will have catch basins for collecting stormwater and an underground piping system with manholes at all junction points and turns. An in-ground separator will treat stormwater runoff prior to discharge. The new stormwater drainage system discharge will be southeast of the project into Buhne Slough. The outfall structure will consist of a grass-lined swale that will serve to further remove potential contaminants before discharging into Buhne Slough.

The surface drainage system will be designed to discharge the 10-year 24-hour storm runoff without flooding roads and the 50-year 24-hour storm runoff without flooding plant facilities (CH2MHILL 2007a, Data Response 44) The 10-year storm has a rainfall intensity of 1.2 inches per hour, which would result in a discharge of 3.11 cubic feet per second (cfs) (PG&E 2006a, App. 7A). Typical design criteria for stormwater drainage systems would require that the post-developed discharge of stormwater not exceed the pre-developed discharge rate, so as to avoid exacerbating flood conditions off site. In the case of the HBRP, the greater portion of the 143-acre HBPP parcel and surrounding properties in the King Salmon vicinity are located within the 100-year flood plain and are so significantly affected by tidal influence that this typical criteria does not apply as communicated to staff by Humboldt County Public Works (HCPW 2007). The HBRP would be protected from flooding within the 100-year flood plain by raising the elevation of the site to range from 11 to 12 feet with equipment foundations set at an elevation of 13 feet, compared to the 100-year flood elevation of about 6 feet.

The project owner would comply with the requirements of operational drainage plans and BMPs. These would be specified in the DESC in accordance with Condition of Certification **Soil & Water-1**, and the Storm Water Pollution Prevention Plan (SWPPP) in accordance with the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Industrial Activity as recommended in Condition of Certification **Soil & Water-3**. These BMPs would include the detention basin, containment of hazardous waste material storage areas, and roof covering of material storage areas. As a result of this mitigation, staff believes there will be no significant adverse impacts associated with stormwater drainage during the operation of HBRP.

Condition of Certification **Soil & Water-6** would require the project owner to file an Application/Report of Waste Discharge and obtain an NPDES Permit from the North Coast Regional Water Quality Control Board to assure the discharge of groundwater associated with dewatering HBRP site excavations during construction and for discharge of stormwater during both construction and operation, would not impair the quality of surface water in Buhne Slough. As an alternative and if applicable, the project owner may either provide documentation from the North Coast RWQCB that HBRP's discharge of groundwater and stormwater to Buhne Slough would be permitted under the General NPDES Permits that would be utilized in accordance with Conditions of Certification **Soil & Water-2 and -3** or has obtained a permit from the Humboldt Community Services District for disposal. Staff believes that there will not be a significant adverse impact on either groundwater or surface water associated with construction and operation of the HBRP if dewatering and stormwater management is conducted in compliance with the NPDES Permit.

Cumulative Impacts and Mitigation

Staff considered the following foreseeable activities at the HBPP in conjunction with the proposed construction and operation of the HBRP for the potential to cause a significant cumulative impact:

1. Independent Spent Fuel Storage Installation (ISFSI);
2. Decommissioning of the Nuclear Unit 3 and associated environmental studies necessary to define decommissioning activities; and
3. Demolition of Humboldt Bay Power Plant's Units 1 and 2, the Mobile Emergency Power Plant (MEPP) and associated equipment.

Each of these projects is, and will be, conducted under a unique set of permit conditions and environmental review and permitting. The ISFSI initiated construction during spring 2007 and was reviewed and approved by the Coastal Commission and the Nuclear Regulatory Agency, as well as subject to permits and approvals of other federal, state and local agencies. The other two projects will be conducted in a similar manner. The regulatory permits and approvals serve to assure that the projects alone as well as cumulatively will not cause a significant adverse impact or non-conformance with LORS.

Activities related to the HBRP project would not result in cumulative impacts to water and soil resources. It does not appear that related projects are occurring in the area that would result in cumulative impacts to soil and water resources; or that there are any other reasonably foreseeable future projects that, together with the HBRP incremental impact to soil and water resources, would result in a significant adverse impact.

NOTEWORTHY PUBLIC BENEFITS

The HBRP will use little water for cooling or other purposes compared with traditional simple-cycle or combined-cycle turbine designs. The project will use an air radiator cooling system in which water circulates between the engines and the radiators in a closed-loop system. The water used in the cooling system is continually recycled and is not used for evaporative cooling, as in a cooling tower system. The HBRP will not discharge wastewater from the power plant cooling process.

Existing Units 1 and 2 use 52,000 gallons per minute of ocean water from Humboldt Bay for their once-through cooling design. Once Unit 1 and 2 cease operation, only 12,900 gpm of water will be required for Unit 3 cooling of the spent fuel rods. The Unit 3 cooling will also cease when the Independent Spent Fuel Storage Installation is in place and the fuel rods are transferred (PG&E 2006a Section 1.6.5).

CONFORMANCE WITH LORS

The HBRP would comply with all applicable soil and water resources LORS, and avoid potentially significant adverse impacts through the preparation and implementation of various construction and operating plans. The proposed water use is consistent with state water conservation policies by utilizing a closed-loop air radiator system for

cooling the reciprocating engine-generator units. HBRP would conform with water quality LORS by preparing and implementing the DESCP and SWPPPs as applicable for both the construction and operating phases of the project, and by securing all related permits. Wastewater, other than stormwater, would be discharged to the sanitary sewer system and would be subject to a Permit for Industrial Wastewater Discharge according to the requirements of Humboldt Community Services District.

COASTAL ACT

Section 30231 of the Coastal Act states:

“The biological productivity and the quality of coastal waters, streams, wetlands, estuaries and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.”

The biological productivity and quality of coastal and inland waters would not be affected by the proposed HBRP. Wastewater, other than stormwater, would be properly contained and treated by way of its discharge to the sanitary sewer system. Stormwater would be managed according to comprehensive DESCP and SWPPP plans during both the construction and operation phases of the project, and BMPs would be properly maintained for the life of the project. The proposed air-cooled engine-generators would not require any withdrawal of seawater, and thus would avoid entrainment of marine life. The 2.7 AFY quantity of groundwater needed to meet process needs is minimal, and would not deplete groundwater supplies. The HBRP would be constructed at an elevation above the flood plain, and would not interfere with surface water flow or cause significant alteration of a waterway. The proposed stormwater outfall to Buhne Slough would have minimal effect on its channel configuration and riparian habitat. Therefore, staff concludes that the proposed HBRP would conform to Section 30231 of the Coastal Act as it applies to soil and water resources.

CONCLUSIONS

With the information provided to date, staff has not identified any unmitigated significant impacts to soil and water resources provided that all of the proposed conditions of certification are met. The HBRP would comply with all applicable soil and water resources LORS including Section 30231 of the Coastal Act, and avoid potentially significant adverse impacts through the preparation and implementation of various construction and operating plans. The construction and operation of HBRP would not affect surface water and groundwater supplies and quality, lead to accelerated erosion and sedimentation, exacerbate flooding by impairing drainage conditions, or allow wastewater to be discharged in a manner that would degrade surface or groundwater quality.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL & WATER-1 Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan (DESCP) that ensures protection of water quality and soil resources of the HBRP site and all linear facilities for both the construction and operational phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, meet local requirements, and identify all monitoring and maintenance activities. The plan shall be consistent with the grading and drainage plan as required by condition of certification **CIVIL-1** and may incorporate by reference any Storm Water Pollution Prevention Plan (SWPPP) developed in conjunction with any NPDES permit. The DESCP shall contain the following elements:

- Vicinity Map – A map shall be provided indicating the location of all project elements with depictions of all significant geographic features including swales, storm drains, and sensitive areas.
- Site Delineation – The Project, which includes the actual facility, lay down area, all linear facilities, and other project elements, shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
- Watercourses and Critical Areas – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. Indicate the proximity of those features to the HBRP construction site; lay down area, and all pipeline and transmission line construction corridors.
- Drainage – The DESCP shall provide a topographic site map showing all existing, interim and proposed drainage systems; drainage area boundaries and water shed size(s) in acres; the hydraulic analysis to support the selection of Best Management Practices (BMPs) to divert off-site drainage around or through the HBRP site and laydown areas. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.
- Clearing and Grading – The plan shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extents of all proposed grading as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography. The DESCP shall include a statement of the quantities of material excavated or filled for each element of the HBRP (project site, lay down area, transmission corridors, and pipeline corridors), whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

- Project Schedule – The DESCOP shall identify on the topographic site map the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.
- Best Management Practices – The DESCOP shall show the location, timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during project element excavation and construction, final grading/stabilization, and following construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. BMPs shall include measures designed to prevent wind and water erosion in areas with existing soil contamination. The maintenance schedule should include post-construction maintenance of erosion control BMPs.
- Erosion Control Drawings -- The erosion control drawings and narrative must be designed and sealed by a professional engineer/erosion control specialist.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCOP to the Humboldt Community Services Department for review and comment. No later than 60 days prior to start of site mobilization, the project owner shall submit the DESCOP and comments to the CPM for review and approval. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

SOIL & WATER-2 The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire HBRP site, lay down area, and all linear facilities (Construction SWPPP).

Verification: The project owner shall submit copies to the CPM of all correspondence between the project owner and the RWQCB about the General NPDES permit for the Discharge of Stormwater Associated with Construction Activities within 10 days of its receipt (when the project owner receives correspondence from the RWQCB) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB). This information shall include copies of the Notice of Intent and Notice of Termination for the project. The project owner shall notify the CPM of any reported non-compliance with the Construction SWPPP.

SOIL & WATER-3 The project owner shall comply with the requirements of the General NPDES Permit for Discharges of Stormwater Associated with Industrial Activity. The project owner shall develop and implement a SWPPP for the operation of the entire HBRP site (Operational SWPPP).

Verification: At least 60 days prior to commercial operation, the project owner shall submit copies to the CPM of the Operational SWPPP for the entire HBRP site for review and approval. This information shall include a copy of the Notice of Intent. Following the commercial operation date, the project owner shall notify the CPM of any reported non-compliance with the SWPPP, any associated corrective measures, and the results of implementing those measures.

SOIL & WATER-4 The project owner shall obtain from Humboldt County Flood Control District/Department of Public Works a Flood Plain Development Permit for HBRP's construction within an area of special flood hazard. HBRP shall comply with all design and reporting requirements as applicable. The project owner must secure a Flood Elevation Certificate (FEMA Form 81-31) based on as-built construction drawings.

Verification: At least 30 days prior to HBRP site mobilization, the project owner shall provide the CPM with a copy of its Flood Plain Development Permit. The Flood Plain Development Permit shall be in accordance with Section 335-4 of the Humboldt County Flood Ordinance. At least 30 days prior to commercial operation, the project owner shall provide evidence of a final Flood Elevation Certificate based on the finished construction to demonstrate compliance with Section 335-5 of the Humboldt County Flood Ordinance.

SOIL & WATER-5 The project owner shall use groundwater as its primary water supply for construction and operations, including cooling, process, and other approved non-potable uses. Prior to construction, the project owner shall install or obtain access to a service or hydrant as supplied by PG&E's well no. 2 for use during construction for compaction and dust suppression, hydrostatic testing, and all other non-potable uses. Prior to commercial operation, the project owner shall install and maintain metering devices as part of the HBRP process water supply and distribution system to monitor and record in gallons per day the total volumes of water supplied to the HBRP from each water source. Those metering devices shall be operational for the life of the project. Potable water supply records can be those provided by HCSD.

The project owner shall prepare an annual Water Use Summary, which shall include the monthly range and monthly average of daily potable and process water usage in gallons per day, and total water used by the project on a monthly and annual basis in acre-feet. For subsequent years, the annual Water Use Summary shall also include the yearly range and yearly average water use by the project. The annual summary shall be submitted to the CPM as part of the annual compliance report.

Verification: At least 30 days prior to construction, the project owner shall submit proof to the CPM that it has installed or obtained access to a service or hydrant as supplied by PG&E's well no. 2 for use during construction for dust suppression, hydrostatic testing and all other non-potable uses. At least 60 days prior to commercial operation of the HBRP, the project owner shall submit to the CPM proof that metering

devices have been installed and are operational on the reclaimed and potable water supply and distribution systems. Potable water use may be based on metering or billings from the supplier.

If there is a significant change in the water supply source(s), the new source(s) supply and distribution system shall also have metering devices. Any water used from the new source(s) shall be incorporated into the annual Water Use Summary within 30 days of hook-up.

The project owner shall submit a Water Use Summary to the CPM in the annual compliance report. The summary report shall distinguish between recorded water use of reclaimed and potable water. Included in the summary report of water use, the project owner shall submit copies of meter records documenting the quantities of water provided. The project owner shall provide a report on the servicing, testing and calibration of the metering devices in the annual compliance report.

SOIL & WATER-6 The project owner shall file an Application/Report of Waste Discharge and obtain an NPDES Permit from the North Coast Regional Water Quality Control Board to assure the discharge of groundwater associated with dewatering HBRP site excavations during construction and for discharge of stormwater during both construction and operation, would not impair the quality of surface water in Buhne Slough. The NPDES Permit issued by the North Coast RWQCB shall be received prior to initiating any grading and/or excavation activities associated with HBRP construction. As an alternative and if applicable, the project owner may either provide documentation from the North Coast RWQCB that HBRP's discharge of groundwater and stormwater to Buhne Slough would be permitted under the General NPDES Permits that would be utilized in accordance with Conditions of Certification **Soil & Water-2 and -3** or has obtained a permit from the Humboldt Community Services District for disposal.

Verification: No later than 180 days prior to start of site mobilization, the project owner shall submit an Application/Report of Waste Discharge to the North Coast RWQCB, with a copy to the CPM. Alternatively, the project owner may provide documentation from the North Coast RWQCB that HBRP's discharge of groundwater and stormwater to Buhne Slough would be permitted under the General NPDES Permits that would be utilized in accordance with Conditions of Certification **Soil & Water-2 and -3** or has obtained a permit from the Humboldt Community Services District for disposal. The NPDES Permit issued by the North Coast RWQCB, or either documentation from the North Coast RWQCB indicating the sufficiency of the General NPDES Permits or the Humboldt Community Services District permit, shall be received and a copy provided to the CPM prior to initiating any grading and/or excavation activities associated with HBRP construction. The project owner shall provide the CPM with copies of all correspondence between itself and the North Coast RWQCB within 10 days of mailing or of receipt as related to the application and permit.

SOIL & WATER-7 The project owner shall secure a Water Supply Service Agreement for potable water service from HCSD. The project owner shall report to the CPM any incidents of non-compliance with the terms of the Water Supply Service Agreement, and remedies to avoid recurrence.

Verification: At least 30 days prior to HBRP commercial operation, the project owner shall provide the CPM with a copy of its Water Service Agreement with HCSD. The CPM shall be notified within 10 days of any incidents of non-compliance with the terms of the Water Supply Service Agreement, including proposed remedies to avoid recurrence, and the results of implementing those remedies.

SOIL & WATER-8 The project owner shall obtain a Permit for Industrial Wastewater Discharge and comply with the wastewater discharge limitations, pretreatment requirements, peak flow restrictions, dewatering discharges, payment of fees, and monitoring and reporting requirements of Humboldt Community Services District.

Verification: At least 30 days prior to HBRP commercial operation, the project owner shall provide the CPM with a copy of its Permit for Industrial Wastewater Discharge from HCSD. The CPM shall be notified in writing within 10 days of any reported non-compliance with HCSD's discharge requirements, including corrective measures for non-compliance and the results of implementing those measures.

REFERENCES

CEC 2006b – California Energy Commission/J.Kessler (tn: 38581). Staff's Data Requests 1 - 57 dated 12/8/2006. Rec'd 12/8/2006.

CEC 2006c – California Energy Commission/J.Kessler (tn: 38893). Staff's Data Requests 58 - 78 dated 1/11/2007. Rec'd 1/11/2007.

CH2MHILL 2006a – CH2MHill/D.Crowe (tn: 38714). Draft Wetland Delineation Report with transmittal letters dated 12/1/2006 to U.S. Army Corps of Engineers and CA Coastal Commission and transmittal letter dated 12/07/2006 to CEC. Rec'd 12/19/2006.

CH2MHILL 2007a – CH2MHill/D. Davy (tn: 38912). Applicant's Responses to CEC Staff's Data Requests 1 - 57. 1/12/2007. Rec'd 1/12/2007.

CH2MHILL 2007b – CH2MHill/D. Davy (tn: 38914). Attachment DR42-1, Drainage, Erosion, and Sediment Control Plan associated with Applicant's Responses to CEC Staff's Data Request 42. 1/12/2007. Rec'd 1/12/2007.

HBWAC 2005 – Humboldt Bay Watershed Advisory Committee. Humboldt Bay Watershed Enhancement Program Report. 2005.

HCPW 2007 – Humboldt County Public Works. Personal communication with Doug Jackson by John Kessler – Energy Commission on 11/28/2007.

PG&E 2006a – PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC
Vol. 1 & 2, 1 AFC CD and 1 Air Modeling CD. 9/29/2006. Rec'd 9/29/2006.

PG&E 2006c – PG&E/R. Kuga (tn: 38321). Data Adequacy Supplement. 11/01/2006.
Rec'd 11/03/2006.

TRAFFIC AND TRANSPORTATION

Testimony of Jason Ricks and Somer Goulet M.S.E.L.

SUMMARY OF CONCLUSIONS

Staff has analyzed the traffic related information provided in the Application for Certification (AFC) and other sources to determine the potential for the Humboldt Bay Repowering Project (HBRP) to have significant adverse traffic and transportation-related impacts. Staff has also assessed the availability of mitigation measures that could reduce or eliminate the significance of these impacts.

The applicant has not proposed any mitigation measures for traffic and transportation; however, staff has recommended conditions of certification to prevent significant adverse traffic and transportation-related impacts and to ensure that the project complies with applicable laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation.

Staff concludes that:

- Although King Salmon Avenue would continue to operate at a level of service (LOS) acceptable to Humboldt County during project construction, the drop in LOS would be substantial; thus condition of certification **TRANS-1** should be implemented to require the execution of a Traffic Control Plan to reduce the impact of a decreased LOS along King Salmon Avenue.
- Condition of certification **TRANS-4** should be implemented to reduce the potential of inadvertent over-flight by California Highway Patrol aircraft of the facility's thermal plumes and any resultant impacts on aircraft safety.

If the California Energy Commission (Energy Commission) grants certification for this project, staff is proposing six conditions of certification.

INTRODUCTION

In the Traffic and Transportation section, staff addresses the extent to which the proposed HBRP may affect the traffic and transportation system within the vicinity of the project site. This analysis focuses on whether construction and operation of the HBRP would cause traffic and transportation impact(s) under the California Environmental Quality Act (CEQA) and whether the project would be in compliance with applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation relevant to the proposed project.

**TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards**

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR), Title 14 Aeronautics and Space, Part 77 Objects Affecting Navigable Airspace (14 CFR 77)	This regulation establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; and provides for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace.
CFR, Title 49, Subtitle B	49 CFR Subtitle B includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
State	
California Vehicle Code (CVC), Division 2, Chapter 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, Div. 14.8, Div. 15	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
Local	
2002 Humboldt 2025 General Plan Update	Establishes regional transportation goals, policies and implementation measures for various modes of transportation, including intermodal and multimodal transportation activities.
Humboldt County Public Works Department	Requires encroachment permits for projects that occur on county right-of-ways (ROW) and for road improvements.

SETTING

The proposed project site is situated on Buhne Point approximately 3 miles south of the city of Eureka, just north of the unincorporated community of King Salmon, and west of the unincorporated community of Humboldt Hill. The proposed site is within the sphere of influence of the city of Eureka and is located at 1000 King Salmon Avenue, Humboldt County, California on 5.4 acres within a 143-acre parcel currently occupied by the existing PG&E Humboldt Bay Power Plant (HBPP). The site is currently zoned Coastal-Dependant Industrial and is within the jurisdiction of the California Coastal Commission (Coastal Commission).

Surrounding land uses include rural residential, port-related industrial, agricultural, and recreational uses. U.S. Highway 101 (Hwy 101) and State Route 299 (SR 299) are the

two nearest primary transportation corridors to the HBRP site. There are three airports within the project vicinity: Eureka Municipal Airport (2.5 miles north), Murray Field Airport (6 miles northeast), and Eureka/Arcata Airport (23 miles north). Additionally, there is a railroad at the eastern boundary of the site (Northwestern Pacific Railroad) as well as bus/transit service (Redwood Transit System) with a bus stop on the east and west sides of the intersection of King Salmon Avenue and Hwy 101.

Parking for construction workers would be provided in a temporary construction parking area located off of King Salmon at the north end of the HBRP temporary construction access road. Construction workers would also park in a temporary remote parking area previously used by PG&E for HBPP construction activities. The parking lot is off King Salmon Avenue west of the HBRP temporary construction access road. In addition, a short-term delivery parking area adjacent to King Salmon Avenue would be used if necessary.

Access to the temporary parking and laydown area would be from a new temporary construction access road, which would be constructed immediately east of the HBPP intake channel. This road would be used to deliver equipment to the project laydown area, which would be within the HBPP site, north of the HBRP boundary and would be prepared at the onset of construction to enable the delivery of the engines, generators and auxiliary equipment. Engines would be delivered to the site and offloaded by the rigging contractor directly to their foundations. Auxiliary equipment would be delivered to the laydown area and offloaded by crane or forklift for later installation. Step-up transformers would be delivered to the switchyard area and assembled. Once the engines are delivered and set, the ventilation units would be installed on the engine hall. After all large equipment has been delivered; the on-site roadways and gravel areas would be completed.

CRITICAL ROADS AND FREEWAYS

Traffic and Transportation Table 2 identifies the critical roads and freeways in the vicinity of the project and the functioning characteristics of each roadway as presented by the applicant in the AFC (PG&E 2006a, Table 8.12-1).

Traffic and Transportation Figure 1 and Figure 2 show the regional and local transportation features as described in the AFC. **Figure 3** shows the locations of the Temporary Access Road and Parking Areas.

**TRAFFIC AND TRANSPORTATION Table 2
Characteristics of Critical Roadways in Project Vicinity**

Name	Classification	Hourly Design Capacity ^a	Average Daily Traffic Volume ^{b, c}	Truck Traffic ^b	Peak Hour Volume ^{b, c}
Regional					
Highway 101	Highway	7,200	27,000	9%	2,850
State Route 299	Highway	3,000	12,600	15%	1,200
Local					
King Salmon Avenue	Local Road	800	2,355	NA	NA

^a Source: Transportation Research Board, 2000

^b Source: State of California, Department of Transportation, 2004 & 2005

^c Source: Garotte, 2006

NA = Not Available

Source: PG&E 2006a, page 8.12-2

The roadways discussion below is based on information contained in the Traffic and Transportation section of the AFC (PG&E 2006a, Page 8.12), as well as traffic data from the California Department of Transportation (Caltrans) and Humboldt County Public Works Department.

U.S. Highway 101

Hwy 101 is a north-south freeway located immediately east of the project area. Within the project vicinity, Hwy 101 is a four-lane roadway that connects Humboldt County north to Interstate 5 (I-5) via SR 299. Hwy 101 extends to areas south of Humboldt County along the coast including Ukiah and San Francisco. Most of the highway south of King Salmon Avenue is a four-lane freeway. To the north of King Salmon Avenue, there is a short section of freeway which continues as city streets through Eureka. North of Eureka, Hwy 101 continues as a fast two-lane road.

According to traffic counts conducted by Caltrans in 2005, Hwy 101 carries approximately 27,000 average daily vehicle trips in the vicinity of the project site (Caltrans, 2004 and 2005). Truck traffic accounts for approximately 9% of all trips based on 2004 data (Caltrans, 2005).

State Route 299

SR 299, which intersects Hwy 101 about 13 miles north of the HBRP site, connects Humboldt County east to Redding, where it connects to I-5. SR 299 in Humboldt County begins as a four-lane highway for approximately the first five miles. The rest of the highway is primarily a two lane (with an intermittent passing lane on ascending grades) scenic and winding route.

According to traffic counts collected by Caltrans in 2005, SR 299 carries approximately 12,600 average daily vehicle trips in the vicinity of the project site, approximately 15% of which are comprised of truck traffic. The hourly design capacity of SR 299 is 3,000 vehicle trips and the peak hour volume is 1,200 (PG&E 2006a, Page 8.12-1 & 8.12-2).

King Salmon Avenue

King Salmon Avenue is a county-maintained road between Hwy 101 and the community of King Salmon. It is also the main access road to the entrance of the HBPP and the

HBRP site. King Salmon Avenue is lightly traveled by passenger cars and trucks. Heavy trucks are limited to those associated with plant operation.

According to the Humboldt County Public Works Department, King Salmon Avenue carried approximately 1,270 vehicles per day in June 1968, 2,290 vehicles per day in July 1970, and 2,355 vehicles per day in June 1973. Only total daily traffic counts were measured during county surveys; therefore, truck traffic and peak-hour volume data were not available for King Salmon Avenue (PG&E 2006a, page 8.12-2). The number of employees at the HBPP and the local population living and working along King Salmon Avenue has been relatively stable since 1973. Therefore, the traffic volume of 2,355 vehicles per day measured in 1973 is likely representative of current traffic volumes on King Salmon Avenue (PG&E 2006a, Page 8.12-2).

LEVEL OF SERVICE

“Level of Service” (LOS) is a qualitative measure describing operational conditions within a traffic stream. LOS is a term used to describe and quantify the congestion level on a particular roadway or intersection, and generally describes these conditions in terms of such factors as speed, travel time, and delay. The Highway Capacity Manual¹ (HCM) defines six levels of service for roadways or intersections ranging from LOS A, which represents the best operating conditions, to LOS F, which represents the worst. A more detailed description of LOS is found in **Traffic and Transportation APPENDIX A**.

Humboldt County uses the LOS criteria, as defined by the 2000 HCM, to assess the performance of its street and highway system and the capacity of roadways. The requirements are specified in *“Moving Goods and People” report of the Humboldt County 2025 General Plan Update, A Discussion Paper for Community Groups* (PG&E 2006a, Page 8.12-7). For road segments within Humboldt County, the acceptable level is a LOS “C” or better.

For county of Humboldt roadways, LOS C (delays of 20 to 35 seconds) is considered to be the limit of acceptable delay. LOS F represents the worst condition with gridlock and is typically unacceptable. See **Traffic and Transportation APPENDIX A** for further discussion.

Traffic and Transportation Table 3 summarizes the current volume-to-capacity (V/C) ratios and LOS for roadway segments in the project vicinity that may be affected by the project during construction and/or operation. The intersection near the project, King Salmon Avenue/Hwy 101, currently operates at LOS A.

¹ The *Highway Capacity Manual* (HCM) is the most widely used resource for traffic analysis. The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. The current edition was published in 2000.

**TRAFFIC AND TRANSPORTATION Table 3
Level of Service Summary for Existing Conditions**

Name	Segment	Hourly Design Capacity	Peak-Hour Volume	V/C	LOS
Hwy 101	East of King Salmon Avenue	7,200	2,850	0.39	A
King Salmon Avenue	HBRP to Hwy 101	800	353	0.44	A

Source: PG&E 2006a, p.8.12-8
V/C = Volume Capacity ratio

The California Highway Patrol provided staff a collision history from 2004 through October 2007 for local roadways and regional highways in the proximity of the project. The data includes collisions at the intersection of Hwy 101 and King Salmon Avenue and 500-feet from the project site. The traffic incident report states that in 2004 there were three traffic incidents, in 2005 there were five, 2006 there were seven, and through October 2007 there have been nine.

RAILWAYS

The North Coast Railroad Authority (NCRA) has full ownership of the Northwestern Pacific Railroad (NWP) from Arcata to Healdsburg and is a member of the Northwestern Pacific Railroad Authority JPA (joint powers authority) for the portion south of Healdsburg. The HBRP site is located next to the northern portion of the railroad, which was officially closed by the Federal Railroad Administration and is currently inactive (CEC 2007(a)).

PUBLIC TRANSPORTATION

Public transportation in the greater Eureka area is provided by the Eureka Transit Service, Arcata and Mad River Transit System, and the Redwood Transit System. However, the Redwood Transit System is the only line that stops along Hwy 101 and King Salmon Avenue. The Redwood Transit System stops at King Salmon Avenue nine times per day between 6:00 a.m. and 10:00 p.m. (Redwood Transit, 2007).

In addition, there are two area schools with bus operations along King Salmon Avenue. The Eureka City Schools (junior high and high schools) and the South Bay Union Elementary both operate Monday-through-Friday service with stops along King Salmon Avenue between 7:20 a.m. and 4:00 p.m. (CEC 2007(e) & CEC 2007 (f)).

BICYCLES & PEDESTRIANS

The majority of the roadways near the project site are narrow with narrow or no shoulders. There is no specially-designated bicycle or pedestrian lanes near the project site; however, all roads in Humboldt County are open to bicycle use. The closest specially-designated bicycle lanes are in the city of Eureka, approximately 3 miles north of the project site (PG&E 2006a, Page 8.12-9).

AIRPORTS

The only commercial airport in the project vicinity is the Eureka-Arcata Airport, located approximately 23 miles north of the HBRP site. This airport serves an average of 115 flights per day (AirNav, 2007). There are two general airports within the site vicinity. The

Eureka Municipal Airport is approximately two miles north of the project site and serves an average of 96 flights per week (AirNav, 2007). The Murray Field Airport is approximately six miles northeast of HBRP and serves an average of 179 flights per day (AirNav, 2007). The Eureka Municipal Airport is the closest to the HBRP site and has one runway designated for powered aircraft.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant impact generated by a project, staff reviews the project using the criteria found in the CEQA Guidelines Appendix G Environmental Checklist and applicable LORS utilized by other governmental agencies. Specifically, staff analyzed whether the proposed project would do the following:

- Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access;
- Result in inadequate parking capacity, or;
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

Although not included as Appendix G Traffic and Transportation items, staff also discusses potential traffic and transportation impacts pertaining to nearby school operations and the transportation of hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

Construction Workforce Traffic

Facility construction is projected to take place over 18 months from July 2008 to January 2010. The maximum number of construction workers commuting to the project site during peak hours is estimated to be 236 daily workers. The peak daily round trips generated by construction traffic are estimated to be approximately 290, which would occur between months 11 and 12 of construction. A daily average of 118 round trips is expected. These trips would be generated by construction-related vehicles (construction workers, craft people, supervisory, support, and construction management personnel), delivery trucks and heavy vehicles commuting to and from the project site.

Construction activities would generally occur between the hours of 7 a.m. and 7 p.m., Monday through Saturday. However, additional hours may be necessary to compensate for schedule deficiencies, or to complete critical construction activities. **Traffic and Transportation Table 4** lists average and peak construction traffic estimates for the HBRP.

The construction workforce (carpenters, electricians, ironworkers, laborers, millwrights, etc.) is expected to come from Humboldt County, particularly from within the Eureka area. The workforce is expected to use southbound Hwy 101 to commute to/from the project site. The maximum expected traffic volume from construction workers commuting to and from the project site would be 236 vehicles commuting via Hwy 101 and accessing the project site from King Salmon Avenue.

Construction Truck Traffic

Truck traffic for the HBRP would be generated primarily by the delivery of construction materials to the project site and the hauling of materials from the project site. The delivery of construction materials and the hauling of materials from the project site would occur throughout the day, not just during peak hours. During some construction periods, including the startup phase of the project, some activities will continue 24 hours a day, 7 days a week.

The primary truck route would be along Hwy 101 to the King Salmon Avenue exit; then east along King Salmon Avenue to the project site. Truck access to the project site would be from King Salmon Avenue via a new temporary access road that crosses Buhne Slough south of Intake Canal and parallels the canal to the site. The HBRP truck access will be separate from the existing HBPP operations.

The applicant states that there would be deliveries of hazardous materials to the project site. During the construction period, small quantities of hazardous materials would be used (for example, cleaning solvents, paint, and antifreeze). No acutely toxic hazardous materials would be used onsite during construction.

Total Construction Traffic

Traffic and Transportation Table 4 summarizes the estimated average daily and peak total construction traffic to be generated during the construction period.

**TRAFFIC AND TRANSPORTATION Table 4
Estimated Trip Generation During Average and Peak Construction Period**

Vehicle Type	Average Daily Round Trips	Peak Daily Round Trips	Morning Peak Hour		Evening Peak Hour	
			In	Out	In	Out
Construction Personnel	101	236	236	0	0	236
Delivery Trucks	2	20	0	0	0	0
Heavy Vehicles & Trucks	15	34	0	0	0	0
Total	118	290	236	0	0	236

Source: PG&E 2006a p. 8.12-12

Traffic and Transportation Table 5 shows the predicted change to critical road segment LOS levels during construction of the HBRP project.

**TRAFFIC AND TRANSPORTATION Table 5
Existing Level of Service and Estimated Construction Level of Service**

Name	Segment	Hourly Design Capacity	Existing Peak-Hour Volume	Construction Peak-Hour Volume	Existing V/C	Construction V/C	Existing LOS	Construction LOS
Highway 101	East of King Salmon Avenue	7,200	2,850	3,086	0.39	0.43	A	A
King Salmon Avenue	Highway 101 to HBRP site	800	353	589	0.44	0.74	A	C

Source: PG&E 2006a p. 8.12-8 & 8.12-13

As shown in **Traffic and Transportation Table 5**, the addition of 236 vehicles would cause the LOS on King Salmon Avenue from Hwy 101 to the project site to decline during the peak hour from LOS A to LOS C. Although the LOS C level is acceptable in Humboldt County (PG&E 2006a, Page 8.12-13) the drop in LOS from A to C is substantial and would be a noticeable impact to circulation along King Salmon Avenue. Therefore, staff is proposing condition of certification **TRANS-1** which would require the applicant to prepare a Traffic Control Plan prior to construction in order to reduce the impact of a decreased LOS along King Salmon Avenue. Hwy 101, east of King Salmon Avenue, currently operates at LOS A during peak-hours and would remain at LOS A during peak construction (PG&E 2006a. pg. 8.12-8 & 8.12 -13).

As noted above, construction-related truck traffic (deliveries to the HBRP site and hauling from the HBRP site) would occur throughout the day. Therefore construction-related truck traffic (54 daily trips at peak) is not expected to reduce LOS or substantially increase congestion. However, there is potential for unexpected damage to roads by vehicles and equipment within the project area. Therefore, staff is proposing condition of certification **TRANS-2** which would require that any road damaged by project construction be repaired to its original condition. This will ensure that any damage to local roadways will not be a safety hazard to motorists.

There were 3 traffic accidents during 2004, 5 in 2005, 7 in 2006 and there have been 9 traffic accidents through October 2007. Staff spoke with Officer Stein of the California Highway Patrol, Arcata Office on November 22, 2007. Officer Stein indicated that the number of traffic accidents fluctuates annually; however, there is nothing specific about this intersection that would contribute to an increase in traffic accidents. Nevertheless, the addition of construction traffic will increase traffic volume which would potentially increase the amount of traffic incidents along this section of the roadway. Therefore, **TRANS-1** is recommended to reduce the potential for additional traffic-related accidents at the intersection of Hwy 101/King Salmon Avenue.

Construction Workforce Parking and Laydown Area

The HBRP would be located in an area with no designated street parking. Construction workers would park in a temporary construction parking area that would be constructed at the north end of the temporary access road. Both the temporary access road and

construction parking area would be removed after construction and the area restored. Construction workers would also park in a temporary remote parking area previously used for construction of the HBPP (PG&E 2006a, page 8.12-6). This parking lot is located off King Salmon Avenue, west of the HBRP temporary construction access road and provides 104 parking spaces. Construction craft workers would walk to the HBRP construction site from the parking areas. The precise number of parking spaces at the proposed temporary construction parking area is unknown; however, using a conservative assumption of 10 feet by 20 feet of area for one parking space, the applicant would need an approximate area of at least 27,000 square feet (0.62 acre) to accommodate 132 vehicles. However, staff was not provided dimensions of the temporary construction parking area and is currently unable to determine if it is large enough to provide enough parking to accommodate the balance of 132 construction worker vehicles. Staff has recommended condition of certification **TRANS-1** which requires the applicant to provide verification that the temporary construction areas would be able to accommodate 236 construction vehicles.

Hazards Due To A Street Design Feature

Primary access to the HBRP would be on King Salmon Avenue from the north side of the road via the proposed temporary access road. To accommodate delivery trucks and construction vehicles, the turning radius from King Salmon on to the temporary access road would need to be 35 feet wide. According to schematic design drawings provided in Data Response No. 64 and No. 65 (CH2MHILL 2007c), both King Salmon Avenue and the entrance to the proposed access road are 30 feet wide and intersect at a perpendicular orientation. Staff has determined (and confirmed by a professional transportation planner) that, in addition to the road improvements shown in these drawings, the width and orientation of King Salmon Avenue and the temporary access road are sufficient to accommodate a safe turning radius (CEC 2007 G).

Linear Facilities

The HBRP would connect to the PG&E electrical transmission system on the project site. Therefore, no new right-of-way (ROW) or widening of roadways will be required and no traffic delays are expected.

Raw water for industrial processes and site landscape irrigation would be supplied via a direct connection to an onsite 6-inch diameter water pipeline from an existing ground water well. However, domestic water required for non-process uses would be provided from a new 1,200-foot long 4- to 6-inch diameter pipeline connecting to the existing Humboldt Community Services District (HCSD) line that runs along King Salmon Avenue. This pipeline would be constructed under the temporary construction access road and would interconnect to the HCSD pipeline in King Salmon Avenue. Installation would have no impact on King Salmon Avenue traffic.

HBRP would connect to the on-site 10-inch diameter, high-pressure, natural gas pipeline. Therefore, no new ROW or widening of roadways would be required and no traffic delays are expected.

Proximity To Schools

The South Bay Union School District and the Eureka City Unified School District serve the HBRP site area. There are two elementary schools within 2.5 miles of the project site: Pine Hill Elementary School located on Vance Avenue approximately 2.5 miles from the HBRP site and South Bay Elementary School, located on Loma Avenue approximately 0.35 mile from the HBRP site.

The proposed construction workforce travel route traverses Hwy 101, SR 299, and King Salmon Avenue and does not pass either of the above schools. However, there are several school bus stops in the King Salmon neighborhood located southwest of the HBRP that can only be accessed via King Salmon Avenue.

South Bay Union School District and Eureka City Schools provide school bus service at several stops within this neighborhood Monday through Friday between 7:00 a.m. and 8:00 a.m. and between 2:00 p.m. and 4:00 p.m. (CEC 2007 (e)). However, construction-related traffic would not pass any of these bus stops and would therefore not present a safety hazard to students waiting at or walking to or from a bus stop.

Operation Impacts and Mitigation

Operation Workforce Traffic

Operation of the HBRP would require 17 employees. However, since the HBRP would include decommissioning of certain HBPP structures and operations, there would be no net increase in permanent employees as result of the HBRP. Therefore, staff agrees with the applicant's traffic consultant that HBRP operations would not significantly impact traffic.

Truck Traffic

Operation of the HBRP would not result in substantial regular truck traffic. Truck traffic associated with operation of the HBRP would not exceed 20 trips per month, except in the event of an emergency which could require up to 24 deliveries of diesel fuel per day (see **Traffic and Transportation Table 6**). However, the expected average daily truck deliveries under normal operation conditions would be two or less trips per day.

Although regular service vehicles and delivery of materials would generally arrive during normal business hours, all deliveries of hazardous materials would occur outside of normal commute times (PG&E 2006a, Page 8.12-15). The addition of this limited number of truck trips would have a negligible effect on overall traffic volume, congestion, and LOS along any of the routes or roadway intersections normally used for these deliveries, except as indicated in **Transportation of Hazardous Materials** below.

TRAFFIC AND TRANSPORTATION Table 6 Operational Truck Traffic

Delivery Type	Number & Occurrence of Trucks
Aqueous ammonia	8 per month
Cleaning chemicals	1 per month
Diesel (normal, gas mode operation)	1 per month
Diesel (emergency diesel operation)	1 per hour
Trash pickup	1 per week
Lubricating oil	31 per year
Lubricating oil filters	4 per year
Laboratory analysis waste	4 per year
Oily rags	4 per year
Oil absorbents	4 per year
Water treatment chemicals	Up to 2 per year

Source: PG&E 2006a p. 8.12-15

Onsite Parking

The Humboldt County Community Development Services provides *Non-Residential Parking Standards* for industrial uses. The calculation is based on the square footage of the proposed building. Although there is no specific parking standard for power generation facilities, the parking standard for manufacturing facilities allows one space for each 1,500 square feet of gross floor space or one space for each employee at the peak shift, whichever is higher. The parking standards for warehouse facilities allow one parking space for each 2,500 square feet of gross floor area or one space for every four employees, whichever is higher. The regular parking space must be at least 18-feet long and 8-feet wide. The project site would have sufficient area to provide the required on-site parking should these standards apply.

The applicant did not cite specific parking requirements, measurements, or spaces for operation in the AFC; however, since the net number of employees of the facility is not expected to change, an increase in parking demand is also not expected. However, to ensure that operational parking would be adequate, staff has proposed condition of certification **TRANS-3**, which would require the applicant to provide adequate parking as needed for operational and maintenance staff. **TRANS-3** would demonstrate coordination with the Coastal Commission and/or Humboldt County Community Development Service Department for onsite parking.

Airports

Staff's experience is that the hot exhaust generated by a power plant can disturb atmospheric stability above a power plant up to 1,000 feet above ground level (AGL), resulting in turbulence with the potential to affect aircraft maneuverability. The Eureka Municipal Airport, located approximately 2.5 miles north of the HBRP, is the closest airport to the project site. This airport is a public general-aviation airport with one runway designated for powered aircraft. There are, on average, 96 flights per week from the Eureka Municipal Airport with 18 aircraft based on the field: 16 single engine airplanes and two ultra-lights. The Engineering Department of the city of Eureka oversees the operation of the Eureka Municipal Airport (FAA Identifier O33). Flight patterns for this airport do not over fly either Humboldt Bay or the city of Eureka and the HBRP would be located well outside its flight patterns (COE 2007). The county facilities at Murray Field Airport are over five miles east of the Eureka Municipal Airport and its

flight patterns are even more removed from the location of the proposed site (COE 2007). Therefore, staff concludes that hot exhaust from the HBRP would not affect aircraft maneuverability from area airports.

In addition, the HBRP does not have any structure exceeding 200 feet in height, which would require notifying the FAA of a potential hazard to air traffic.

Staff spoke to Sergeant Larson of the California Highway Patrol (CHP), Humboldt Area Office, on November 7, 2007. Sergeant Larson informed staff that the CHP currently conducts monthly deployments out of the Redding Field Office for traffic enforcement. The CHP primarily uses airplanes for traffic enforcement. The airplanes fly at a minimum of 500 feet AGL. The CHP also uses helicopters but they are primarily for transport and emergencies. The CHP flies over Hwy 101 and SR 299 at a minimum of two to three times per month and a maximum of four to five times per month. Staff recommends that the applicant send a written notification to the CHP, Humboldt Area Office informing them of the start date of commercial operation for the power plant, and advising them that potential turbulence caused by thermal plumes emitted from the engine exhaust stacks may adversely affect aircraft flying directly over the power plant. Staff has proposed condition of certification **TRANS-4** which requires the applicant to submit written notification to the CHP, Humboldt Area Office.

Emergency Services Vehicle Access

The Humboldt Fire District Station Number 12, Bayview, provides 24-hour fire protection to the HBPP site and would provide service to the HBRP once operational. Station 12 is staffed by three personnel who cover the southern end of the Fire District. Station 12 is the first station required to respond to the HBPP. One of the department's reserve engines, Engine 14, is housed at Station 12, in addition to Engine 12. In the event of an emergency at the HBRP during construction, the emergency vehicles would enter the project site via King Salmon Avenue. The temporary access road would allow for adequate access into the facility. As discussed above, the temporary access road would have a turning radius of sufficient length to accommodate large trucks and construction vehicles and therefore would also be able to accommodate emergency vehicles.

Permanent plant access to the site will be provided by the existing access road into the HBPP from King Salmon Avenue and would allow for adequate access into and out of the facility during construction and operations. Additionally, there would be adequate room for emergency vehicles to turn around within the facility boundaries. For a more detailed discussion of emergency services serving the facility refer to the **Worker Safety and Fire Protection** section in this Final Staff Assessment (FSA).

Transportation of Hazardous Materials

Operation of HBRP would result in the generation of wastes including lubricants, water treatment chemicals, herbicides and pesticides, and sludge. During operation of the HBRP, trucks would deliver and haul away aqueous ammonia, sulfuric acid and other hazardous materials. The applicant estimates a maximum of eight truck deliveries a month with an average of two truck trips per week to the site. The primary designated hazardous materials route for the HBRP is Hwy 101 to the King Salmon Avenue exit, then northwest along King Salmon Avenue to the HBRP site. Staff agrees with the

applicant that this route is suitable and would minimize off-freeway travel and avoids passing directly by any local schools. However, as discussed above, school buses travel along King Salmon Avenue past the project site. School bus traffic occurs Monday through Fridays between 7:00 a.m. and 8:00 a.m. and between 2:00 p.m. and 4:00 p.m. Therefore, to avoid potential conflicts or accidents between school buses and vehicles transporting hazardous materials staff has proposed condition of certification **HAZ-3** (please refer to the **Hazardous Materials Management** section of this FSA) which requires the applicant to schedule delivery of aqueous ammonia and diesel fuel to the site so as not to coincide with school bus traffic.

Although the transportation and handling of hazardous materials (i.e. aqueous ammonia) can increase roadway hazard potential, impacts associated with the hazardous materials can be mitigated to a level of insignificance by compliance with existing federal and state standards established to regulate the transportation of hazardous substances. These standards constitute a comprehensive regulatory program whose purpose is to ensure the safety of hazardous materials transportation. Staff has assessed the efficacy of these standards and finds that they are successful in minimizing the risks associated with hazardous materials transportation. The applicant stated that delivery of hazardous materials will comply with Caltrans, U.S. Environmental Protection Agency, California Department of Toxic Substances Control, CHP, and California State Fire Marshal regulations (PG&E 2006a, Section 8.5.4.2.4).

Specific sections of the California Vehicle Code and the California Streets and Highways Code ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the CHP.

The California Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to check weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are required to take instruction in first aid and procedures on handling hazardous waste spills. Drivers transporting hazardous waste are required to carry a manifest that is available for review by the CHP at inspection stations along major highways and interstates.

The applicant would be required to comply with all LORS governing the transport, storage, and use of hazardous materials. For a more detailed discussion on the handling and disposal of hazardous substances, see the **Hazardous Materials Management** section of this FSA.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130.).

The Independent Spent Fuel Storage Installation (ISFSI) is an underground facility to provide long-term, safe storage of the spent fuel rods currently stored within Unit 3 of

the HBPP. The ISFSI is the first step in decommissioning Unit 3, which ceased operations in 1976. The ISFSI was certified by the Coastal Commission on September 15, 2005. The ISFSI construction is substantially complete with spent fuel loading scheduled to be completed by 2009 (PG&E 2008d). The ISFSI construction will not overlap with HBRP construction, and thus there would be no cumulative impacts associated with construction and operation of ISFSI and construction and operation of the HBRP.

Construction of the HBRP would directly result in the cessation of operation of the HBPP; however, there is no schedule for demolition of Units 1 and 2 (PG&E 2006a, Page 2-4). As stated in the HBRP AFC, Units 1 and 2 need to be fully operational to serve the Humboldt County load until the HBRP is constructed, commissioned, and fully operational. Therefore, any demolition of these units would occur after the HBRP is constructed, and thus the HBRP and the demolition of Units 1 and 2 would not combine to have a significant adverse cumulative impact on traffic flow.

In addition to the ISFSI project, PG&E has proposed to remove 4,200-feet of retired fuel oil pipeline between Olson's Wharf and the HBPP storage tanks. The pipeline removal project site is along the east margin of Humboldt Bay at King Salmon Slough near the HBPP. The removal of the retired fuel oil pipeline would be conducted in July through September 2008 and last for approximately ten weeks (PG&E 2007). Removal of the retired fuel oil pipeline and construction of the HBRP would potentially overlap. The pipeline removal project activities are expected to remain within approximately 50-feet of the fuel oil pipeline alignment. The pipeline removal project would span from the fuel oil storage tanks within the HBPP to the HBPP security fence/access road (King Salmon Avenue) and continue to Olson's Wharf (Hookton Channel). The pipeline removal project would use a boom truck or medium sized crane, excavator or back hoe, flat bed trailer, dump truck, barge, and various utility and crew vehicles (PG&E 2007). As presented in Table 5, Highway 101 and King Salmon Avenue would operate at LOS A and LOS C respectively, with the addition HBRP construction traffic. Considering this traffic, it would take the addition of over 2,700 trips to reduce Highway 101 to LOS D and the addition of 60 trips to reduce King Salmon Avenue to LOS D. Although the precise number of workers required to complete this project is unknown, based on the pipeline removal project equipment list presented above, it is unlikely the project would require 60 daily trips. Therefore, the removal of the retired fuel oil pipeline and construction of the HBPP would not have a significant adverse cumulative impact on traffic flow.

The HBRP construction workforce traffic, construction truck traffic, and hazardous materials truck traffic would not travel through areas with an identified minority or low income population. In addition, staff has determined that all significant direct or cumulative impacts specific to traffic and transportation resulting from the construction or operation of the project would be less than significant with mitigation. Therefore, the proposed project does not introduce traffic and transportation-related environmental justice issues.

COMPLIANCE WITH LORS

Traffic and Transportation Table 7 provides a general description of applicable statutes, regulations and standards adopted by the federal government, the State of California, and Humboldt County pertaining to traffic and transportation with which the project is required to comply. Conditions of certification have been proposed to ensure project consistency with a LORS where it was not already mandated by federal or state regulations.

**TRAFFIC AND TRANSPORTATION Table 7
Project Compliance With Adopted Traffic and Transportation LORS**

Applicable Law	LORS Description and Project Compliance Assessment
Federal	
CFR, Title 14, Section 77 (14 CFR 77)	Includes standards for determining physical obstructions to navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace [including temporary flight restrictions (TFR)].
	The project does not have any structures exceeding 200 feet in height and is beyond restricted airspace; therefore no notification to the FAA is required.
CFR, Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and specifies safety measures for motor carriers and motor vehicles who operate on public highways.
	Enforcement is conducted by state and local law enforcement agencies, and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., Humboldt County Department of Public Works permits).
State	
California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, Div. 14.8, Div. 15	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.
	Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting, and/or local agency permitting.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
	Enforcement is provided by state and local law enforcement, and through ministerial state agency licensing and permitting, and/or local agency permitting.

Local	
2002 Humboldt County 2025 General Plan Update	Establishes regional transportation goals, policies and implementation measures for various modes of transportation, including intermodal and multimodal transportation activities.
	Staff has proposed condition of certification TRANS-1 which requires the preparation of a construction traffic control and implementation of this management plan. These plans includes timing of heavy equipment and building materials deliveries and scheduling of construction workforce start and end times to ensure the project meets the County's LOS C standards on project roadways; prevent additional traffic related accidents at King Salmon Avenue/Hwy 101 intersection; and require coordination for deliveries.
Humboldt County Public Works Department	Requires encroachment permits for projects that occur on County right-of-ways (ROW) and for road improvements.
	Staff has proposed condition of certification TRANS-5 which requires the applicant to obtain encroachment permits prior to the start of construction.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any traffic related benefits associated with the HBRP.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments related to traffic and transportation.

CONCLUSIONS

Staff has analyzed potential construction and operational impacts related to the regional and local traffic and transportation system by the proposed project and concludes the following:

- The construction and operation of the HBRP as proposed with the effective implementation of staff's recommended conditions of certification **TRANS-1** through **TRANS-5** would ensure that the project's direct adverse traffic and transportation impacts are less than significant and would ensure that the project complies with applicable LORS regarding traffic and transportation.
- Construction of the HBRP and other identified projects in the same time frame would not result in a significant adverse cumulative impact on local traffic flow.
- During operation, workforce and truck traffic to and from the facility would not result in a substantial increase in congestion, or deterioration of the existing LOS, during any time in the daily traffic cycle and would have a less than significant adverse

impact along the routes or roadway intersections that would be used to access the HBRP site.

- Staff has proposed condition of certification **HAZ-3** to ensure that truck delivery of aqueous ammonia does not present a hazard to school buses on King Salmon Avenue.
- During construction and operation, the project would not generate commuter or truck traffic trips through a residential area or directly adjacent to a school facility or school bus stop.
- Project-generated thermal plumes would not present a hazard to aircraft originating from area airports flying at or above 1,000 feet above ground level and the presence of the plant would not significantly influence the potential for an aircraft accident during normal airport operations.
- Condition of certification **TRANS-4** should be implemented to reduce the potential of inadvertent over-flight by California Highway Patrol aircraft of the facility's thermal plumes and any resultant impacts on aircraft safety.

Should the Energy Commission certify the project, staff recommends that the Energy Commission adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

Traffic Control and Implementation Plan

TRANS-1 The project owner shall prepare and implement a construction traffic control and implementation plan for the HBRP and its associated facilities, containing:

- A Traffic Management Plan (TMP) addressing the movement of vehicles and materials, including arrival and departure schedules outside of peak travel periods and school bus pick-up/drop-off and designated workforce and delivery routes and coordination with Caltrans, and other traffic-related activities and resulting impacts during construction of the project.
- Redirection of construction traffic with a flag person.
- Signing, lighting, and traffic control device placement.
- A Heavy Haul Plan (HHP), addressing the transport and delivery of heavy and oversized loads requiring permits from Caltrans or other state and federal agencies.
- A Parking Plan to ensure designated parking areas are adequate to accommodate construction workforce vehicles and parking spaces comply with county length and width dimensions.
- Access and entry for emergency service vehicles to the project site.

The project owner shall consult with the Coastal Commission, Humboldt County Public Works Department, and Caltrans in the preparation and implementation of the traffic control and implementation plan and shall submit

the proposed traffic control plan to the Coastal Commission, Humboldt County and Caltrans in sufficient time for review and comment and to the Energy Commission Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan. The project owner shall provide a copy of any written comments from the Coastal Commission, Humboldt County or Caltrans and any changes to the traffic control plan to the CPM prior to the proposed start of construction.

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant site or its associated easements, the project owner shall submit the proposed traffic control and implementation plan to the Coastal Commission, Humboldt County Public Works Department and Caltrans for review and comment and shall provide at least 60 days for these agencies to respond and comment on the plan. Additionally, the project owner shall submit the proposed traffic control and implementation plan to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the Coastal Commission, Humboldt County and Caltrans requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from either the Coastal Commission, Humboldt County or Caltrans, along with any changes to the proposed plan to the CPM for review and approval.

Repair of Public Right-of-Way

TRANS-2 The project owner shall restore all public roads, easements, and rights-of-way (ROW) that have been damaged due to project-related construction activities to original or near original condition in a timely manner.

Prior to the start of site mobilization, the project owner shall consult with Humboldt County and Caltrans (if applicable) and notify them of the proposed schedule for project construction. The purpose of this notification is to request that the local jurisdiction and Caltrans consider postponement of public ROW repair or improvement activities in areas affected by project construction until construction is completed and to coordinate with the project owner any concurrent construction-related activities that are planned or in progress and cannot be postponed.

Verification: At least 30-days prior to the start of mobilization, the project owner shall photograph or videotape all affected public roads, easements, and ROW segment(s) and/or intersections and shall provide the CPM, the affected local jurisdiction(s) and Caltrans (if applicable) with a copy of these images.

Within 60 calendar days after completion of construction, the project owner shall meet with the CPM, the affected local jurisdiction(s) and Caltrans (if applicable) to identify sections of public ROW to be repaired. At that time, the project owner shall establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public ROW repairs, the project owner shall provide a letter signed by the affected local jurisdiction(s) and Caltrans stating their satisfaction with the repairs to the CPM.

Parking Standards

TRANS-3 The project owner shall comply with the applicable parking standards for project operation as established by the Coastal Commission and Humboldt County.

Verification: At least 30 days prior to start of construction, the project owner shall submit written evidence to the CPM that the project conforms to all applicable parking standards as established by the Coastal Commission and Humboldt County standards. The submittal to the CPM shall include evidence of review by the Coastal Commission and Humboldt County.

CHP Notification

TRANS-4 Prior to the start of commercial operation the project owner shall submit written notification to the California Highway Patrol (CHP), Humboldt Area Office informing them of the start of commercial operation date for the power plant, and advising them that potential turbulence caused by thermal plumes emitted from the power plant's engine exhaust may adversely affect aircraft flying directly over the power plant below an elevation of 1,000 feet above ground level.

Verification: The project owner shall provide to the CPM a copy of the transmittal letter submitted to the CHP, Humboldt Area Office.

The project owner shall provide any written comment(s) received on the written notification from the CHP, Humboldt Area Office to the CPM for review.

Encroachment Permit

TRANS-5 Prior to any ground disturbance or obstruction of traffic (for example, temporary delays) within any public road, easement, or ROW, the project owner or its contractor(s) shall coordinate with the Humboldt County Public Works Department and Caltrans (if applicable) and obtain all required permits. All activities by the project owner or its contractor(s) shall comply with the applicable requirements of any affected local jurisdiction and Caltrans.

Verification: At least 20 days prior to ground disturbance or interruption of traffic in or along any public road, easement, or ROW, the project owner shall provide copies of all permit(s) received from Caltrans or other affected jurisdiction to the CPM. In addition, the project owner shall retain copies of the issued/approved permit(s) and supporting documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

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TRAFFIC AND TRANSPORTATION APPENDIX A

HIGHWAY CAPACITY MANUAL

The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. It represents a concentrated, multi-agency effort by the Transportation Research Board, the Federal Highway Administration, the American Association of Highway and Transportation Officials, and other traffic/transportation related agencies. It is the most widely used resource for traffic analysis. Several versions of the Highway Capacity Manual (HCM) have been published. The current edition was published in 2000. It contains concepts, guidelines, and computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in the Highway Capacity Manual 2000. The Highway Capacity Manual 2000 represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level of service A representing the best operating conditions and level of service F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels. A general description of service levels for various types of facilities is shown in **Table A-1**.

**Table A-1
Level of Service Description**

Facility Type	Uninterrupted Flow	Interrupted Flow
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-way Stop Control - All-way Stop Control
Level of Service		
A	Free-flow	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow	Tolerable delay
E	Unstable flow	Limit of acceptable delay
F	Forced or breakdown flow	Unacceptable delay

Source: Highway Capacity Manual 2000

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table A-2**.

Table A-2
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: Highway Capacity Manual 2000

The use of control delay, often referred to as signal delay, was introduced in the 1997 update to the Highway Capacity Manual. It represents a departure from previous updates. In the third edition of the Highway Capacity Manual, published in 1985 and the 1994 update to the third edition, delay only included stop delay. Thus, the level of service criteria listed in Table B differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the Highway Capacity Manual and represent a revision of the methodology published in the 1994 update to the 1985 Highway Capacity Manual. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and

increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table A-3**.

Table A-3
Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: Highway Capacity Manual 2000

REFERENCE

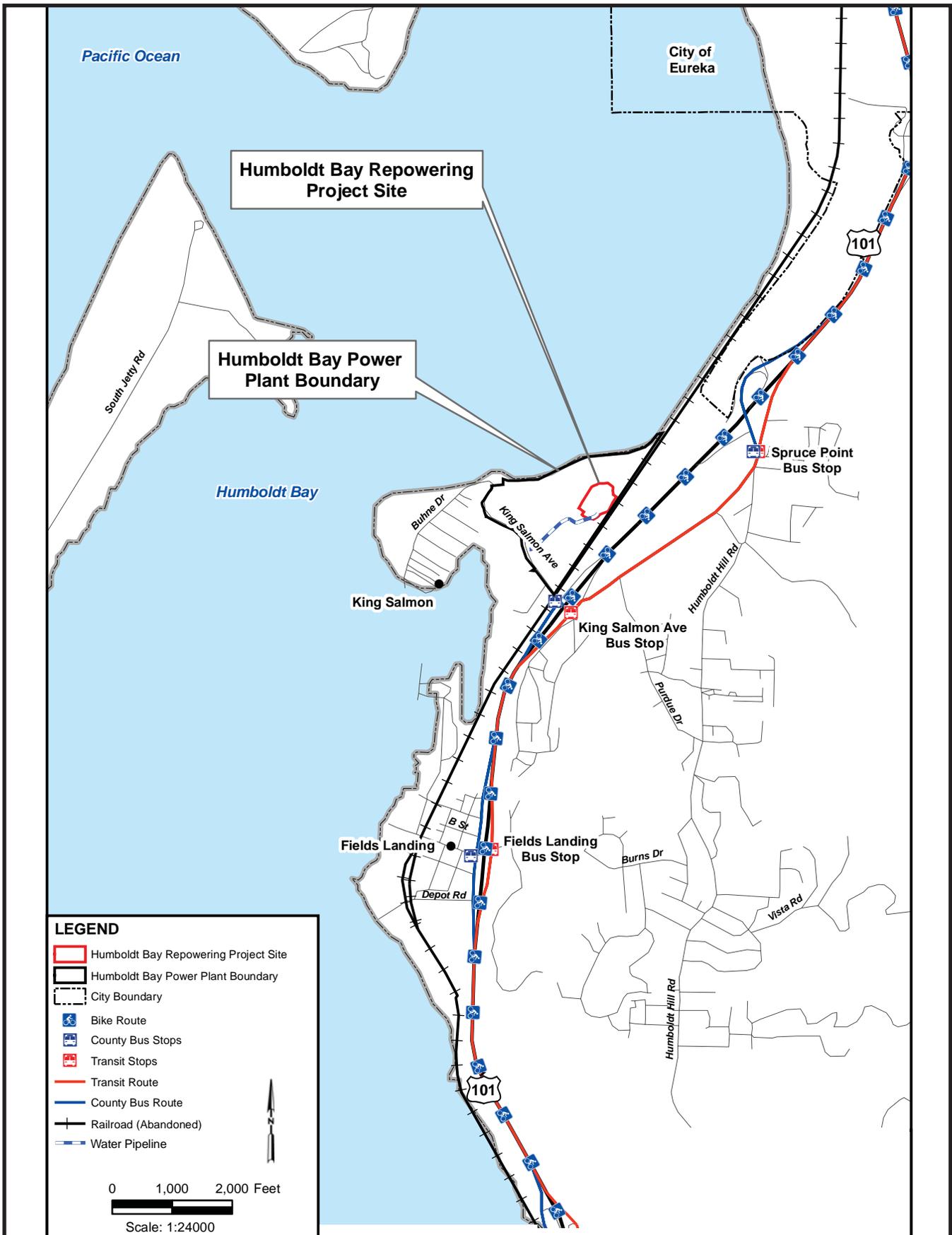
Transportation Research Board. Highway Capacity Manual 2000. Washington, D.C.

TRAFFIC AND TRANSPORTATION - FIGURE 1
Humboldt Bay Repowering Project - Regional Transportation System



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008
SOURCE: AFC Figure 8.12-1

TRAFFIC AND TRANSPORTATION - FIGURE 2
Humboldt Bay Repowering Project - Local Transportation System



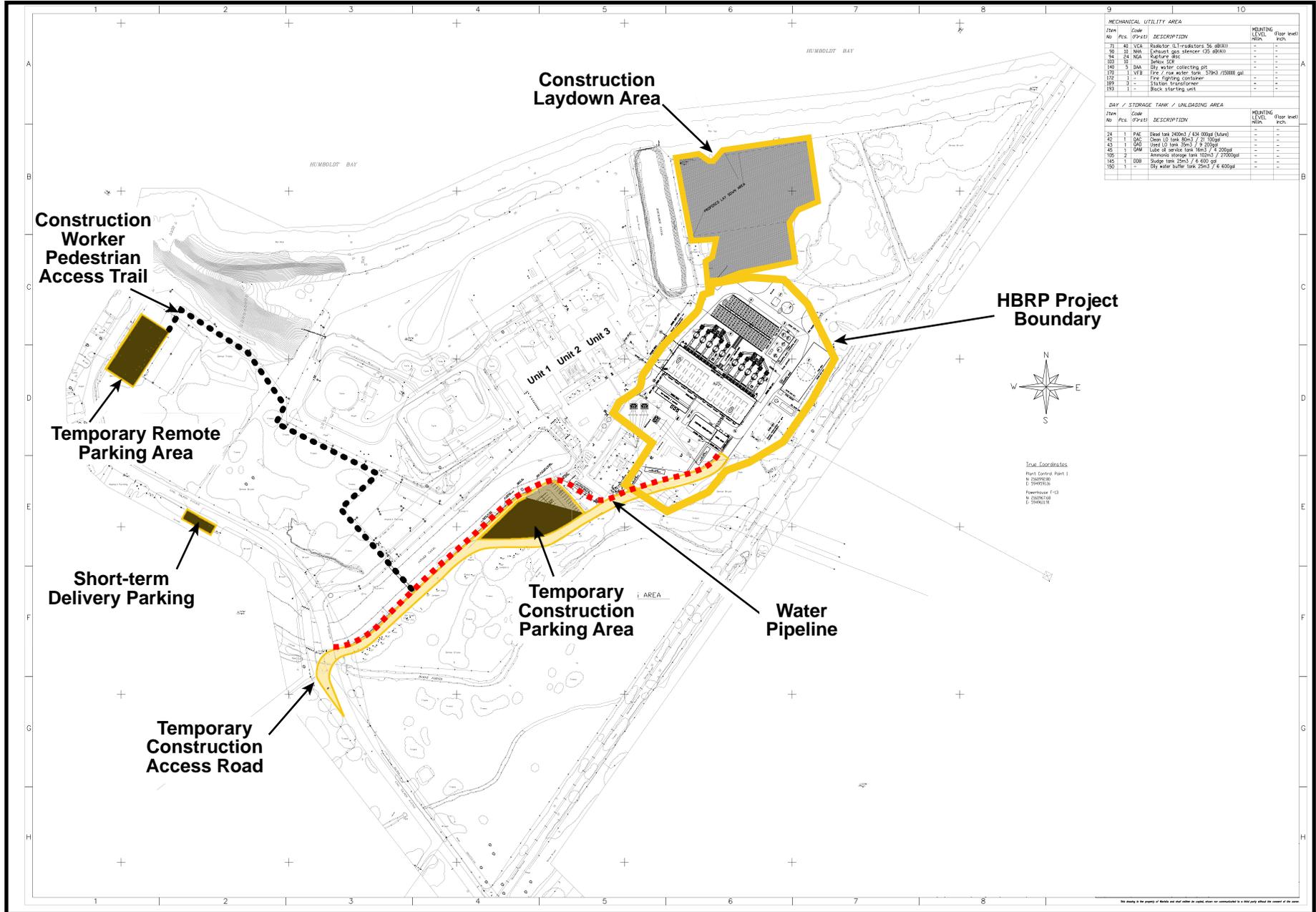
CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008

SOURCE: AFC Figure 8.12-2

TRAFFIC AND TRANSPORTATION - FIGURE 3
Humboldt Bay Repowering Project - Temporary Access Road and Parking Areas

MAY 2008

TRAFFIC AND TRANSPORTATION



TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

Pacific Gas and Electric (PG&E) proposes to transmit the power from the proposed Humboldt Bay Repowering Project (HBRP) to its electric transmission grid through two 60-kilovolt (Kv) and one 115-Kv line connecting the proposed facility to the same Humboldt Bay Power Plant Substation that is used for the existing Humboldt Bay Power Plant. These tie-in lines would be located within the property lines for the existing power generating complex meaning that no off-site lines would be built. Since there would be no residences in the immediate vicinity of the project and related substation and lines, there would be none of the residential electric and magnetic field exposures that have raised concern about human health effects in recent years. The proposed lines would be designed, erected, operated, and maintained by PG&E according to its standard practices, which conform to applicable laws, ordinances, regulations and standards (LORS). Since these lines are of PG&E design, their field and non-field impacts would be similar to those of PG&E lines of the same design and current-carrying capacity. With the adoption of three recommended conditions of certification, all of these impacts would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the proposed lines' design and operational plan to determine whether their related field and non-field impacts would constitute a significant environmental hazard in the area around them. All related health and safety LORS are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues as related primarily to the physical presence of the lines, or secondarily to the physical interactions of their electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

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	Not to exceed applicable local noise ordinances – (no design-specific federal or state regulations for noise from transmission lines).
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) Section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

Applicable LORS	Description
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC "Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California"	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields for CPUC-regulated utilities.
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 Humboldt Bay Power Plant Substation (to which the proposed HBRP would be connected) would be located on the same 143-acre PG&E property as both the PG&E power generating complex to be replaced, and HBRP that is proposed to replace it. The proposed tie-in lines would be located entirely within this PG&E property in an industrial zone with the immediate residential buildings

located approximately 0.25 miles from the lines and related switchyard. This lack of residences in the immediate vicinity means that there would not be the types of long-term human EMF exposures that have been 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 immediate vicinity of the line. These types of exposures are short term and are not of health concern but staff would recommend the measurements necessary for comparison with PG&E lines of the same voltage and current-carrying capacity.

PROJECT DESCRIPTION

The proposed HBRP will be connected to PG&E's grid with the following three transmission lines:

- An overhead 115-kV line extending approximately 500 feet from the project's 115-kV/60-kV switchyard to PG&E's existing Humboldt Bay-Humboldt 115-kV line to the northeast;
- Two 60-kV overhead lines of 82 feet and 117 feet (for the first and second sets of generators respectively) connecting the HBRP Switchyard to the existing Humboldt Bay Power Plant; and
- The project's on-site 60-kV/115-kV switchyard from which the conductors would extend to their respective system connection points.

The proposed lines' conductors would be standard low-corona aluminum conductors or equivalent and would be located on steel poles (of 70 feet to 90 feet for the 60-kV line and 50 feet for the 115-kV line), which would allow for ground clearance typical of such PG&E lines. The applied design and construction would be in keeping with PG&E guidelines necessary to ensure line safety and efficiency together with maintainability, and reliability.

There would be no public access to the proposed lines or related switchyard since they would all lie within the property boundaries of the PG&E power generation complex within which HBRP would be located.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the transmission line impacts of concern in this staff analysis depends on compliance with the listed LORS whose related mitigation measures have been established as adequate to maintain such 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 and the need to file a "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA as noted in the LORS section. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved.

As noted by the applicant (PG&E 2006a, p.5-16) the maximum height of the proposed lines' support structures would, at 90 feet, be much less than the 200 feet regarded by the FAA as triggering the concern about aviation safety. Furthermore, the lines would be located in an area with several other PG&E lines some of which are of similar voltage and structural dimensions. For airports with runways measuring 3,200 feet or less, the restricted space would extend 10,000 feet. HBRP would be located about 12,000 feet from the runway of the nearest public airport, the Eureka Municipal, whose runway is 2,700 feet long. Given these conditions, staff considers the proposed lines' structures as not posing an obstruction-related aviation hazard to area aircraft as defined using current FAA criteria. Therefore, no FAA "Notice of Construction or Alteration" would be required for the lines.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is, therefore, minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed HBRP lines connecting the generators and the existing substation would be built and maintained in keeping with standard PG&E practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345-kV and above, and not the proposed 60-kV and 115-kV lines. 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. Since these existing lines do not currently cause the corona-related complaints along their existing routes, staff does not expect any corona-related radio-

frequency interference or related complaints in the general project area and therefore, recommends no condition of certification in this regard.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as proposed for HBRP. 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 lines (PG&E 2006a, p. 3-16). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Compliance with **TLSN-1** should ensure implementation of 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 (PG&E 2006a, p. 5-12) 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 line, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (PG&E 2006a, pp. 3-15 and 3-16). Staff recommends Condition of Certification **TLSN-3** to ensure such grounding.

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, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend reduction of such fields as feasible without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction 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 high-voltage lines) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new or modified line in California is currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, its fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing PG&E safety and field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC finished revisiting the EMF management issue in 2006 to assess the need for policy changes to reflect the available information on possible health impacts. The findings (in Decision 06-08-019 of August 24, 2006) did not point to a need for significant changes to existing field management policies.

Industrial Standards

The present focus is on the magnetic field because only it can penetrate the soil, buildings and other materials to potentially produce the types of health impacts at the root of the health concern of recent years. As one focuses on the strong magnetic fields

from the more visible overhead transmission and other 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 (National Institute of Environmental Health Services and the U.S. Department of Energy, 1995). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines are lower level, but long-term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar PG&E lines, specific field strength-reducing measures would be incorporated into the design of the proposed line to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

- Protocol: 1. Increasing the distance between the conductors and the ground;
- Protocol: 2. Reducing the spacing between the conductors;
- Protocol: 3. Minimizing the current in the line; and
- Protocol: 4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Since optimum field-reducing measures would be incorporated into the proposed line design, staff considers further mitigation to be unnecessary, but would seek to validate the applicant's assumed reduction efficiency from the field strength measurements recommended in Condition of Certification, **TLSN-2**.

CUMULATIVE IMPACTS AND MITIGATION

Since the proposed project transmission lines and switchyard would be designed according to applicable field-reducing PG&E guidelines (as currently required by the CPUC for effective field management), staff expects the resulting fields to be of the same intensity as fields from PG&E lines of the same voltage and current-carrying capacity. Any contribution to cumulative area exposures should be at similar levels. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is PG&E. Since the proposed project lines and related switchyard would be designed according to the respective requirements of GO-95, GO-52, GO-131-D, and Title 8, Section 2700 et seq. of the California Code of Regulations, and operated and maintained according to current PG&E guidelines on line safety and field strength

management, staff considers the presented design and operational plan to be in compliance with the health and safety LORS 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.

CONCLUSIONS

Since the proposed lines and related facilities are not close enough to the nearest airport to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location or design changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current PG&E guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of PUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed HBRP 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 lines' 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 absence of residences in the area around them. 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 lines would be operated to minimize the health, safety, and nuisance impacts of concern to staff, while located along a route without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. 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 transmission lines according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2. High Voltage Electrical Safety Orders, Sections 2700 through 2974 of the California Code of Regulations, and PG&E's EMF-reduction guidelines.

Verification: At least thirty 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 lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall hire a qualified consultant to measure the strengths of the electric and magnetic fields from the lines before and after they are energized. The measurements shall be made according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures at the locations of maximum field strengths along the proposed route. These measurements shall be completed not later than six months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this Condition.

REFERENCES

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

Pacific Gas and Electric (PG&E) 2006a. Application for Certification. Volumes I and II for the Humboldt bay Repowering Project. Submitted to the California Energy Commission on September 29, 2006.

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August 1998.

VISUAL RESOURCES

Testimony of Mark R. Hamblin

SUMMARY OF CONCLUSIONS

Staff has analyzed visual resource related information pertaining to the proposed Humboldt Bay Repowering Project, and found that the project would not introduce an adverse “Aesthetic” impact under the California Environmental Quality Act and Guidelines, and would comply with applicable laws, ordinances, regulations, and standards pertaining to aesthetics or preservation and protection of sensitive visual resources.

INTRODUCTION

Visual resources are the viewable natural and man-made features of the environment. In this section, staff evaluates the proposed project’s construction and operation using the “Aesthetic” section in the California Environmental Quality Act (CEQA) Guidelines to determine if the project would introduce a significant impact under CEQA, and if the project would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or preservation and protection of sensitive visual resources.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 1 provides a general description of identified adopted federal, state, and local LORS pertaining to aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project.

**VISUAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards Laws**

Applicable LORS	Description
Federal	
Transportation Equity Act for the 21st Century of 1998, and Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2005.	The project site does not involve federal managed lands, nor a recognized National Scenic Byway or All-American Road within its vicinity.
State	
California Coastal Act of 1976, Section 30251 – Scenic and Visual Qualities	The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.
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.
Local	
Humboldt County General Plan, Vol. II Humboldt Bay Area Plan of the Humboldt County Local Coastal Program, April 1995 (effectively certified by the California Coastal Commission on January 10, 1986)	This area plan represents one of six county coastal planning areas. It identifies land uses and standards by which development will be evaluated within the Coastal Zone. The plan identifies uses and provides standards adopted by the county of Humboldt, and certified by the California Coastal Commission that are in conformance and satisfy the policies and requirements for coastal land use contained in the California Coastal Act 1976.
-Section 3.13 Coastal-Dependent Development/Industrial (MC)	Coastal-dependent industrial facilities are encouraged to locate or expand within existing sites and be permitted reasonable long-term growth where consistent with this division. However, where new or expanded

<p>- Section 3.40 Visual Resource Protection</p>	<p>coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section.</p> <p>The scenic and visual qualities of coastal areas are to be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and where feasible, to restore and enhance visual quality in visually degraded areas.</p>
<p>Humboldt County Zoning Regulations - Chapter 3 – Regulations Inside the Coastal Zone</p> <p>- Section 313-3.4 MC: Industrial/Coastal-Dependent</p> <p>- Section 313-103.1 Industrial Performance Standards</p>	<p>Chapter 3 contains regulations which apply exclusively within the California Coastal Zone in Humboldt County.</p> <p>Coastal-Related subject to the Coastal-Dependent Industrial Regulations; heavy industrial, limited to alteration, improvement, and relocation of existing facilities.</p> <p>The purpose of these regulations is to establish minimum standards for the operation of industrial development in Humboldt County.</p>

SETTING

The proposed Humboldt Bay Repowering Project (HBRP) would be built three miles southwest of the city of Eureka, in unincorporated Humboldt County, California. The site is situated along the eastern shore of Humboldt Bay on Buhne Point, a peninsula that protrudes into Humboldt Bay.

The proposed power plant would be constructed on an approximate 5.4-acre portion of a 143-acre property owned by Pacific Gas and Electric (PG&E) Company. The terrain of the property varies from submerged and low tidal land, protected by dikes and tide gates, to a high bluff along the southwestern boundary. The property currently contains the 50-year old Humboldt Bay Power Plant, cooling water intake and discharge canals, various large cylindrical storage tanks, emergent marshes, seasonal wetlands, and Buhne Slough.

In the area of the project site is the Pacific Ocean two miles to the west. Humboldt Hill (elevation 500 feet) is located 1.5 miles to the southeast. It has several small residential neighborhoods. The Elk River Wildlife Area is to the northeast. Coastal hills are 3-4 miles to the east and extend from the north to the southeast. The tops of these hills range from 1,500 to 2,500 feet in elevation. Further east is a mostly inaccessible mountainous area. Land uses in the vicinity can generally be described as rural residential, port-related industrial, agricultural, and recreational uses (see **Visual Resources Figure 1** – Humboldt Bay Harbor and Bay Aerial View). To the southwest of the PG&E property is King Salmon Resort, a gentrifying bay front community established in the 1940s. It consists of several hundred new and old single family residences many with water access to the bay, public and private recreation facilities that include a public beach, picnic and recreational vehicle camping area, a boat marina, fresh seafood markets and a restaurant. To the east is U.S. Highway 101 (see **Visual Resources Figure 2** – Aerial View of PG&E Property and Vicinity).

The Humboldt Bay Power Plant is a 105-megawatt (MW) natural gas-fired power plant that covers a 19-acre area of the PG&E property. It operates two 100-foot tall steam boiler turbine-generators (Units 1 and 2) with 120-foot tall exhaust stacks, two 15-MW diesel-fueled gas turbine mobile emergency power plants (MEPPs), fuel tanks, administration and service buildings, and an inoperable 63-MW nuclear-powered boiling water reactor generating unit (unit 3). Unit 3 was shutdown in 1976 (see **Visual Resources Figure 3** – View of Humboldt Bay Power Plant From King Salmon Avenue).

A segment of public trail maintained by PG&E and the Humboldt Bay Harbor Recreation and Conservation District, runs along the shoreline of the PG&E property. The public shoreline trail is to be part of the California Coastal Trail system; a 1,100-mile planned coastal trail system that would eventually extend from Oregon to Mexico (PG&E 2007, page 8.13-6). Although the trail is more than half complete, much of the remaining designated trail path is fenced-off, over-built, or otherwise inaccessible (COC2007).

PROJECT

Demolition - The HBRP's construction requires the removal of several structures on the 5.4-acre project site. The most publicly visible structures to be removed would include an existing paint and sandblasting building (100 feet long by 50 feet wide by 30 feet tall), a storage building (60 feet long by 40 feet wide by 15 feet tall), and an 80 foot tall 115 kV steel lattice structure.

Project Site Structures -The HBRP's most publicly visible structures would include: ten 100-foot tall, seven-foot diameter exhaust stacks, three 78-foot tall tubular steel electric transmission poles; a 46 foot tall by 62-foot diameter diesel tank, and a 45-foot tall by 90- foot long by 230-foot wide engine hall (see **Visual Resources Figure 4** – Southwest View of Power Plant Elevation, and **Visual Resources Figure 5** – Southeast View of Power Plant Elevation).

VISUAL RESOURCES Table 2
Summary of Major Publicly Visible Structures

Project Component	Number of Units	Length, Width, Diameter (approximately)	Height (approximately)
Exhaust Stacks	10	7-foot diameter	100 feet
Engine Hall	1	90-foot x 230 foot	45 feet
Transmission Poles	3	31-foot diameter	78 feet
Circuit Breaker	1	36-foot x 1-foot	50 feet
Circuit Breaker	2	26-foot x 1-foot	36 feet
Diesel Tank	1	62 foot diameter	46 feet
Radiators	1	186 foot x 87 foot	25 feet

Transmission Line - The HBRP would connect to the Humboldt Bay Power Plant Substation on the PG&E property by means of a 150 foot long 115-kilovolt (kV) connector and a 100 foot-long 60-kV connector.

Process Water - Raw process water uses for the facility (e.g., engine cooling systems) would be supplied from PG&E's Well No. 2 by an existing underground six-inch raw water supply pipeline located on the PG&E property.

Domestic Water - Domestic water required for non-process uses (e.g., sinks, toilets, drinking fountains) would be provided by a new underground 1,200 foot long, 4- to 6-inch water supply pipeline that would connect with an existing Humboldt Community Services District pipeline that runs along King Salmon Avenue. The water supply pipeline would be located on the east side of the intake channel and extend to King Salmon Avenue.

Natural Gas - A new underground 10-inch diameter pipeline would connect the HBRP site to the gas regulating station on the PG&E property.

Construction Access Road - A 24-foot wide, approximately 600-foot long gravel construction access road is to be built off King Salmon Avenue. It would travel along the east side of the intake water channel to the primary parking area (**Visual Resources Figure 6 – Proposed Construction Road Access From King Salmon Avenue**).

Primary and Remote Parking Areas - The project description includes use of two parking areas (primary and remote). The primary parking area for construction personnel would occur on a 0.34-acre area at the north end of the intake water channel, approximately 600 feet from King Salmon Avenue (**Visual Resources Figure 7- Proposed Primary Parking Area**).

The remote parking area would require the refurbishment of a 0.96-acre area on the PG&E property and previously used by PG&E as a construction parking lot for the Humboldt Bay Power Plant. The parking area is currently unmanaged, overgrown with vegetation, and contains broken pavement (**Visual Resources Figure 8 – Proposed Remote Parking Area**). The proposed remote parking area is to be used during the peak construction period only. It provides area for 104 vehicle spaces.

Construction Laydown Area - A 2.5 acre construction laydown area is to be located on the PG&E property along Humboldt Bay. This area currently contains two lined boiler washdown treatment ponds that were used by the Humboldt Bay Power Plant (**Visual Resources Figure 9 – Proposed Construction Laydown Area**). The ponds are to be removed so the area can be used for construction laydown. The area would be used for the storage of equipment and materials. Once construction of HBRP is complete, PG&E may use the laydown area for the future demolition of the Humboldt Bay Power Plant.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, Energy Commission staff reviews the project using the 2006 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 the existing visible physical environmental setting from a fixed vantage point (called a “Key Observation Point” [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP¹ to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select KOPs that would most clearly display the visual effects of the proposed project. KOPs may also represent primary viewer groups that would potentially be affected by the project. In addition to the KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area.

Staff also reviews federal, state, and local LORS and their policies or guidelines for aesthetics or preservation and protection of sensitive visual resources that may be applicable to the project site and surrounding area. These LORS include local government land use planning documents (e.g., General Plan, zoning ordinance).

¹The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

Please refer to **Appendix VR-1** for a complete description of staff's visual resources evaluation criteria. **Appendix VR-2** provides terms defined by staff for the purpose of this analysis.

Visual Resources Figure 10 shows the locations of the six KOPs used in this analysis:

- KOP 1 – Northbound U.S. Interstate 101 Looking West;
- KOP 2 – King Salmon Avenue Looking North;
- KOP 3 – Humboldt Bay Public Shoreline Trail Looking South;
- KOP 4 – Loma Avenue On Humboldt Hill Looking Northwest;
- KOP 5 – Spruce Vista Point Looking Southwest; and,
- KOP 6 – South Spit Wildlife Area Looking Across Humboldt Bay.

Staff's analysis of the project's effect on each KOP is presented under Operation Impacts.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following topics: scenic vista, scenic resources, visual character or quality, and light or glare.

A. SCENIC VISTA

“Would the project have a substantial adverse effect on a scenic vista?”

A scenic vista for the purpose of this analysis is defined as a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality. There are no scenic vistas in the KOP 1, KOP 2, KOP 3, KOP 4, KOP 5 and KOP 6 viewsheds. The proposed project would not cause a significant visual impact to a scenic vista.

B. SCENIC RESOURCES

“Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?”

A scenic resource for the purpose of this analysis includes a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

There are no officially designated state scenic highways in Humboldt County (Caltrans2007). At the current time, both U.S. Highway 101 (approximately 1,000 feet east of the HBRP site) and State Route 255 are listed as “eligible.” The status of a state scenic highway changes from eligible to officially designated when the local jurisdiction adopts a scenic corridor protection program, applies to the California

Department of Transportation for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a Scenic Highway.

Humboldt Bay is California's second largest natural bay and estuary, and is the only deep-water port on the North Coast. The bay covers approximately 27 square miles. The bay serves as a major transportation link between the Pacific Northwest and the rest of the maritime world. Portions of the bay can be seen in the viewsheds of KOP 4, KOP 5, and KOP 6.

Commercial/industrial harbor uses are limited to mid-Humboldt Bay, an area extending from the Samoa Bridge south to the southern end of the Fields Landing Channel. The major Humboldt Bay shipping terminals consist of the Fairhaven Business Park, Humboldt Bay Forest Products, Fields Landing Terminal, Redwood Marine Terminal, Schneider Dock, Sierra Pacific Eureka Dock and Simpson Chip Export. Humboldt Bay Forest Products is the closest shipping terminal to the project site; it is approximately 4,000 feet to the southwest.

Humboldt Harbor Historic District is listed number 882 on the list of California State Historical Landmarks. Humboldt Harbor is located in the city of Eureka approximately five miles to the north. Humboldt Harbor Historic District is not within the viewsheds of KOP 1 through 6.

The Humboldt Bay National Wildlife Refuge is located at the southern end of Humboldt Bay, approximately five miles from the PG&E property. The Wildlife Refuge consists of 4,604 total acres of open ocean; coastal marsh; coastal mudflats; estuarine; riparian forest; brackish/freshwater wetlands; coastal sand dune; and coastal dune forest habitats. It attracts large numbers of waterfowl, shorebirds, and migratory birds from the Pacific Flyway. It is maintained by the U.S. Fish and Wildlife Service. The Humboldt Bay National Wildlife Refuge is not visible within the viewsheds of KOP 1-6.

Although portions of Humboldt Bay are visible in the KOP 1, KOP 4, KOP 5 and KOP 6 viewsheds, the portions of the bay seen are not identified as a scenic resource. The proposed project would not damage views of an identified scenic resource and would not cause a significant visual impact to a scenic resource.

C. VISUAL CHARACTER OR QUALITY

“Would the project substantially degrade the existing visual character or quality of the site and its surroundings?” The project aspects evaluated under this criterion are broken down into two categories: Construction Impacts and Operation Impacts.

Construction Impacts

Project Site - Construction activities for the project would occur over an approximate 18-month period. After demolition of existing structures is complete, the topsoil would be removed, and the stormwater drainage system would be installed with the first layer of engineered fill. Next, piles would be driven to appropriate depths and cut to the appropriate foundation levels. Underground utilities, conduits and grounding grids would be laid out. The subsequent layers of engineered fill would be installed to complete the

soil exchange. The plant site would be built up to the elevation necessary to avoid the 100-year floodplain (13 feet above mean sea level) (PG&E2007, page 2-34).

The construction access road would be prepared at the onset of construction to enable the delivery of the engines, generators and auxiliary equipment.

After the soils and piling work, the foundation work would begin. When the foundations reach their required strength (75% of the total strength) the erection of the steel structures would begin for the engine hall. Subsequently, as foundations are made ready, steel structures for stacks and auxiliary equipment support would also be completed.

Other buildings, such as the control/administration building, maintenance building, and switchgear rooms would be installed next. Pre-fabricated buildings would be delivered in sections and installed on completed foundations. For buildings fabricated onsite, steel work will be completed first. Tanks would be installed after the buildings are constructed.

As engine hall erection proceeds, mechanical and electrical contractors would start work on piping runs, cable tray, conduits, and building lighting. Engines would then be delivered to the site and offloaded by the rigging contractor directly to their foundations. Auxiliary equipment would be delivered to the laydown area and offloaded by crane or forklift for later installation. Step-up transformers will be delivered to the switchyard area and assembled. Once the engines are delivered and set, the ventilation units would be installed on the engine hall. After all large equipment has been delivered the on-site roadways and gravel areas would be completed. During the final phase of construction, the mechanical auxiliary equipment would be installed and connected. At the same time, the electrical auxiliary equipment and interconnecting cable tray, conduit, and cabling would be installed. Final tie-ins to utility sources would take place after all piping and wiring is in place (PG&E2007, page 2-34).

Public visibility of the construction site and activities on it from U.S. Highway 101 (KOP 1), King Salmon Avenue (KOP 2), the public shoreline trail (KOP 3), Loma Avenue (KOP 4) and Spruce Vista Point (KOP 5) would occur as project structures are erected that exceed the height of onsite trees and structures.

Laydown Area - During the construction period, materials and heavy equipment on the laydown area would be publicly visible to viewers from the public shoreline trail (see KOP 3) and Spruce Vista Point (KOP 5).

Construction Access Road and Primary Parking Area - The construction access road and primary construction employee parking area would be located along the east side of the intake channel. Presently along the east side of the intake canal and Buhne Slough are ornamental plantings of gum trees, Monterey cypress, Monterey pine, and irrigated hedgerows of Rhododendron underlain with sweet vernal grass (PG&E2006a, page 8.13-30). Staff estimates 20-30 trees may be removed. The trees provide partial visual screening of existing power plant structures to the public from U.S. Highway 101 (KOP 1), King Salmon Avenue (KOP 2), and Loma Avenue (KOP 4). The project owner

proposes to restore the temporary construction access road and parking area after construction is complete (PG&E 2007, page 8.2-49) (PG&E2007, page 2-6).

Remote Parking Area and Construction Worker Pedestrian Access Trail - The project includes the reuse of an area that had previously been used for vehicle parking years ago. The reuse of the area involves the removal of the existing fence, onsite debris and vegetation (weeds), the spreading of new aggregate surfacing, and installation of a new six-foot tall chain link fence on its perimeter. Existing pole and light fixtures in the parking area are to be replaced with fixtures that are hooded and directed downward (HBRP Data Response, page 41). The remote parking area would be used when the number of construction workers exceeds the number of available spaces in the primary parking area which is estimated to be nine months of the construction period (HBRP Data Response, page 41).

Construction worker vehicles would be publicly visible on the 0.96 acre area from King Salmon Avenue and from residences in King Salmon Resort. The parking area would be approximately 60 feet from the nearest residence (see **Visual Resources Figure 12** – Landscape Character Photo Showing Residence Across From Proposed Remote Parking Area On King Salmon Avenue).

In addition, lights used in the parking area would be visible to residences in King Salmon Resort. The project owner states that in addition to using hooded fixtures, they will add shields to the lights where appropriate to further mitigate the visibility of the lights from the King Salmon Avenue residents (HBRP Data Responses, page 42). When the HBRP is completed, the temporary construction parking area is to be restored, and the eastern half of the remote parking area is to be restored as wetland. The western half of the remote parking area would remain as a parking lot for future use involving the decommissioning and demolition of the Humboldt Bay Power Plant.

A former construction worker pedestrian access trail extends from the remote parking area to the west side of the intake channel. The trail would be refurbished and extended to the primary parking area. Workers previously used the original portion of the pedestrian trail for construction projects for the Humboldt Bay Power Plant. The pedestrian trail is visually buffered and screened by vegetation, and an existing line of mature trees and marsh. The pedestrian trail is not noticeable from King Salmon Avenue during daytime.

There are existing lights along the trail which enable its use at night. The lights are not hooded. Prior to project construction, PG&E will determine whether any of the lights are visible from residents on King Salmon Avenue. If a light is visible, it will be replaced with a hood fixture. Shields would also be installed if necessary (HBRP Data Responses, page 42).

Conclusion - Typically screening of construction site activities, laydown and construction parking areas is accomplished by attaching a fabric or adding wooden slats to a perimeter fence. This screening is effective in limiting ground level visual exposure of the areas that are close to the viewer; such as a street or sidewalk next to the project site. Staff believes that the use of fabric or wooden slat screening would provide little to

no visual screening of the HBRP construction site and laydown area from U.S. Highway 101 and King Salmon Avenue.

The remote parking area would be publicly visible from King Salmon Avenue and King Salmon Resort. The project owner is proposing to install a 6-foot tall fence around it. Ground level screening would reduce the visibility of parked cars for the handful of residences across the street and motorist on King Salmon Avenue during the peak construction time. If fabric or wooden slats were added to the fence it would make the parking area more noticeable in the streetscape. However, it may limit the visibility of vehicles entering and exiting the parking area. The visible parking of vehicles on the remote parking area would not visually dominate the streetscape of King Salmon Avenue due to existing trees and shrubs to the east and in the backdrop to the north.

Project construction activities would take place the majority of the time during daylight hours. Lighting that may be required to facilitate nighttime construction activities would, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting would be used to the extent practical while complying with worker safety regulations. The use of shielded directional exterior lights and fixtures of a non-glare type on the project site, in the construction laydown area, the remote parking area and along the pedestrian trail would minimize offsite light and glare impacts introduced by construction activities. Staff has proposed condition of certification **VIS-1** formalizing the construction lighting measures proposed by the project owner.

The project owner proposes to bury project related linear pipelines. With the burying of pipelines and the restoration of the ground surfaces, the linear routes and parking and laydown areas would not create a change to the existing visual condition. Staff has recommended condition of certification **VIS-2** to provide for the restoration of ground surfaces affected by construction activities (e.g., primary and remote parking areas, construction access road, laydown area, pipe alignments) to ensure that these construction activities are temporary in nature and would not result in a long-term visual degradation.

Overall, staff believes the project's proposed construction activities, with the effective implementation of mitigation measures proposed by the project owner and staff's proposed conditions of certification **VIS-1** and **VIS-2**, would generate a less than significant visual impact.

Operation Impacts

KOP 1 - Northbound U.S. Interstate 101 Looking West

Visual Resources Figure 13 represents the existing view toward the project site from northbound U.S. Highway 101, approximately 1,000 feet north of the King Salmon Avenue, and 1,300 feet from the project site.

Visual Sensitivity

The view from KOP 1 includes a portion of four asphalt lanes and grassy median of U.S. Highway 101, diked emergent marsh and seasonal wetlands interspersed with groupings of mature canopy type trees and shrubs, and partial views of the multi-color-

tone 100-foot tall steam turbine-generator structure and the top of its two 120-foot tall exhaust stacks, the switch yard, steel vertical poles, overhead wires, an 80-foot lattice tower, and a fuel tank. A portion of Humboldt Bay can be seen in the background. The estimated public appeal of the visual impression (quality) of the KOP 1 viewshed is considered to be moderate.

Viewers at this KOP location would mainly consist of motorist on U.S. Highway 101. Typically motorists along a rural highway have a moderate to low sensitivity to the visual environment due to their concentration on driving and their focus on their destination.

U.S. Highway 101 is not shown as an officially designated State Scenic Highway by the State of California (d.b.a., California Department of Transportation) on the California Scenic Highway Mapping System, nor is it designated a county scenic highway.

The KOP 1 viewshed does not include a scenic resource or vista. There is no scenic focal point or unique feature in the viewshed that draws the viewer's eye (e.g., rock outcroppings, historic building, etc.). The Humboldt Bay Power Plant's 100-foot steam turbine-generator structure and exhaust stacks are a focal point in the viewshed. From this KOP, a motorist would have a relatively unobstructed view of the project site. The visibility of proposed power plant structures at this KOP would be considered high. The estimated level of viewer concern towards preserving (keeping) the existing KOP 1 viewshed as shown is considered to be moderately low.

U.S. Highway 101 connects Humboldt County north to U.S. Interstate 5 via U.S. Highway 299. Highway 101 extends to areas south along the coast to Ukiah and San Francisco. According to traffic counts conducted by the California Department of Transportation (Caltrans) in 2005, U.S. Highway 101 carries approximately 27,000 average daily vehicle trips in the vicinity of the project site (PG&E 2006a, page 8.12-1). If at least one individual per vehicle trip was exposed to a view of the project site with publicly visible structures, this number of exposures would be considered high.

Viewers at this KOP would be exposed to a short duration, relatively unobstructed view of the potential project. The posted speed limit along this segment of the highway is 65 miles per hour. Staff visited the project site in December 2006 and estimates the duration of view for motorists traveling northbound U.S. Highway 101 through the KOP 1 viewshed to be ten to twenty seconds (short) which is considered to be moderately low. Overall exposure (based on the number of viewers, duration of view, and visibility) for motorists is considered to be moderately high.

The overall visual sensitivity for motorists would be considered moderate from KOP 1. This assessment is the result of a moderate visual quality, moderately low viewer concern, and a moderately high overall viewer exposure.

Visual Change

Visual Resources Figure 14 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 1 viewshed. The photo simulation does not show the proposed landscaping.

The project would introduce to the viewshed a 90-foot tall rectangular engine hall and two groups of five cor-ten (rust-colored) steel exhaust stacks (100-feet tall). A 46-foot tall diesel storage tank would be located east of the engine hall. Project structures would be painted a neutral, non-reflective gray color.

Contrast (includes form, line, color, and texture) introduced by the project's publicly visible structures would demand attention, would not be overlooked, and would be dominant from this KOP. The potential contrast of the structures is considered strong (high).

The photo simulation shows that the proportionate size relationship of the visible project structures to other man-made and natural elements would occupy a medium portion of the total field-of-view of KOP 1. Project structures would appear co-dominant when compared to other elements in the KOP view. The relative visual scale (dominance) of the structures as simulated in the KOP 1 viewshed is considered to be moderate.

The degree of view disruption (blockage) introduced by project structures is considered to be moderately low. The view of blue sky blocked by project structures is considered small. Existing structures (temporary offices, paint and sandblasting building, storage building and lattice tower) and vegetation would be removed. The view disruption is considered to be moderately low. Although a greater amount of sky would be blocked from this viewpoint Humboldt Bay would not be blocked to a greater degree.

The removal of 50 to 65-foot tall trees along the intake canal would cause existing structures associated with the Humboldt Bay Power Plant (e.g., the steam boiler turbine-generator structure, fuel tanks, the switchyard) to become more visible to viewers on U.S. Highway 101. The trees currently help screen direct views of structures and soften the industrial character of the facility in the viewshed.

The overall visual change caused by the introduction of the proposed project's structures into the viewshed is considered to be moderate as a result of a high visual contrast, moderate visual scale, and moderately low view disruption.

Staff concludes the introduction of project structures would not substantially degrade the existing viewshed at KOP 1. When considering the moderate overall visual sensitivity and the moderate overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual impact from this KOP.

KOP 2 – King Salmon Avenue Looking North

Visual Resources Figure 15 represents the existing view from King Salmon Avenue looking north toward the project site approximately 1,300 feet away.

Visual Sensitivity

The view from KOP 2 towards the project site includes diked emergent marsh and seasonal wetlands, a line of mature canopy trees and shrubs, partial view of the 100-foot tall steam turbine-generator structure and its exhaust stacks, the switchyard, steel vertical poles, overhead wires, an 80-foot lattice tower, and two diesel-fueled gas

turbine mobile emergency power plants. The estimated public appeal of the visual quality of the KOP 2 viewshed is considered moderate.

Viewers at this KOP location would mainly consist of residents traveling to and from King Salmon Resort. The estimated level of viewer concern towards preserving the existing KOP 2 viewshed is considered to be moderately low. The viewshed does not include a designated scenic resource or vista. From this KOP, viewers would have a relatively unobstructed view of the project site. The visibility of the proposed power plant is considered to be high.

According to King Salmon Avenue traffic count provided by the project owner in the Application for Certification (AFC), King Salmon Avenue carries approximately 2,355 average daily vehicle trips (PG&E 2006a, page 8.12-2). If at least one individual per vehicle trip was exposed to a view of the project site with potential power plant structures, the estimated number of viewer exposures would be considered moderately low.

Viewers would be exposed to a short duration, relatively unobstructed view of the potential project. Staff visited the project site and estimates the duration of view for individuals traveling on King Salmon Avenue through the KOP 2 viewshed to be 20 to 60 seconds which is considered moderate. Overall exposure for viewers on King Salmon Avenue is considered to be moderate.

The overall visual sensitivity for viewers would be considered moderate from the KOP 2 location. This assessment is the result of a moderate visual quality, moderately low viewer concern, and a moderate overall viewer exposure.

Visual Change

Visual Resources Figure 16 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 2 viewshed. The photo simulation does not show the proposed landscaping.

The project would introduce to the viewshed a 90-foot tall engine hall, two groups of five stacks, and a 46-foot tall diesel storage tank. The structures would be painted a neutral, non-reflective gray color, and the exhaust stacks would be cor-ten (rust-colored) steel (PG&E2006a, page 8.13-10).

The contrast introduced by the project's publicly visible structures would demand attention, would not be overlooked and would be dominant from this KOP. The potential contrast of the structures is considered strong. The multi-color-tone 100-foot tall Humboldt Bay Power Plant units 1 and 2, the substation, and the HBRP 90-foot tall engine hall would be more visible due to the removal of trees and other vegetation until the proposed landscaping matures.

The project owner has provided a draft landscaping plan dated February 7, 2007, for the PG&E property (**Visual Resources Figure 11a** – Draft Landscape Plan - Sheet 1) and (**Visual Resources Figure 11b** – Draft Landscape Plan - Sheet 2). Proposed landscaping would replace and expand the amount of screening seen from King Salmon Avenue (PG&E2006a, page 8.13-13). Landscaping would include the installation of

native, evergreen trees and shrubs. The draft landscape plan shows the planting of coniferous evergreen trees on the PG&E property and the HBRP site. New trees would be installed in the area south of the intake canal and in an area north of the project site, east of the discharge canal. The approximate maximum height of the trees would be 65-feet and spread of canopy 60 feet. The primary purpose of the new landscaping would be to screen views of the project and the existing facilities (PG&E2006a, page 8.13-11)(see **Visual Resources Figure 17** – Photo Simulation Of Proposed Landscaping At Five Years With The Future Removal Of Humboldt Bay Power Plant Units 1, 2, and 3 in the KOP 2 Viewshed). Staff has proposed condition of certification **VIS-5** which provides for the submittal and approval of a landscaping plan.

The photo simulation shows that the proportionate size relationship of the visible project structures to other man-made and natural elements would occupy a moderate portion of the total field-of-view of KOP 2. In addition, the structures would visually appear co-dominant when compared to other elements in the KOP view. The dominance of the structures as simulated in the KOP 2 viewshed is considered to be moderate.

The degree of view disruption introduced by project structures is considered to be moderately low in this viewshed. The 90-foot tall engine hall and exhaust stacks would block an increased amount of sky to that which is currently blocked by structures and vegetation already at this location. Humboldt Bay is not blocked in the viewshed.

The overall visual change caused by the introduction of the proposed project's structures into the KOP 2 viewshed is considered to be moderate as a result of a high visual contrast, moderate dominance, and moderately low view disruption.

Staff concludes the introduction of project structures would not substantially degrade the existing viewshed at KOP 2. When considering the moderate overall visual sensitivity and the moderate overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual impact at this KOP.

KOP 3 – Humboldt Bay Public Shoreline Trail Looking South

Visual Resources Figure 18 represents the existing view from the public shoreline trail at the discharge canal on the PG&E property approximately 500 feet north of the project site.

Visual Sensitivity

The KOP 3 viewshed includes grass areas, perimeter fencing, a water filled rock lined discharge channel, the 100-foot tall steam turbine-generator structure and its 120-foot tall exhaust stacks, the decommissioned unit 3 white colored brick containment building, a beige colored corrugated tin shed, steel vertical poles of various heights, an 80-foot tall steel lattice structure, overhead wires, a partial view of the two diesel-fueled gas turbine mobile emergency power plants, a gray colored corrugated tin shed and commercial coaches, a paint and sandblasting building, storage building, and switchyard. In the background is the silhouette of Humboldt Hill. The estimated public appeal of the visual quality of the KOP 3 viewshed is considered to be moderately low.

A public shoreline trail lies between the PG&E property perimeter fence and Humboldt Bay. Viewers at this KOP location would consist of individuals who are fishing along the rock revetment or walking along the bay on the California Coastal Trail (**Visual Resources Figure 19** – Landscape Character Photo of Public Shoreline Trail Area Along PG&E Property Looking East). Viewers would tend to be directed towards the bay and away from the project. There is no scenic focal point in the viewshed. The 100-foot tall steam boiler turbine generator with its plume emission tends to draw the viewer's eye. The estimated level of viewer concern towards preserving the existing KOP 3 viewshed is considered to be low.

From this KOP, viewers would have an unobstructed view of the project site and the construction laydown area. The project's visibility would be high. The specific number of viewers at this location is unknown to staff. Staff used a conservative estimate of between 11 to 25 individuals for the purposes of this KOP analysis. This number of viewers is considered low. Viewers would experience an extended duration of view (high) of proposed project structures. Overall viewer exposure is considered moderately high.

The overall visual sensitivity of viewers would be considered moderately low from the KOP 3. This visual assessment is the result of a moderately low visual quality, low viewer concern, and a moderately high overall viewer exposure.

Visual Change

Visual Resources Figure 20 represents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 3 viewshed. The photo simulation does not show the proposed landscaping.

The project's 90-foot tall engine hall, 25-foot tall radiator, and 100-foot tall cor-ten steel stacks with its metal stack support frame would introduce contrast to the KOP that is considered high.

The photo simulation of project structures shows that their proportionate size relationship to other man-made and natural elements would be large in the total field-of-view of KOP 3. In addition, the structures would be dominant when compared to other elements in the KOP view. The dominance of the structures as simulated in the viewshed is considered to be high.

A silhouette of Humboldt Hill in the background would be blocked by project structures at this KOP. A portion of the 100-foot tall exhaust stacks would extend above the ridgeline into the sky. The amount of Humboldt Hill and sky blocked from view would be much more than that currently blocked by existing structures. The amount of view blockage introduced by project structures is considered to be moderately high.

The project owner has provided a draft landscape plan. The plan shows that trees would be replaced in areas where removed due to project construction. The landscape plan shows new trees being planted along the north boundary of the PG&E property, east of the discharge canal. The approximate maximum height of the trees would be 65-feet and spread of canopy 60-feet at maturity. Over time, as the project's landscaping matures, the visual impact at KOP 3 would be reduced.

The overall visual change caused by the proposed project's structures is considered to be moderately high as a result of a high visual contrast, high dominance, and moderately high view disruption.

Staff concludes that the introduction of the project's publicly visible structures would not substantially degrade the existing viewshed at KOP 3. When considering the moderately low overall visual sensitivity and the high overall visual change, the introduction of the project structures would generate a less than significant visual impact at this KOP.

KOP 4 – Loma Avenue on Humboldt Hill Looking Northwest

Visual Resources Figure 21 represents the existing hillside view (100-150 feet elevation) from the north side of Loma Avenue on Humboldt Hill, approximately 3,500 feet south of the project site.

Visual Sensitivity

The view includes a portion of asphalt road, ornamental landscaping and lawn items, steel and wood vertical poles, portions of steep pitched roof tops of three single family residences, emergent marsh, Buhne Slough, groupings and scattered canopy trees and shrubs. Also in the view are the 100-foot tall steam boiler turbine-generator structure, four large off-white colored cylinder fuel tanks, and an expanse of Humboldt Bay. Seen across the bay are the South Spit, and the U.S. Coast Guard Station, Fairhaven Biomass Power Plant, and the Evergreen Pulp Mill located on the Samoa Peninsula (North Spit), a partial view of the city of Eureka, and the Pacific Ocean. The estimated public appeal of the visual quality of the KOP 4 viewshed is considered to be high.

Viewers at this KOP location would mainly consist of residents on Humboldt Hill. Humboldt Hill has several residential neighborhoods. According to the U.S. Census Bureau, in the year 2000 the total population of the census designated Humboldt Hill area was 3,246 (PG&E 2006a, page 8.10-1). The actual number of residences that have a view of the project site is unknown to staff. The residential enclave at this KOP location consists of approximately 40-60 residences. Using 60 residences as the potential number of viewers that may be exposed to a view of power plant structures, this number of viewer exposures would be considered moderately high.

Residential viewers are typically considered to be highly sensitive to modifications of a viewshed. From this KOP, viewers have a relatively unobstructed view of the project site. The visibility of power plant structures at this KOP is considered to be moderately high. The estimated level of viewer concern towards preserving the KOP 4 viewshed is considered to be moderately high. Viewers at this KOP location would be exposed to an extended duration view of the project. Overall exposure for viewers at this KOP is considered to be moderately high.

The overall visual sensitivity for residents would be considered moderately high from the KOP 4 location. This assessment is the result of a high visual quality, moderately high viewer concern, and a moderately high overall viewer exposure.

Visual Change

Visual Resources Figure 22 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 4 viewshed.

The view of the 100-foot tall steam boiler turbine-generator structure, four large off-white colored cylinder tanks, and switchyard equipment would become more visible due to the removal of the trees and other vegetation.

Project structures that would be visually unobstructed from KOP 4 include the engine hall, the 100-foot exhaust stacks, the control room/office, fencing, switchyard equipment, and a fuel tank. The contrast introduced by the project's publicly visible structures would be seen but does not attract attention from this KOP. The potential contrast of the structures is considered moderate.

The photo simulation shows that the proportionate size relationship of the visible project structures to other man-made and natural elements would occupy a small portion of the total field-of-view of KOP 4. The structures would visually appear co-dominant when compared to other elements in the KOP view. The dominance of the structures as simulated in the KOP 4 viewshed is considered to be moderately low.

A small portion of a view of Humboldt Bay would be disrupted by the introduction of project structures, specifically the exhaust stacks. The view disruption is considered to be moderately low.

The overall visual change caused by the introduction of project structures into the viewshed is considered to be moderate as a result of a moderate visual contrast, moderately low dominance, and moderately low view disruption.

Staff concludes that the introduction of project structures would not substantially degrade the existing viewshed at KOP 4. When considering the moderately high overall visual sensitivity and the moderate overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual impact at this KOP.

KOP 5 – Spruce Vista Point Looking Southwest

Visual Resources Figure 23 represents the existing view from Spruce Vista Point looking southwest towards the project site approximately 3,000 feet away.

Visual Sensitivity

The view includes a portion of asphalt surfacing and safety railing of Humboldt Hill Road, undulating open grassland terrain with scattered canopy trees, marsh, and northbound and southbound lanes and grass median of U.S. Highway 101. Also in view are shoreline rock revetment, Humboldt Bay, and the distant view of the South Spit. The 100-foot tall steam boiler turbine-generator structure and its 120-foot tall exhaust stacks and decommissioned unit 3 structures are also in view. A lattice tower, vertical poles and a maintenance building are also seen. The estimated public appeal of the visual quality of the KOP 5 viewshed is considered to be moderate.

Viewers at this KOP location would involve individuals who have departed U.S. Highway 101 to see the Humboldt Harbor Historical District landmark (marker) and an elevated open view of Humboldt Bay. The plaque was placed by the California Department of Parks and Recreation in cooperation with the Humboldt County Historical Society in April 10, 1976. The specific number of visitations to this location is unknown by staff. Staff used a conservative estimate of 51-100 persons per day for the purpose of this KOP analysis. This number of viewer exposures to potential power plant structures would be considered moderate.

The estimated level of viewer concern towards preserving the KOP 5 viewshed is considered moderately high. From this KOP, viewers would have an unobstructed view of the project site. The visibility of the proposed power plant at this KOP is high. Viewers at this location would be directed towards reading the inscription on the Humboldt Harbor Historical District marker and taking in the view of the bay. Viewers at this KOP location would be exposed to a short duration view of power plant structures. Overall exposure for viewers at this KOP is considered to be moderate.

The overall visual sensitivity for viewers would be considered moderate from the KOP 4 location. This assessment is the result of a moderate visual quality, moderately high viewer concern, and a moderate overall viewer exposure.

Visual Change

Visual Resources Figure 24 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 5 viewshed.

Publicly visible project structures would include the 100-foot tall cor-ten steel exhaust stacks and its metal stack support frame, the 41-foot tall tank, and portions of the 45-foot tall engine hall, and the 25-foot tall radiators. The contrast introduced would be strong from this KOP.

As previously noted, the project owner's landscape plan shows new trees being planted along the north boundary of the PG&E property, east of the discharge canal. The approximate maximum height of the trees would be 65-feet and spread of canopy 60-feet at maturity. Over time, as the project's landscaping matures, the visual impact at KOP 5 would be reduced.

The photo simulation shows that the proportionate size relationship of the visible project structures to other man-made and natural elements would occupy a moderate portion of the total field-of-view of KOP 5. The structures would visually appear co-dominant when compared to other elements in the KOP view. The dominance of the structures as simulated in the KOP 5 viewshed is considered to be moderate.

The view disruption is considered to be low. From this KOP, new power plant structures would block a view of existing power plant structures, trees and a small amount of sky. No view of Humboldt Bay would be disrupted by project structures from this KOP.

The overall visual change caused by the introduction of project structures into the viewshed is considered to be moderate as a result of a high visual contrast, moderately low visual scale, and a low view disruption.

Staff concludes the introduction of project structures would not substantially degrade the existing viewshed at KOP 5. When considering the moderate overall visual sensitivity and the moderate overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual impact at this KOP.

KOP 6 – South Spit Wildlife Area Looking Across Humboldt Bay

Visual Resources Figure 25 represents the existing view from the South Spit Wildlife Area looking east towards the project site approximately one mile away.

Visual Sensitivity

The view includes a portion of sand dune with seashore grass, rock revetment and Humboldt Bay. Seen across the bay is the dark silhouette of tree covered high bluff on Buhne Point, and the 100-foot tall steam boiler turbine-generator structure with its two 120-foot tall exhaust stacks. Visually indiscernible structures and vegetation at King Salmon Resort, the Humboldt Bay Forest Products shipping terminal, Fields Landing Humboldt Hill, and Elk River Wildlife Area are in the viewshed. The outline of the coastal hills can be seen. The estimated public appeal of the visual quality of the KOP 6 viewshed is considered to be high.

Viewers at this KOP location would consist of individuals engaged in passive recreational activities such as bird watching, hiking and fishing. The specific number of visitations to this location is unknown by staff. Staff used a conservative estimate of 51-100 persons per day for the purpose of this KOP analysis. This number of viewers is considered moderate.

The estimated level of viewer concern towards preserving the KOP 6 viewshed is considered high. From this KOP, viewers would have a disrupted and distant view of the project site. The visibility of the proposed power plant's structures at this KOP would be moderately low. Viewers at this KOP location would be exposed to an extended duration view of power plant structures. Overall exposure for viewers at this KOP is considered to be moderate.

The overall visual sensitivity for viewers would be considered moderately high from the KOP 6 location. This assessment is the result of a high visual quality, high viewer concern, and a moderate overall viewer exposure.

Visual Change

Visual Resources Figure 26 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 6 viewshed.

The publicly visible project structures would involve the 100-foot tall exhaust stacks. The contrast introduced by the project's structures would be seen but does not attract attention (weak) from this KOP. The potential contrast of the structures is considered low.

The photo simulation shows that the proportionate size relationship of the visible project structures to other man-made and natural elements would occupy a very small portion

of the total field-of-view of KOP 6. The structures would visually appear subordinate when compared to other elements in the KOP view. The dominance of the structures as simulated in the KOP 6 viewshed is considered low.

The view disruption is considered low. The project's exhaust stacks would be contained below the ridgeline silhouette of the coastal hills. The project's exhaust stacks as seen from this KOP would disrupt a very small portion of the view of the coastal hills.

The overall visual change caused by the introduction of project structures into the viewshed is considered to be low as a result of a low contrast, low visual scale, and a low view disruption.

Staff concludes the introduction of project structures would not substantially degrade the existing viewshed at KOP 6. When considering the moderately high overall visual sensitivity and the low overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual impact at this KOP.

LINEARS

Overhead Transmission Lines -The HBRP would interconnect six reciprocating engines to the 60-kV bus at the Humboldt Bay Power Plant Substation via two 60-kV generator tie lines. An additional four reciprocating engines would connect to the Humboldt Bay-Humboldt 115-kV line via a 115-kV tie line. Concurrently with the completion of the HBRP, the two existing mobile electric power plants currently connected to the Humboldt Bay-Humboldt 115-kV line would be disconnected and retired. The existing power plant steam turbines connected to the 60-kV line would be disconnected as well. The two existing circuit breakers at the 60-kV interconnection points and the one existing circuit breaker at the 115-kV interconnection point would be replaced as part of the project. The proposed interconnection would include three transmission lines that would all be located within the PG&E property. One of the lines would be a 115-kV tie line that would be less than 700 feet long. The remaining two lines would be 60-kV tie lines that would be less than 500 feet long. All three tie lines would be interconnected to the high sides of their respective generator step-up transformers from take-off structures near the generator switchyard to existing structures in the Humboldt Bay Power Plant Substation. Each tie line would require the installation of one new steel pole with bypass switches and would be composed of only two spans (PG&E2007a, pages 5-1-11).

The non-reflective gray colored steel poles to be used would introduce a moderately low contrast among the dark colored vegetation and the existing structures on the PG&E property. The degree of view blockage by the steel poles and overhead wires would be low. The construction of the onsite overhead transmission lines would introduce a less than significant visual disturbance.

Pipelines -The project's underground pipelines are to interconnect to existing gas, sewer, and water pipelines that already serve the PG&E property. After construction, the ground surfaces would be restored as required by condition of certification **VIS-2**. With the burying of the project's pipelines and resurfacing a visual impact would not be introduced.

PUBLICLY VISIBLE WATER VAPOR PLUMES

The HBRP would use an air radiator cooling array and does not involve the use of a wet cooling tower, which is the main generator of visible water vapor plumes at power plants. In addition, as a result of the very high exhaust temperature (minimum 670 degrees Fahrenheit) of the proposed project's lean burn² engines and generators, under normal weather conditions there is no potential for visible water vapor plumes to form above the exhaust stacks. This conclusion is based on the project owner's proposed facility design at operation.

D. LIGHT OR GLARE

"Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

The proposed project during operation has the potential to introduce light offsite to surrounding properties, and up-lighting to the nighttime sky. If bright exterior lights were not hooded, and lights not directed onsite they could introduce significant light or glare to the vicinity.

Nighttime lighting that takes place on the PG&E property at the current time is for personnel safety and security purposes. Lighting includes pole-mounted lighting structures and lighting at building entrances. The single most visible light source on the property is the 100-foot-tall steam boiler turbine generator structure. Lighting on the structure takes place on all four stories.

The project owner states the HBRP would introduce new nighttime lighting to the property due to safety and security needs. Lighting would be directed onsite; and would be shielded from public view, and non-glare fixtures and use of switches, sensors, and timers to minimize the time that lights not needed for safety and security are on will be specified.

Staff believes that the project owner's description of their proposed light mitigation would reduce offsite light impacts to the area; however, the description does not specifically describe what the mitigation measures may consist of during the project's operation. Staff has proposed condition of certification **VIS-4** which requires submittal and approval of a lighting control plan. With the effective implementation of the proposed light mitigation measures, staff believes that the HBRP would not result in a substantial new source of light that could adversely affect existing nighttime views.

The photo simulations of the completed power plant provided by the project owner show the use of a surface treatment on major project structures and buildings consisting of a neutral grey color and low gloss finish, and rust color stacks. All new structures including permanent equipment and fencing will be treated or painted with a non-reflective finish so as to reduce potential glare effects (PG&E2007, page 8.13-19). With effective implementation of the project owner's proposed surface treatment, project structures would not be a source of substantial glare that could

² Lean burn pertains to a type of engine that runs very fuel lean so that the moisture content in the exhaust is considerably lower than typical internal combustion engine (less than half).

adversely affect daytime views. Staff has proposed condition of certification **VIS-3** which requires submittal of a surface treatment plan for power plant structures and the electric transmission line poles to ensure impacts are mitigated.

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) views of a scenic resource is impaired; or (3) visual quality is diminished.

A development within one mile of the HBRP site is the Humboldt Bay Power Plant "Independent Spent Fuel Storage Installation" (ISFSI). The ISFI project has been approved by the Nuclear Regulatory Commission (NRC) and the California Coastal Commission. The ISFSI would store spent nuclear fuel and other materials from the Humboldt Bay Power Plant unit 3 in a dry cask storage constructed on the PG&E property. PG&E is evaluating a plan that would have all spent fuel in dry cask storage by 2008. Although Humboldt Bay Power Plant's current license expires in 2015, PG&E is evaluating a plan that would have the plant dismantled, the Part 50 license terminated and site restoration completed in the 2009-2011 time frame (NRC2007). The dry cast storage has been built in the open area on the bay side of the 100-foot tall turbine-generator structure, approximately 600 feet from the HBRP site.

It is foreseeable that the structures and associated equipment used by the Humboldt Bay Power Plant would be demolished after the HBRP is operating. The demolition of unit 3 is not a consequence of the HBRP project and is entirely separate from it. The NRC would oversee the demolition process. It is expected that the HBRP would be in operation at the time that demolition of unit 3 begins, but the final schedule for unit 3 demolition is not certain at this time (PG&E2007 page 2-4).

While project-related nighttime light and daytime glare impacts on the project site would be mitigated to a level that would be less than significant, existing light and glare levels in the vicinity of the project would increase temporarily as a result of the project and existing and planned projects. Upon commercial operation of the HBRP, lighting at the Humboldt Bay Power Plant would be reduced as a result of its operational shutdown.

Light and glare impacts generated by these projects are not anticipated to be cumulatively considerable with the effective implementation of the applicable requirements of the Humboldt County Government Code, the Nuclear Regulatory Commission and the California Energy Commission.

The Humboldt County Redevelopment Plan Environmental Impact Report (EIR) is undergoing public review. The Redevelopment Plan EIR identifies several

redevelopment sub-areas for Humboldt County: Orick, Willow Creek, Glendale, Manila, Samoa, Fairhaven, Fields Landing, and Alton. The Fields Landing subarea is within 1 mile of the project site. The proposed project for Fields Landing involves rehabilitating a main drainage line and two tide gates at the C Street and Railroad Avenue. These improvements would improve drainage and prevent localized flooding (PG&E2007, page 8.6-15). The rehabilitation of the main drainage line in Fields Landing is not within the viewsheds of KOP 1 through 6.

The introduction of the projects to the KOP 1-6 viewsheds would generate a less than significant cumulative visual effect specific to aesthetics or preservation and protection of sensitive visual resources.

Staff has reviewed Census 2000 information (maps) which shows no minority population greater than 50 percent within a six-mile radius of the proposed power plant (see the **Socioeconomics** section of this FSA, **Socioeconomics Figure 1**). The proposed project would not introduce a visual resources related environmental justice issue.

Staff has determined that all significant direct or cumulative impacts specific to aesthetics or the preservation and protection of sensitive visual resources resulting from the construction or operation of the project would be mitigated.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 3 provides an analysis of the applicable LORS pertaining to aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project. Conditions of certification are proposed to make the project conform to a LORS where appropriate.

**VISUAL RESOURCES Table 3
Proposed Project's Consistency with
LORS Applicable to Visual Resources**

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
State			
California Coastal Act of 1976 Section 30251 – Scenic and Visual Qualities	The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance	YES AS CONDITIONED	The HBRP site is located within the designated state coastal zone. The HBRP site is shown on the California Coastal Commission's Post-LCP Certification Permit and Appeal Jurisdiction map for the Humboldt Bay area of Humboldt County as being within the California Coastal Commission's retained jurisdiction (COC2007d). The California Coastal Commission often uses policies of the adjacent

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
	visual quality in visually degraded areas.		<p>Local Coastal Program (LCP) as guidance. Some LCP policies are much more specific than similar Coastal Act policies, so while the Coastal Commission uses Coastal Act policies for its decisions; it might also reference the LCP to help interpret how those policies should be implemented.</p> <p>The Humboldt County LCP was effectively certified by the California Coastal Commission on January 10, 1986 (COC2007c, pg. 4).</p> <p>Energy Commission staff used the applicable scenic/visual related policies described in the certified Humboldt County LCP to conduct the review of the proposed project's consistency within the Coastal Commission's retained jurisdiction area and with the California Coastal Act (see below), and found that the project as conditioned would be consistent.</p>
Local			
Humboldt County General Plan Vol. II Humboldt Bay Area Plan of the Humboldt County Local Coastal Program	This area plan represents one of six county coastal planning areas. It identifies land uses and standards by which development will be evaluated within the Coastal Zone. The plan identifies uses and provides standards adopted by the county of Humboldt, and certified by the California Coastal Commission that are in conformance and satisfy the polices and requirements for coastal land use contained in the California Coastal Act 1976.		
Coastal-Dependent Development /Industrial (MC)	<p>Purpose is to protect and reserve parcels on or near the sea for industrial uses dependent on, or related to, the harbor.</p> <p>Coastal-dependent industrial facilities are encouraged to locate or expand within existing sites and be permitted reasonable long-term growth where consistent with this division. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent</p>	YES AS PROPOSED	The HBRP involves the building of a facility that would use 10-natural gas fired Wartsila engine-generators producing 163 MW on the 143-acre PG&E property and replace the existing 50-year old Humboldt Bay Power Plant steam boiler turbine generator units 1 and 2 which produce 105 MW. Units 1 and 2, and the two mobile emergency power plants would cease operation after the HBRP becomes commercially operational and are to be eventually removed

	with other policies of this division, they may nonetheless be permitted in accordance with this section.		from the property.
Visual Resource Protection (section 3.40)	30251. The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.		
<p><u>Development Policies:</u></p> <p>1. Physical Scale and Visual Compatibility</p> <p>No development shall be approved that is not compatible with the physical scale of development as designated in the Area Plan and zoning for the subject parcel; and the following criteria shall be determinative in establishing the compatibility of the proposed development:</p> <p>a. For proposed development that is not the principle permitted use, or that is outside an urban limit and for other than detached residential, agricultural uses, or forestry activities regulated by the California Division of Forestry (CDF), that the proposed development compatible with the principle permitted use, and, in addition is either:</p> <p>(1) No greater in height or bulk than is permitted for the principle use, and is otherwise compatible with the styles and visible material of existing development or land forms in the immediate neighborhood, where such development is visible from the nearest public road.</p> <p>(2) Where the project cannot feasibly conform to paragraph 1, and no other more feasible location exists, that the exterior design, and landscaping be subject to a public hearing, and shall be approved only when:</p> <p>(a) There is no less environmentally damaging feasible alternative location.</p> <p>(b) The proposed exterior design and landscaping are sufficient to assure compatibility with the physical scale established by surrounding development.</p> <p>2. Protecting of Natural Landforms and Features</p> <p>Natural contours, including slope, visible contours of hilltops and tree lines, bluffs and rock outcroppings, shall suffer the minimum feasible disturbance compatible with development of any permitted use, and the following standards shall at a minimum secure this objective:</p> <p>a. Under any permitted alteration of natural landforms</p>		<p>YES AS PROPOSED</p>	<p>1. Physical Scale and Visual Compatibility -The Industrial/Coastal-Dependent (MC) zone district provides for industrial use types including heavy industrial, limited to alteration, improvement, and relocation of existing facilities.</p> <p>The proposed development is a conditional use allowed within the MC zone district. The project would be located outside of an urban limit boundary.</p> <p>The HBRP would be of a smaller height than the existing power plant. A comparison of the most publicly visible structures between the Humboldt Bay Power Plant (HBPP) and HBRP include the following; the HBPP exhaust stacks are 120 feet tall, the proposed HBRP exhaust stacks 100 feet. The HBPP steam boiler turbine structure is 100 feet tall. The HBRP engine hall is approximately 45 feet tall. The HBRP site is already highly disturb by existing HBPP structures that are to be removed to allow for the proposed project. No disturbance of natural contours would occur on the project site. The HBRP would introduce structures less visually intrusive to the immediate neighborhood.</p> <p>The project conforms to paragraph 1. In addition, there is no less environmentally damaging feasible alternative location for the construction of the HBRP. The HBRP's photo simulations and draft landscaping plan show that the exterior design and landscaping</p>

<p>during construction, mineral extraction or other approved development, the topography shall be restored to as close to natural contours as possible, and the area planted with attractive vegetation common to the region.</p> <p>b. In permitted development, land form alteration for access roads and public utilities shall be minimized by running hillside roads and utility corridors along natural contours where feasible, and the optional waiving on minimum street width requirements, where proposed development densities or use of one-way circulation patterns make this consistent with public safety, in order that necessary hillside roads may be as narrow as possible.</p> <p>3. Coastal Scenic Area</p> <p>In the Coastal Scenic Area designated in the Area Plan Map (Indianola area), it is the intent of these regulations that all developments visible from Highway 101 be subordinate to the character of the designated area, and the following uniform standards shall apply to all development within said area, in addition to other applicable policies of this plan:</p> <p>a. New industrial and public facility development shall be limited to:</p> <ul style="list-style-type: none"> (1) Temporary storage of materials and equipment for the purpose of road and utility repair or improvement provided that this is necessary to the repair or improvement, and no feasible site for storage of equipment of material is available outside such area. (2) Underground utilities, telephone lines, and above-ground lines consistent with Sections 3.14 and 3.26 (Industrial/Electrical Transmission Lines). <p>b. All permitted development shall be subject to the following standards for siting and design except for structures integral to agricultural use and timberland management subject to CDF requirements for special treatment areas.</p> <ul style="list-style-type: none"> (1) Siding and roofing materials shall not be of reflective materials, excepting glass and corrugated roofing. Solar collectors for on-site use shall be permitted and exempt from this standard. (2) The highest point of a structure shall not exceed 30' vertically measured from the highest point of the foundation, nor 40' from the lowest point of the foundation. (3) Exterior lighting shall be shielded so that it is not directed beyond the boundaries of the property. (4) Vegetation clearing for new development shall be minimized. New development on ridgelines shall be sited adjacent to existing major vegetation, prohibiting removal of tree masses which might destroy the ridgeline silhouette, and limiting the height of structures so that they maintain present ridgeline silhouettes. (5) Timber harvests and activities related to timber management exempt from CDF regulations shall conform to timber harvesting visual standards for 	<p>NOT APPLICABLE</p>	<p>would be compatible in physical scale with established surrounding development.</p> <p><u>2. Protecting of Natural Landforms and Features</u> -The preparation of the building pad for the HBRP does not involve modifications to the described natural landforms and features on the property. The temporary access road, the primary parking and laydown areas, and a portion of the remote parking area are to be restored after completion of the construction of the HBRP.</p> <p>Landscaping removed during project construction is to be replaced, and increased to exceed that which is currently on the PG&E property. No hillside roads are being constructed.</p> <p><u>3. Coastal Scenic Area</u> -The project site is not within the Indianola area which is located northeast of the city of Eureka along Arcata Bay on the east side of U.S. Highway 101. This Indianola area is approximately 9 miles from the project site.</p>
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<p>Special Treatment Areas.</p> <p>4. Coastal View Areas</p> <p>For view areas as designated in the Area Plan, it is the intent of these regulations that no development shall block coastal views to the detriment of the public; and the following uniform standards and conditions shall apply to all development other than agricultural development and timberland management subject to CDF regulations for special treatment areas in said areas, and to specified developments in Coastal Scenic Areas, in addition to standards identified in the Area Plans:</p> <p>a. No off-premise signs shall be permitted; and on-premise signs to a total area of 40 square feet shall be permitted.</p> <p>b. Where the principle permitted use is residential a development may be approved subject to the standards of this document only on the following conditions:</p> <p>(1) The development is not visible from the road or would not block any part of the view; or</p> <p>(2) Where the development cannot be sited to prevent blocking any part of the view, that its height does not exceed 20 feet nor its width, perpendicular to the line of view, exceed 40 feet, and that it is set back from the road at least 60 feet and from property lines vertical to the road at least 30 feet; and</p> <p>c. Where the principle permitted use is commercial or industrial, the proposal shall include a detailed plan for exterior design of all structures and signs, and this plan shall be the subject of public hearings at which the following findings shall be made:</p> <p>(1) That the development does not block any part of the view to the coast or coastal waterways as viewed from public roads in a vehicle.</p> <p>(2) That the exterior design, lighting and landscaping combine to render the overall appearance compatible with the natural setting as seen from the road.</p> <p>(3) That no development, other than landscaping, signs, utilities, wells, fences, and a driveway for access to the public road where required, be located within 50 feet of the public road.</p> <p>(4) That all feasible steps have been taken to minimize the visibility of parking areas from the public road.</p> <p>(5) Exterior lighting shall be shielded so that it is not directed beyond the boundaries of the parcel.</p> <p>d. Uses other than those defined in a through c of this section including those proposed by public agencies, shall be subject to the requirements of Section c in so far as these are relevant.</p> <p>e. Where feasible, new and existing utilities should be underground.</p>	<p>YES AS CONDITIONED</p> <p>NOT APPLICABLE</p> <p>YES AS CONDITIONED</p>	<p>4. Coastal View Areas – The HBRP would not block a view of the Pacific Ocean. The top portion of the project’s engine hall and its exhaust stacks would block a small view of Humboldt Bay as seen from KOP 4 (Loma Avenue) location.</p> <p>No off-premise signs are being proposed by the project owner. However, condition of certification VIS-6 would ensure compliance with the provision. (a)</p> <p>The principle permitted use is not residential. (b)</p> <p>The requested use is industrial. The Application For Certification (AFC) filed with the California Energy Commission included elevation plans (see Visual Resources Figures 4 and 5). No signs have been proposed for the project. The California Energy Commission’s rules of Practice and Procedure & Power Plant Site Certification Regulations present the procedural requirements for the processing of a power plant application. The requirements include public notification and outreach for the staff assessments, public workshops, and evidentiary hearings. (c)</p> <p>The project would be seen from north and south bound U.S. Highway 101. Photo simulations of the project show that it would not block a view of the coast or coastal waterway from the highway. A small portion of the view of Humboldt Bay would be blocked by project structures from the Loma Avenue KOP. No coast or coastal waterway is shown in the viewshed of the King Salmon Avenue KOP. (1)</p> <p>The exterior design of the project as shown in the KOP photo</p>
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		<p>simulations and elevation drawings, the described lighting scheme for the project site and the draft landscaping plan for the PG&E property if effectively implemented would render the overall appearance of the HBRP compatible with the industrial use designation and the natural setting. All areas not required for permanent easements and development would be restored to preconstruction conditions, including topography, hydrology, topsoil, and, if appropriate, revegetation that focuses on erosion control. (2)</p> <p>Structural development would occur on the HBRP site. The site is located approximately 800 feet from U.S. Highway 101, and 1,500 feet from King Salmon Avenue. (3)</p> <p>The existing permanent employee parking lot serving the Humboldt Bay Power Plant would also serve the HBRP at operation. The existing employee parking lot is not noticeable from U.S. Highway 101, King Salmon Avenue, or Loma Avenue. The temporary primary construction parking area is located about 600 feet from King Salmon Avenue. This distance provides a softening of the view of it from King Salmon Avenue. The remote parking area would be noticeable during the peak construction period when vehicles are parked on it. When the project is completed, the temporary primary parking area is to be restored. The eastern half of the remote parking area would be restored as wetland. The western half would remain as an area for future parking use during demolition of the HBPP. Staff has recommended condition of certification VIS-2 to ensure restoration. (4)</p> <p>Exterior lighting on the HBRP site would be shielded and directed downward so that light is not directed beyond the boundaries of the property as required by condition of certification VIS-4. (5)</p> <p>The proposed project is industrial development that is identified as a conditional use allowed within the MC zone district. It is subject to the requirements of section c. (d)</p>
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<p><i>5. Highway 101 Corridor</i></p> <p>The Humboldt County Board of Supervisors shall initiate the preparation of a Scenic Route Study pursuant to the adopted Scenic Highways Element of the Humboldt County General Plan for the portion of Highway 101 between Eureka and Arcata and that portion south of Fields Landing, inclusively.</p> <p><i>6. New Off-Site Signs</i></p> <p>No new off-site signs shall be permitted in rural areas except for directional signs that indicate directions to major recreational facilities, hospitals, and other emergency facilities.</p> <p><i>7. Public Lands Resource Buffer</i></p> <p>The intent of this policy is to guide public agencies through a step-by-step procedure in both the acquisition of land and in the generation of management or development plans for existing public lands. Where necessary, buffer areas around public lands to mitigate adjacent land uses, including buffers necessary for habitat and resources protection, shall be identified and implemented according to the following policy:</p> <p>a. Where feasible, buffer areas shall be internalized within the boundary of the public lands. This applies to both future proposed acquisitions and to existing public lands where the public agency involved sees the need for buffers from adjacent uses or activities.</p> <p>b. Where adequate buffers cannot be feasibly internalized during the acquisition process or, where applicable in the development of management plans for the public lands:</p> <p>(1) activities requiring buffering are to be identified,</p> <p>(2) the location, width, and nature of the buffer are to be determined, and</p> <p>(3) any proposed restrictions affecting adjacent privately owned properties shall be discussed with the affected property owner and Humboldt County.</p> <p>(4) Pursuant to this meeting a mutual agreement shall be made between the public agency and the affected property owner regarding the implementation of the identified buffer. Techniques to be considered for implementation of a buffer include, but are not limited to:</p> <p>(a) alternatives to full acquisition (b) purchase of easements (c) purchase of development rights (d) purchase of major vegetation (e) full acquisition of buffer areas</p>	<p>NOT APPLICABLE</p> <p>YES AS PROPOSED</p> <p>NOT APPLICABLE</p>	<p>The project's natural gas, water, sanitary sewer pipelines are to be buried. (e)</p> <p><u>5. Highway 101 Corridor</u> -At the present time, U.S. Highway 101 has not been designated as a "Scenic Highway" by the county or the state.</p> <p><u>6. New Off-Site Signs</u> -The proposed project does not involve installing new off-site signs in a rural area.</p> <p><u>7. Public Lands Resource Buffer</u> -The project does not involve a public agency's acquisition of land, or the generation of management or development plans for existing public lands.</p>
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<p>(5) Eminent domain proceedings shall be initiated by the public agency seeking a resource buffer only after the opportunity for mutual agreement, outlined above, has been exhausted.</p> <p>8. Natural Features</p> <p>Significant natural features within the Humboldt Bay Planning Area include the following:</p> <ul style="list-style-type: none"> • Arcata Bottoms, • Bottomlands between Eureka & Arcata, • South Spit, • Table Bluff, • Dune Forests along the North Spit, • Bottomland along South Bay, and • Ryan and Freshwater Slough. <p>These features require specific protection for their retention.</p>	<p>NOT APPLICABLE</p>	<p>8. Natural Features -The project site is located on Buhne Point. Buhne Point is not identified as a feature that requires specific natural feature protection.</p>	
<p>Humboldt County Zoning Regulations - Chapter 3 Regulations Inside the Coastal Zone</p>			
<p>Industrial/Coastal-Dependent (MC) (section 313-3.4) - Industrial Use Type</p>	<p>Coastal-related subject to the Coastal-Dependent Industrial Regulations; heavy industrial, limited to alteration, improvement, and relocation of existing facilities.</p> <p>(see also Industrial Performance Standards, section 313-103.1 below)</p>		
<p>• Minimum Yard Setbacks</p>	<p>Minimum Front Yard: None Minimum Side Yard: None Minimum Rear Yard: None</p>	<p>YES AS PROPOSED</p>	<p>As depicted on the site plan, the project would comply with the yard area requirements for the MC zone district as stipulated by the Development Standard Combining Zone regulations.</p>
<p>• Maximum Ground Coverage</p>	<p>None</p>	<p>YES AS PROPOSED</p>	<p>Project is consistent.</p>
<p>• Maximum Structure Height</p>	<p>Fifty feet plus one foot for each foot of front yard setback over fifty feet to a maximum of seventy-five feet.</p>	<p>NOT CONSISTENT</p>	<p>The HBRP's ten exhaust stacks and three transmission poles would each exceed 75 feet in height. The exhaust stacks would each be 100 feet tall. The transmission poles would each be 78 feet tall. See section 99.1.1.1 "Exception to Height Standards" below.</p>
<p>Section 99.1.1.1</p>	<p><u>Exceptions to Height Standards.</u> Any structure, building or any architectural feature of a building may be erected to a height greater than the maximum height limits in this division provided</p>	<p>YES, IF SPECIAL PERMIT IS APPROVED</p>	<p>The project's ten 100-foot tall exhaust stacks and three 78-foot tall transmission poles are necessary to the commercial operation of the power plant and should be excused from the MC</p>

	<p>that a Special Permit is first obtained. Such excess height, when allowed, will normally be conditioned upon proportional increases in the yards required. (Former Section CZ#A314-15(A)(1))</p>		<p>zone district height limitation of 75-feet if the project is licensed. This stack height is necessary for adequate dispersion of stack emissions for air quality and public health reasons.</p> <p>The project owner has not obtained a Special Permit from the California Coastal Commission allowing an exceedance to the county height limitation for the MC zone allowing the project's exhaust stacks and transmission poles.</p> <p>The Humboldt Bay Area Plan of the Humboldt County LCP - Policy 3.40 Visual Resource Protection, Development Policy 1 states "No development shall be approved that is not compatible with the physical scale of development as designated in the Area Plan and zoning for the subject property." The subject property is zoned "MC." The MC zone district has a height limitation of 75-feet.</p> <p>See section 312-17- Special Permit below.</p>
Section 312-17 Special Permit	<p>Unless waived by State law, the Humboldt County Hearing Officer may approve or conditionally approve an application for a Special Permit, Use Permit, Coastal Development Permit, or Planned Unit Development Permit only if all of the following findings, in addition to any applicable findings in Sections 312-18 through 312-49, Supplemental Findings, are made: (Former Section INL#317-36, 317-40.7; CZ#A315-14; Ord. 946, Sec. 4, 10/2/73; Ord. 1726, Sec. 4, 3/4/86; Amended by Ord. 2214, 6/6/00)</p>		<p>The California Energy Commission has exclusive permitting authority over the project and is, thus, an "appropriate approving authority" to perform the required findings for a "Special Permit" to allow exceedance of the height limitation for necessary appurtenances, upon making the required county findings (see below).</p>
- Required Findings For All Permits	<p>17.1.1 The proposed development is in conformance with the County General Plan; (Former Section INL#317-36(c), 317-40.7(3); CZ#A315-14(A); Ord. 946, Sec. 4, 10/2/73; Ord. 1726, Sec. 4,3/4/86)</p> <p>17.1.2 The proposed development is consistent with the purposes of the existing zone in which the site is located, or when processed in conjunction with a zone reclassification, is consistent with the purposes of the proposed zone; (Former Section INL#317-36(a), 317-40.7(1); CZ#A315-14(B))</p>	<p>YES</p> <p>YES</p>	<p>The project site is designated Coastal-Dependent Development/ Industrial. This designation allows electrical generating facilities.</p> <p>The project site is zoned Industrial/Coastal-Dependent which allows heavy industrial type uses, limited to alteration, improvement, and a relocation of existing facilities. The proposed HBRP at commercial operation would allow for the shut down of the 50-year old HBPP and its eventual demolition and removal from the property.</p> <p>The project would comply or conform accordingly to the</p>

	<p>17.1.3 The proposed development conforms with all applicable standards and requirements of these regulations; and (Former Section CZ#A315-14(C))</p> <p>17.1.4 The proposed development and conditions under which it may be operated or maintained will not be detrimental to the public health, safety, or welfare or materially injurious to properties or improvements in the vicinity. (Former Section INL#317-36(b), 317-40.7(2); CZ#A315-14(D))</p> <p>17.1.5 The proposed development does not reduce the residential density for any parcel below that utilized by the Department of Housing and Community Development in determining compliance with housing element law (the mid point of the density range specified in the plan designation) unless the following written findings are made supported by substantial evidence:</p> <ul style="list-style-type: none"> - 17.1.5.1 The reduction is consistent with the adopted general plan, including the housing element, and - 17.1.5.2 The remaining sites identified in the housing element are adequate to accommodate the County's share of the regional housing need pursuant to Section 65584 of the Government Code, and - 17.1.5.3 The property contains insurmountable physical or environmental limitations and clustering of residential units on the developable portions has been maximized. 	<p>YES</p> <p>YES</p> <p>NOT APPLICABLE</p>	<p>identified county visual resource LORS. However, the making of this finding is not limited to the "visual resources" technical section of the FSA, but applies to multiple technical sections within the FSA and is better addressed under those specific sections. This being said, the purpose of the Energy Commission's conditions of certification on a project is to prevent adverse effects that a project may generate to the public health, safety and welfare. Conditions of certification are basically comprised of two components; to mitigate potentially significant impacts identified by CEQA and to ensure conformance with state or local LORS. For this project, Energy Commission staff reviewed county LORS for applicability to the project and proposed conditions of certification on the project to make the project comply or conform accordingly to the identified county LORS.</p> <p>The building of the proposed HBRP does not involve a reduction of residential density for any parcel below that utilized by the Department of Housing and Community Development.</p>
<p>Section 313-103.1 Industrial Performance Standards</p>	<p>The purpose of these regulations is to establish minimum standards for the operation of industrial development in Humboldt County.</p>		
<p>Standards for Industrial Development that Impact Nonresidential Zones</p>	<p>103.1.4.1 <u>Noise</u>. Mitigation measures shall be required where necessary to insure that noise generated by industrial operations does not exceed 70 dB (A) anywhere off the site. (Former Section CZ#A314-</p>	<p>SEE NOISE & VIBRATION SECTION OF FSA</p>	<p>The making of this finding is not limited to the "visual resources" technical section of the FSA, but applies to multiple technical sections within the FSA and is better addressed under those specific sections. The purpose of</p>

	<p>18(D)(1))</p> <p>103.1.4.2 <u>Lights</u>. No restrictions. (Former Section CZ#A314-18(D)(2))</p> <p>103.1.4.3 <u>Traffic</u>. No restrictions. (Former Section CZ#A314-18(D)(3))</p> <p>103.1.4.4 <u>Vibrations</u>. No perceptible vibrations shall be permitted to interfere with adjacent land uses. (Former Section CZ#A314-18(D)(4))</p> <p>103.1.4.5 <u>Electronic Interference</u>. No visual or audible interference of radio or television reception by operations shall be permitted. (Former Section CZ#A314-18(D)(5))</p> <p>103.1.4.6 All manufacturing and fabricating areas shall be enclosed in buildings. (Former Section CZ#A314-18(D)(6))</p>	<p>YES AS CONDITIONED BY VISUAL RESOURCES SECTION</p> <p>SEE TRAFFIC SECTION OF FSA</p> <p>SEE NOISE & VIBRATION SECTION OF FSA</p> <p>SEE FACILITY DESIGN SECTION</p> <p>YES AS PROPOSED</p>	<p>the Energy Commission's conditions of certification on a project is to prevent adverse effects that a project may generate to the public health, safety and welfare. Conditions of certification are basically comprised of two components; mitigation measures required by CEQA and state or local LORS. For this project, Energy Commission staff reviewed county LORS for applicability to the project and proposed conditions of certification on the project to make the project comply or conform accordingly to the identified county LORS.</p> <p>The project owner has proposed measures to control light trespass beyond the boundaries of the PG&E property. Directional light fixtures and shielding of lighting to reduce light scatter and glare are to be used. Condition of certification VIS-4 would ensure compliance with this standard.</p> <p>The project would generate electricity using ten natural gas fired Wartsila reciprocating engine-generator sets and other equipment housed within an engine hall.</p>
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NOTEWORTHY PUBLIC BENEFITS

Upon commercial operation of the HBRP, the Humboldt Bay Power Plant steam boiler turbine-generation units 1 and 2 would cease operation, resulting in the elimination of visible plume emissions and a reduction in the use of exterior lighting.

The HBRP would result in the planting of additional landscaping to that presently on the PG&E property and the restoration of several wetland areas.

The HBRP would in directly result in the demolition and removal of structures associated with the 50-year old Humboldt Bay Power Plant.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments pertaining to visual resources have been received.

CONCLUSIONS

The visual analysis focused on two main issues; (1) would construction and operation of the project cause an aesthetic impact under CEQA; and (2) would the project comply

with applicable local LORS pertaining to aesthetics or preservation and protection of sensitive visual resources.

1. The project is to be constructed on a 143-acre property in the “Industrial/Coastal-Dependent” zone district within unincorporated Humboldt County. Land uses in the area are a mixture of residential, recreational, commercial and industrial.
2. The project would not have a substantial adverse effect on an identified scenic vista or a scenic resource from the selected key observation points.
3. The project site does not have frontage on, or traverse a segment of a road recognized as a National Scenic Byway or All American Road, or a State Scenic Highway.
4. The project would generate a less than significant visual impact to the viewsheds at the selected key observations points with the effective implementation of the recommended conditions of certification.
5. The project would not substantially degrade the existing visual character or quality of the site and its surroundings with the effective implementation of the conditions of certification.
6. The project would generate a less than significant new source of light or glare to nighttime or daytime views with the effective implementation of the conditions of certification.
7. There would be no publicly visible water vapor plumes emitted by the project at operation during normal weather conditions based on the project owner’s proposed facility design.
8. The project’s publicly visible structures would not be seen by an identified minority population of greater than 50 percent and would not result in any significant adverse visual impacts. Therefore, the proposed project does not introduce a significant visual resource related environmental justice issue.
9. With the effective implementation of the landscaping and lighting design/construction measures that the project owner has agreed to, and staff’s recommended visual resources conditions of certification, the construction and operation of the project would not contribute significantly to a cumulative visual impact to adjacent land uses.
10. Staff made a scenic and visual quality consistency determination for the project on the behalf of the California Coastal Commission. Staff determined that the project would be in conformance with Section 30251 – Scenic and Visual Qualities of the California Coastal Act, using the required development policies for Visual Resource Protection found in the Humboldt County General Plan, Volume II Humboldt Bay Area Plan of the Humboldt County Local Coastal Program, dated April 1995. The development policies are presented in **Visual Resources Table 2** under Visual Resource Protection.

11. The “Industrial/Coastal-Dependent” zone district has a height limitation of 75-feet for structures. The project proposes ten 100-foot tall exhaust stacks and three 78-foot tall transmission poles. The project owner has not obtained a “Special Permit” from the California Coastal Commission allowing an exceedance to the height limitation for the exhaust stacks and transmission poles. The California Energy Commission has exclusive permitting authority over the project and is, thus, an “appropriate approving authority” to perform the findings for the granting of a Special Permit allowing the height exceedance. The required county findings are presented in **Visual Resources Table 2** under Section 312-17 Special Permit.
12. With the adoption of the Section 312-17 findings granting a Special Permit, the project would comply with all applicable laws, ordinances, regulations, and standards pertaining to aesthetics or preservation and protection of sensitive visual resources.

The construction and operation of the Humboldt Bay Repowering Project as proposed, with the effective implementation of the project owner’s proposed design/construction measures and staff’s recommended conditions of certification (below), would ensure that visual resource impacts generated by the project are less than significant, and ensure that the project complies with all applicable LORS pertaining to aesthetics or preservation and protection of sensitive visual resources.

PROPOSED CONDITIONS OF CERTIFICATION

Construction Lighting

VIS-1 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, to direct light 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. Wherever feasible and safe and not needed for security, lighting shall be kept off when not in use; and
- D. If the project owner receives a complaint about construction lighting, the project owner shall notify the Compliance Project Manager (CPM) and shall use the complaint resolution form shown in the General Conditions section of the Compliance Plan to record each lighting complaint and to document the resolution of that complaint. The project owner shall provide a copy of each complaint form to the CPM.

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 notifies the project owner that modifications to the lighting are needed to minimize impacts, 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.

Within 48 hours of receiving a lighting complaint, the project owner shall provide to the CPM a) a report of the complaint b) a proposal to resolve the complaint, and c) a schedule for implementation of the proposal. The project owner shall notify the CPM within 48 hours after completing implementation of the proposal. The project owner shall provide a copy of the completed complaint resolution form to the CPM in the next Monthly Compliance Report.

Surface Restoration

VIS-2 The project owner shall remove all evidence of construction activities, and shall restore the ground surface to the original condition or better condition, including the replacement of any vegetation or paving removed during construction where project development does not preclude it. The project owner shall submit to the CPM for review and approval a surface restoration plan the proper implementation of which will satisfy these requirements. The project owner shall complete surface restoration within 60 days after the start of commercial operation. If the identified ground surface area has been specifically included in an approved biological resources mitigation plan by the California Energy Commission the timeframe specified in the mitigation plan for completion of restoration of the ground surface area shall apply.

Verification: At least 60 days prior to the start of commercial operation, the project owner shall submit the surface restoration plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the surface restoration plan are needed, within 30 days of receiving that notification the project owner shall submit to the CPM a plan with the specified revisions.

The project owner shall complete surface restoration within 60 days after the start of commercial operation unless the timeframe is specific otherwise in a biological resources mitigation plan approved by the California Energy Commission. The project owner shall notify the CPM within seven days after completion of surface restoration that the restoration is ready for inspection.

Surface Treatment of Project Structures and Buildings

VIS-3 The project owner shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

The project owner shall submit a surface treatment plan to the CPM for review and approval. The surface treatment plan shall include:

- A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;
- B. A list of each major project structure and building (e.g., building, tank, pipe, and wall; transmission line towers and/or poles; and fencing), specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;
- C. One set of color brochures or color chips showing each proposed color and finish;
- D. A specific schedule for completing the treatment; and
- E. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not request vendor surface treatment of any buildings or structures during their manufacture, or perform final field treatment on any buildings or structures, until the project owner has received treatment plan approval by the CPM.

The project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection; and shall submit one set of electronic color photographs from the selected KOPs 1, 2, and 3 showing the “as built” surface treated structures and buildings.

Verification: At least 45 days prior to applying vendor color(s) and finish (es) for structures or buildings to be surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval, and simultaneously to the Executive Director of the California Coastal Commission for review. The project owner shall allow the Executive Director of the California Coastal Commission at least 30 days to provide comment on the submitted surface treatment plan.

The project owner shall provide to the CPM a copy of the transmittal letter submitted to the Executive Director of the California Coastal Commission requesting their review of the submitted surface treatment plan.

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.

If the CPM determines that the plan requires revision, the project owner shall provide to the Executive Director of the California Coastal Commission a plan with the specified revision(s) for review before the plan is implemented.

Within ninety (90) days after 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 is ready for inspection; and shall submit one set of electronic color photographs from the selected KOPs 1, 2, and 3, at the least, showing the “as built” surface treated structures and buildings.

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) major maintenance activities that occurred during the reporting year; and c) the schedule of major maintenance activities for the next year.

Permanent Exterior Lighting

VIS-4 To the extent feasible, consistent with safety and security considerations and commercial availability, the project owner shall design and install all permanent exterior lighting such that a) light fixtures do not cause obtrusive spill light beyond the project site; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky; d) illumination of the project and its immediate vicinity is minimized, and e) lighting complies with local policies and ordinances. The project owner shall submit to the CPM for review and approval and simultaneously to the Executive Director of the California Coastal Commission for review and comment a lighting management plan that includes the following:

- A. A process for addressing and mitigating lighting related complaints;
- B. Lighting shall incorporate commercially available fixture hoods/shielding, with light directed downward or toward the area to be illuminated;
- C. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and
- D. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 45 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to determine the required documentation for the lighting management plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the Executive Director of the California Coastal Commission for review a lighting management plan. The project owner shall allow the Executive Director of the California Coastal Commission at least 30 days to provide comment on the submitted lighting plan.

The project owner shall provide to the CPM a copy of the transmittal letter submitted to the Executive Director of the California Coastal Commission requesting their review of the submitted lighting plan.

The project owner shall provide the Executive Director of the California Coastal Commission comments to the CPM at least 10 days prior to the date lighting materials are ordered.

If the CPM determines that the lighting management plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval. Any modifications to the lighting management plan must be submitted to the CPM for review and approval.

The project owner shall not order any exterior lighting until receiving CPM approval of the lighting management plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been installed 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 10 days 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 10 days after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days of complaint resolution.

Landscaping

VIS-5 The project owner shall install landscaping consistent with the draft landscape plan, dated February 7, 2007, shown on **Visual Resources Figures 11a** and **Figure 11b**. The project owner shall submit to the CPM for review and approval and simultaneously to the Executive Director of the California Coastal Commission for review and comment a landscaping plan.

The Executive Director of the California Coastal Commission shall have 30 calendar days to review the landscaping plan and provide written comments to the project owner. The project owner shall provide a copy of the Executive Director of the California Coastal Commission's written comments to the CPM for review and approval.

The project owner shall not implement the landscaping plan until the project owner receives approval of the plan from the CPM. The planting must be completed by the start of commercial operation, and the planting must occur during the optimal planting season.

Verification: Prior to commercial operation and at least 45 days prior to installing the landscaping, the project owner shall provide a copy of the landscaping plan to the Executive Director of the California Coastal Commission for review. The project owner shall allow the Executive Director of the California Coastal Commission at least 30 days to provide comment on the submitted landscaping plan.

The project owner shall provide to the CPM a copy of the transmittal letter submitted to the Executive Director of the California Coastal Commission requesting their review of the submitted landscaping plan.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM, and the Executive Director of the California Coastal Commission a landscaping plan with the specified revision(s) for review, and to the CPM for final approval before the plan is implemented.

The project owner shall notify the CPM within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

Signage

VIS-6 The project owner shall install minimal signage visible to the public, that shall a) have unobtrusive colors and finishes that prevent excessive glare; and b) be consistent with the policies stipulated in the certified Humboldt County Local Coastal Program if the Humboldt Bay Redevelopment Project (HBRP) signage is to be located within the state designated coastal zone, or the applicable ordinances of the county of Humboldt if the signage is to be located outside of the designated state coastal zone. The design of any signs required by safety regulations shall conform to the criteria established by those regulations. The project owner shall submit signage for the project to the CPM for review and approval and simultaneously to the Executive Director of the California Coastal Commission, or the Humboldt County Community Development Services Department, Planning Division, if applicable, for review and comment.

The Executive Director of the California Coastal Commission, or the Humboldt County Community Development Services Department, Planning Division, if applicable, shall have 30 calendar days to review the HBRP signage and provide written comments to the project owner. The project owner shall provide a copy of the Executive Director of the California Coastal Commission and the Humboldt County Community Development Services Department, Planning Division written comments to the CPM for review.

The project owner shall not install any signage until the project owner receives approval from the CPM.

Verification: Prior to the start of commercial operation and at least 60 calendar days prior to installing signage, the project owner shall submit HBRP signage to the CPM for review and approval and simultaneously to the Executive Director of the California Coastal Commission, or the Humboldt County Community Development Services Department, Planning Division, if applicable, for review and comment.

The project owner shall allow the Executive Director of the California Coastal Commission, or the Humboldt County Community Development Services Department, Planning Division at least 30 days to provide comment on the submitted HBRP signage.

The project owner shall provide to the CPM a copy of the transmittal letter submitted to the Executive Director of the California Coastal Commission, or the Humboldt County

Community Development Services Department, Planning Division requesting their review of the submitted HBRP signage.

If the CPM determines that HBRP signage requires revision, the project owner shall provide to the CPM the signage with the specified revision(s) for review and approval by the CPM before any signage visible to the public is installed.

The project owner shall provide the CPM with electronic color photographs within 30 days after completing installation of signage.

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APPENDIX VR-1

ENERGY COMMISSION STAFF - VISUAL RESOURCES ANALYSIS EVALUATION CRITERIA

Staff evaluates the visual characteristics of the existing physical setting, estimates the potential affects to a viewer, and estimates the potential degree of visual change that the proposed project may introduce to the physical setting using the following: applicable federal, state and local LORS, key observation points, publicly visible water vapor plume frequency, and the California Environmental Quality Act and Guidelines.

LORS

Energy Commission staff consider federal, state, and local laws, ordinances, regulations, and standards (LORS) relevant to aesthetics or protection and preservation of visual sensitive resources. Conflicts with such LORS can constitute significant visual impacts. Staff examines land use planning documents, such as a local government's General Plan, Specific Plan, and zoning ordinances applicable to the project site and surrounding area pertaining to aesthetics or protection and preservation of visually sensitive resources.

Key Observation Points

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a "Key Observation Point" [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP³ to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen (visible to the public). Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent a primary viewer group(s) that would potentially be affected by the project. In addition to KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the immediate area of the selected KOP. Staff participates in the selection of appropriate KOP(s) to be used for the proposed project's visual analysis, prior to the applicant's filing of an application with the California Energy Commission.

Publicly Visible Water Vapor Plume Frequency

When a proposed power plant is operated at times of low temperature and high humidity, the potential exists for the exhaust from its cooling towers to condense and form visible water vapor plumes (steam plume). The formed plume potentially could have an adverse effect on visual sensitive resources in the vicinity of the project.

³The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

The severity of the visual impacts created by a project's visible plumes depends on six factors: 1) the frequency of the plumes, 2) the physical size of the plumes (dimensions), 3) the sensitivity of the viewers who would see the plumes, 4) the distance between the plumes and the viewers, 5) the visual quality of the existing viewshed; and, 6) whether a scenic resource or vista would be blocked by the plumes.

Staff completes water vapor plume modeling of the proposed project's cooling towers using design parameters provided by the applicant. Staff models the estimated plume frequency and dimensions for the cooling tower and turbine exhaust using the Combustion Stack Visible Plume (CSVP) model, and a multi-year meteorological data set obtained for the area where the project is proposed.

Staff considers the 20th percentile plume to be the reasonable worst case plume dimensions on which to base its visual impact analysis. The 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20% of the time. Eighty (80) percent of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. A one percentile clear hour plume would be extremely large, very noticeable to a wide area, but would occur very infrequently.

Staff focuses its frequency of the plumes analysis on the portion of the year when the ambient conditions (i.e., cool/cold temperatures and high relative humidity) are such that plumes are most likely to occur (typically from November through April) and when "clear" sky conditions exist because this is when the plumes would cause the most visual contrast with the sky and have the greatest potential to cause adverse visual impacts. Staff eliminates from consideration plumes that occur at night or during rain or fog conditions because plume visibility, and overall visual quality, is typically low during those conditions. In addition, plumes that occur during specific cloudy conditions are also eliminated because under these conditions, plumes have less contrast with the background sky. A plume frequency of 20% of seasonal daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. If it is determined that the seasonal daylight clear hour plume frequency is greater than 20%, then plume dimensions are determined and a significance analysis is included in the Visual Resources section of the Staff Assessment for the proposed project.

Plume frequencies of less than 20% have been determined to generally have a less than significant impact. If the modeling predicts seasonal daylight clear plume frequencies greater than 20%, staff calculates the dimensions of the clear hour plumes and then conduct an assessment of the visual change (in terms of contrast, dominance and view blockage) that would be caused by the 20th percentile plume dimensions. Staff also analyzes the predicted plume's potential luminescence (light refraction resulting in a glare or glow) and color contrast, and opacity (the degree to which light is prevented from passing through an emission plume) that may be introduced to the KOP viewsheds. Considering the visual sensitivity of the existing landscape and viewing characteristics, the degree of visual change introduced by the plumes may result in a significant visual impact.

California Environmental Quality Act And Guidelines

The California Environmental Quality Act (CEQA) defines a "significant effect on the environment" to mean a "substantial, or potentially substantial, adverse change in any of

the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance” (California Code of Regulations, Title 14, Section 15382).

To determine whether there is a potentially significant visual resources impact introduced by a proposed project, Energy Commission staff reviews the project using the CEQA Guidelines Appendix G Environmental Checklist Form pertaining to “Aesthetics.” The CEQA 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 answers each of the four checklist questions for the proposed project, including any related facility such as a transmission line or gas pipeline, for both the construction and operation phases.

APPENDIX VR-2

ENERGY COMMISSION STAFF - VISUAL RESOURCES ANALYSIS TERMS

For the purpose of this visual analysis, Energy Commission staff has defined the following visual related terms:

Duration of View - ranges from high (extended) a view of the project site that is reached across a stretched out distance, or amount of time; to, low (brief) a view of the project site that is reached in a short amount of distance or time. The range of view duration generally differs depending on the type of activity in which the viewers is engaged.

Scenic Resource - a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

Scenic Vista - a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality.

Viewer Concern - estimated level of a viewer's anticipated interest in preserving and protecting the existing physical environment. Viewer attitudes and expectations is often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern.

Existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, indicate a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Viewer Exposure – visibility of a landscape feature, the number of viewers, distance, and the duration of the view are primary factors affecting viewer susceptibility to impacts.

Viewshed – an area visible to an observer from a fixed vantage point (Key Observation Point [KOP]). Staff uses a 35mm camera with a focal length of 50mm which encompasses an approximate image angle of 46⁰ similar to the field-of-view of the

human eye. The staff uses a viewshed that is not to be confused with a panoramic (180⁰) or cycloramic (360⁰). These are broad horizontal composition with no apparent limits to the view.

Visibility - the level the proposed project site is visually obstructed by natural and/or man-made surface features (development, vegetation, hills) from the Key Observation Point.

Visual Contrast - The conspicuousness or prominence of a project, and its compatibility with its setting. Contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting. Consider the proposed project's introduction of **form** (shape and mass), **line** (changes in edge types and interruption or introduction of edges, bands and silhouette lines), **color** (surface color, reflectivity, and glare), and **texture** (noticeable differences in the grain, or irregularity and directional patterns) to the existing physical environment to determine the degree of contrast. Degree of contrast: **none** – the element contrast is not visible or perceived; **weak** – the element contrast can be seen but does not attract attention; **moderate** – the element contrast begins to attract attention and begins to dominate the characteristic landscape; **strong** – the element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Visual Disruption - the extent to which a previously visible scenic resource or scenic vista in the existing physical environment is blocked from view by the proposed project. The view disruption is assigned greater weight according to the quality and importance of the block view.

Visual Quality – the estimated visual impression and appeal of the existing physical environmental setting and the associated public value attributed to it. An outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as “picture postcard” landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

Visual Scale - the proposed project's apparent size relationship with other components in the existing physical environment relative to the total field-of-view as viewed by the human eye, or the lens of a 35mm camera with a focal length of 50mm.

Visual Sensitivity - the overall level of sensitivity of a viewshed due to visual change is a function of visual quality, viewer concern, and viewer exposure.

VISUAL RESOURCES - FIGURE 1

Humboldt Bay Repowering Project - Humboldt Bay Harbor and Bay Aerial View

MAY 2008



VISUAL RESOURCES

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SOURCE: Digital Visual Library, Photographer Robert Campbell - May 3, 2007

VISUAL RESOURCES - FIGURE 2

Humboldt Bay Repowering Project - Aerial View of PG&E Property and Vicinity

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VISUAL RESOURCES - FIGURE 3

Humboldt Bay Repowering Project - View of Humboldt Bay Power Plant from King Salmon Avenue

MAY 2008



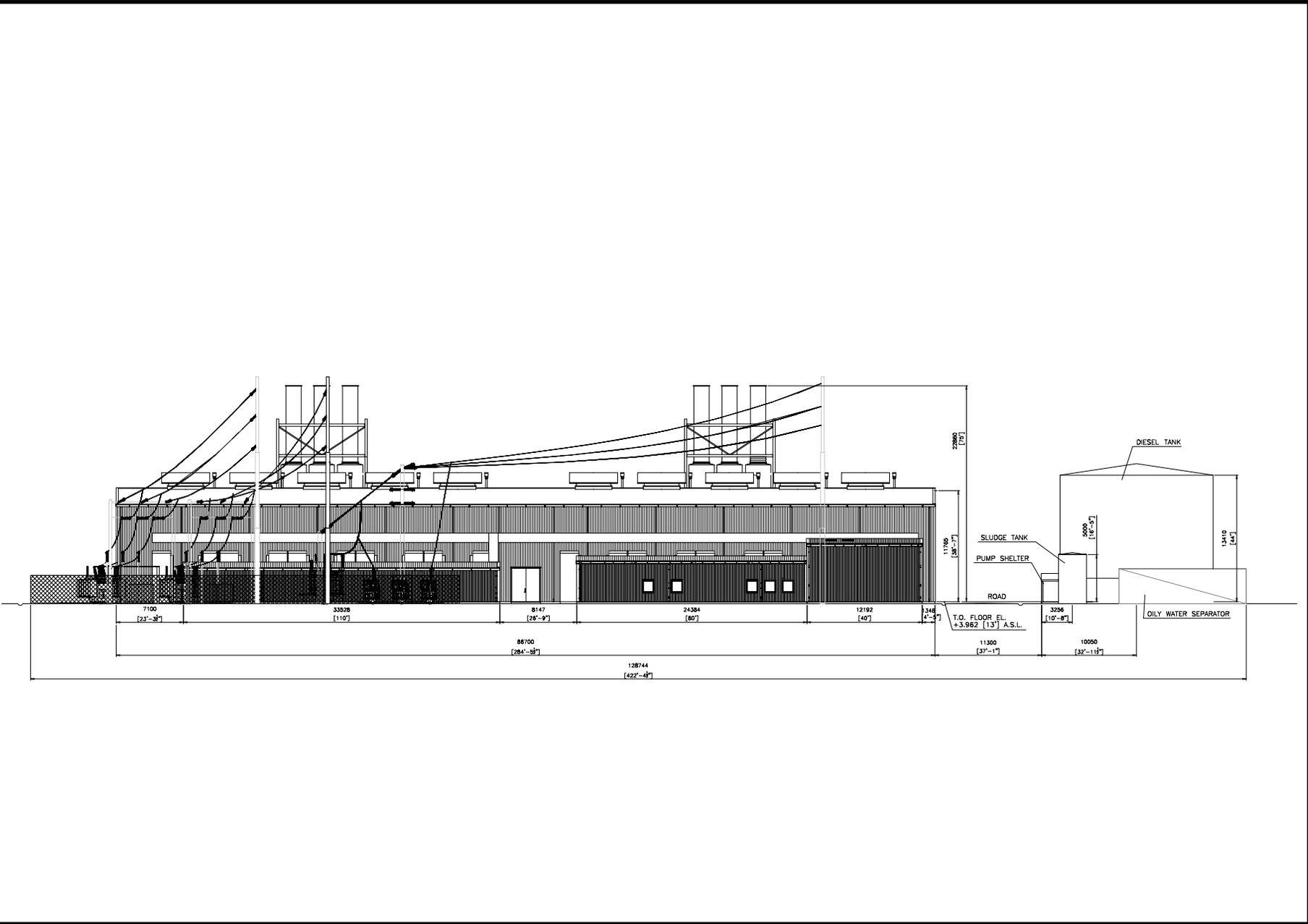
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CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 4
Humboldt Bay Repowering Project - Southwest View of Plant Elevation

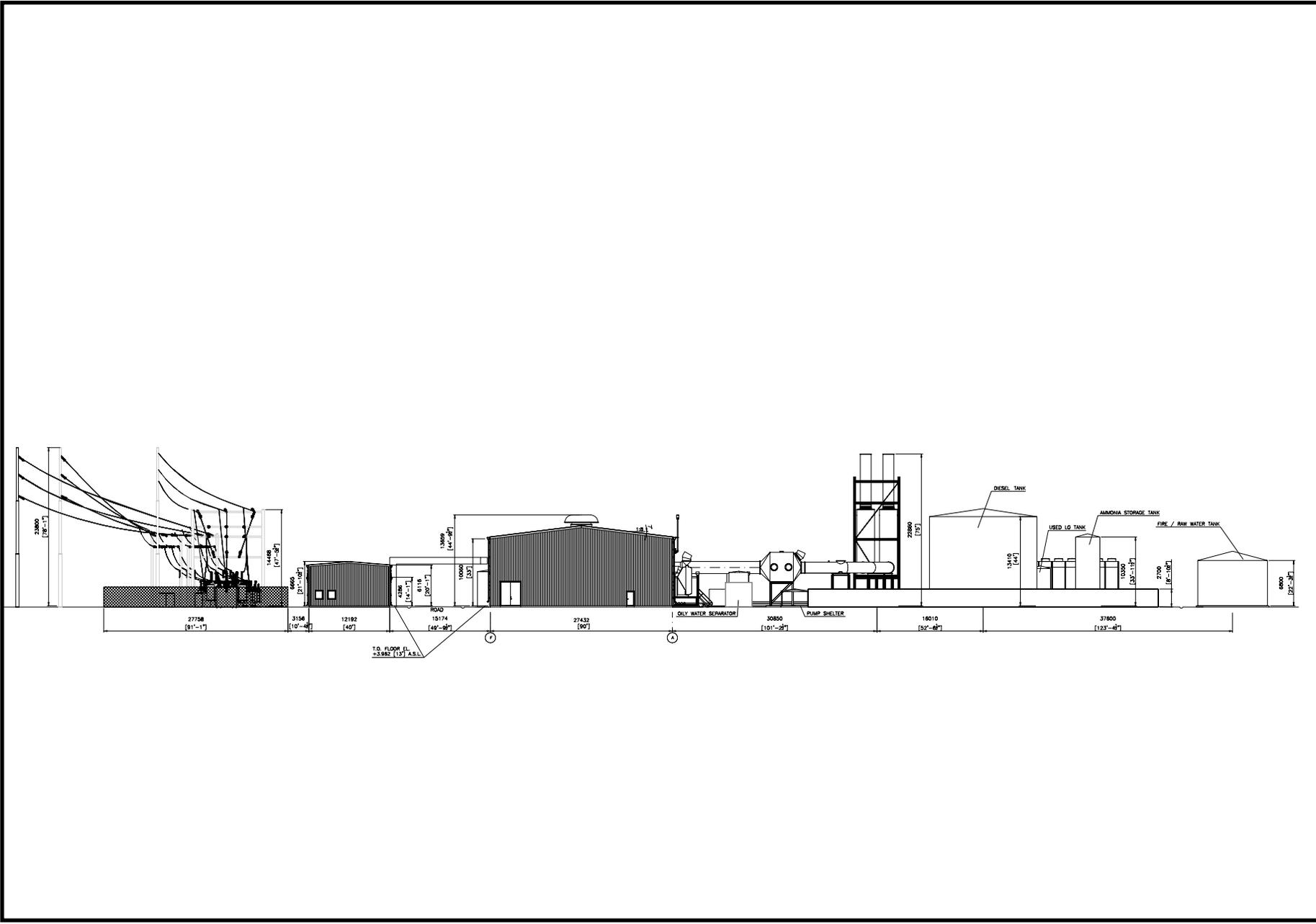
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VISUAL RESOURCES - FIGURE 5
Humboldt Bay Repowering Project - Southeast View of Plant Elevation

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VISUAL RESOURCES - FIGURE 6

Humboldt Bay Repowering Project - Proposed Construction Road Access from King Salmon Avenue

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VISUAL RESOURCES - FIGURE 7
Humboldt Bay Repowering Project - Proposed Primary Parking Area

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VISUAL RESOURCES - FIGURE 8
Humboldt Bay Repowering Project - Proposed Remote Primary Parking Area

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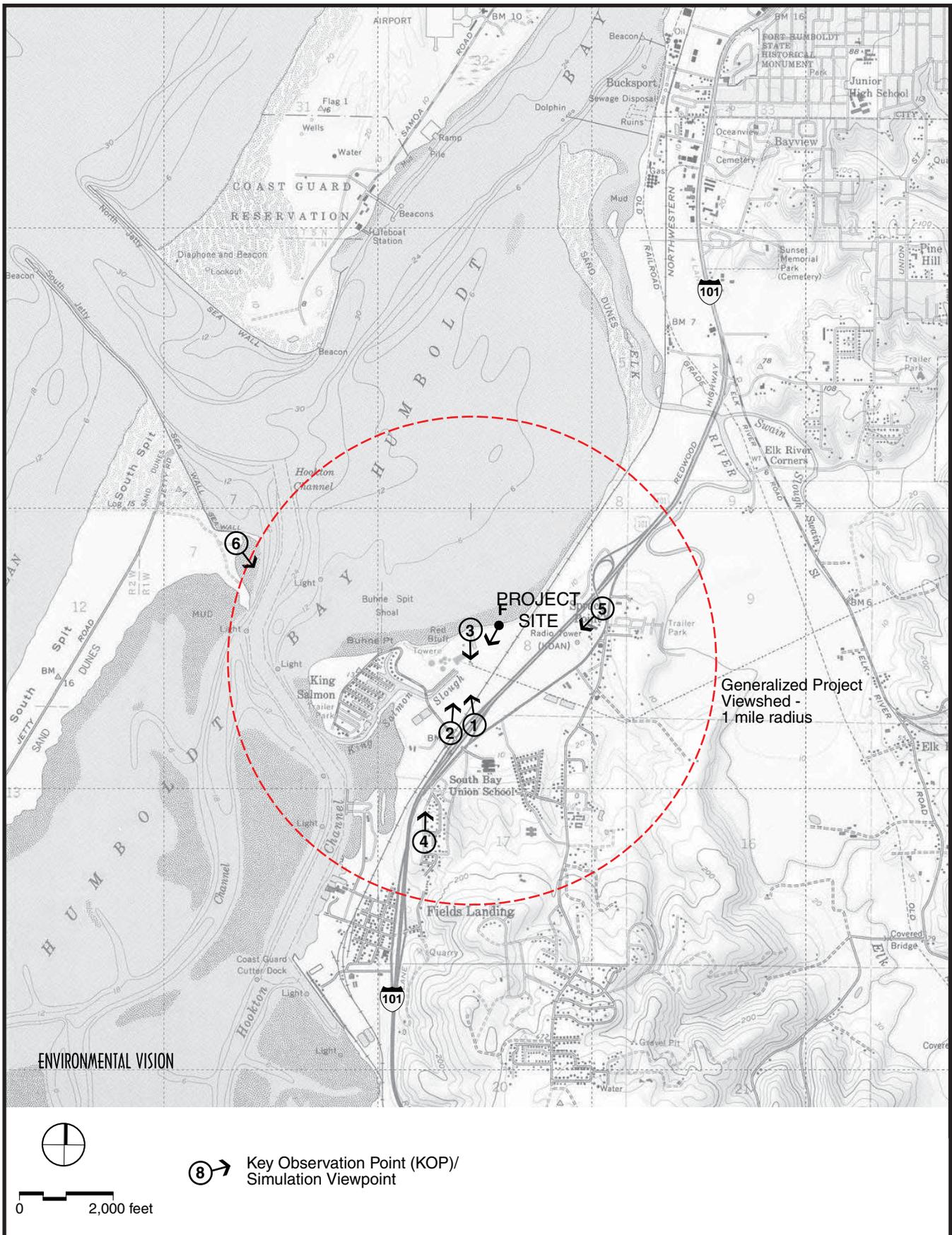
VISUAL RESOURCES - FIGURE 9
Humboldt Bay Repowering Project - Proposed Construction Laydown Area

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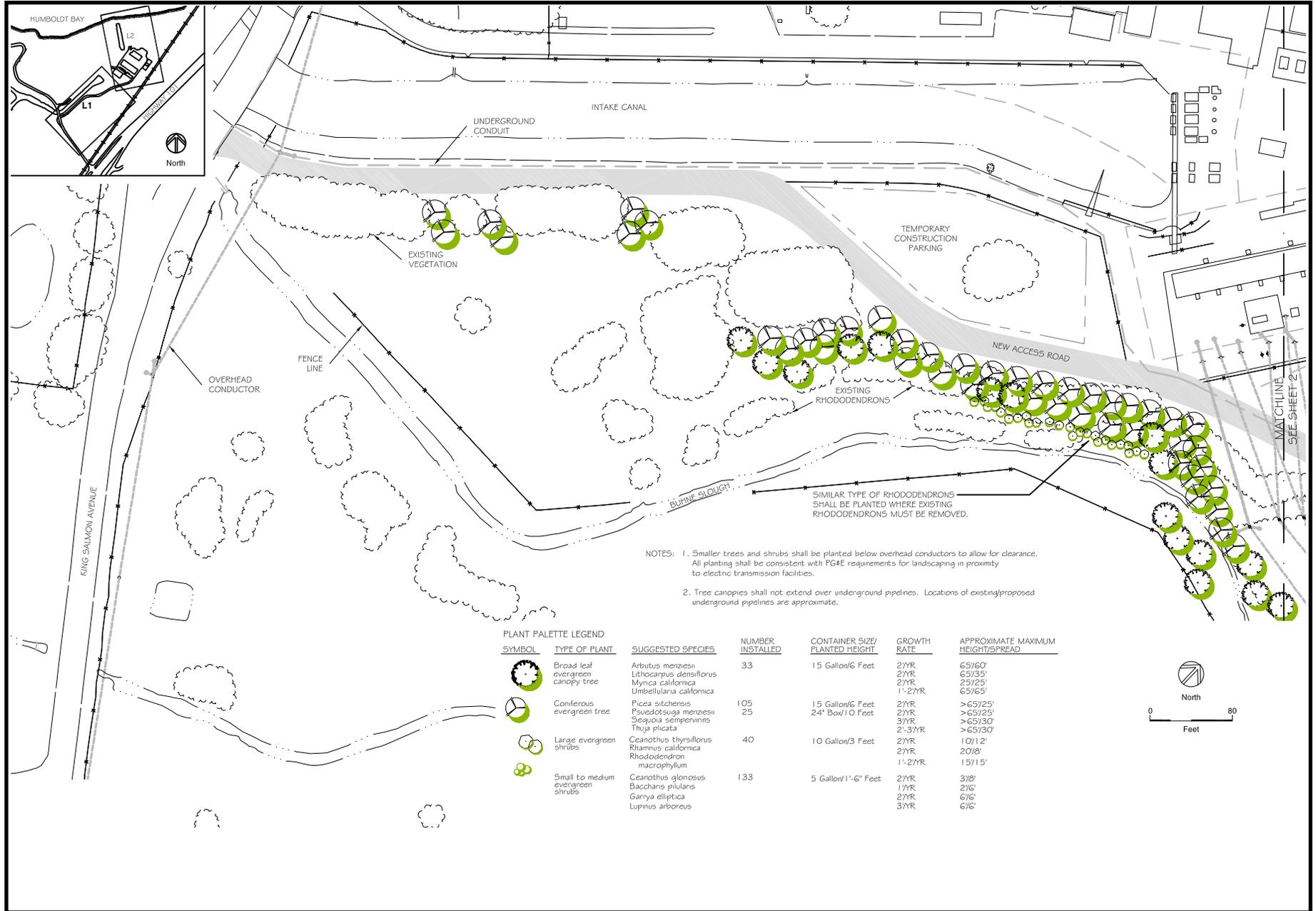
VISUAL RESOURCES - FIGURE 10
Humboldt Bay Repowering Project - Key Observation Points



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008
 SOURCE: AFC Figure 8.13-3

VISUAL RESOURCES - FIGURE 11-A
Humboldt Bay Repowering Project - Draft Landscape Plan - Sheet 1

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NOTES: 1. Smaller trees and shrubs shall be planted below overhead conductors to allow for clearance. All planting shall be consistent with PG&E requirements for landscaping in proximity to electric transmission facilities.
 2. Tree canopies shall not extend over underground pipelines. Locations of existing/proposed underground pipelines are approximate.

PLANT PALETTE LEGEND

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES	NUMBER INSTALLED	CONTAINER SIZE/ PLANTED HEIGHT	GROWTH RATE	APPROXIMATE MAXIMUM HEIGHT/SPREAD
	Broad leaf evergreen canopy tree	<i>Arbutus menziesii</i> <i>Lithocarpus densiflorus</i> <i>Myrica californica</i> <i>Umbellularia californica</i>	33	15 Gallon/6 Feet	2/YR 2/YR 2/YR 1'-2/YR	65/60' 65/35' 25/25' 65/65'
	Coniferous evergreen tree	<i>Picea sitchensis</i> <i>Pseudotsuga menziesii</i> <i>Sequoia sempervirens</i> <i>Thuja plicata</i>	105 25	15 Gallon/6 Feet 24" Box/10 Feet	2/YR 2/YR 3/YR 2-3/YR	>65/25' >65/25' >63/30' >63/30'
	Large evergreen shrubs	<i>Ceanothus thyrsiflorus</i> <i>Rhamnus californica</i> <i>Rhododendron macrophyllum</i>	40	10 Gallon/3 Feet	2/YR 2/YR 1'-2/YR	10/12' 20/8' 15/15'
	Small to medium evergreen shrubs	<i>Ceanothus glaberrimus</i> <i>Baccharis pilularis</i> <i>Garrya elliptica</i> <i>Lupinus arboreus</i>	133	5 Gallon/1'-6" Feet	2/YR 1/YR 2/YR 3/YR	3/8' 2/6' 6/6' 6/6'

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VISUAL RESOURCES - FIGURE 11-B
Humboldt Bay Repowering Project - Draft Landscape Plan - Sheet 2

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- NOTES:
1. See Sheet 1 for plant palette legend.
 2. Smaller trees and shrubs shall be planted below overhead conductors to allow for clearance. All planting shall be consistent with PG&E requirements for landscaping in proximity to electric transmission facilities.
 3. Tree canopies shall not extend over underground pipelines. Locations of existing/proposed underground pipelines are approximate.

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VISUAL RESOURCES - FIGURE 12

Humboldt Bay Repowering Project - Landscape Character Photo Showing Residence Across From Remote Parking Area on King Salmon Avenue

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CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 13 - KOP 1
Humboldt Bay Repowering Project - Existing View Toward the Project Site from Northbound U.S. Highway 101



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VISUAL RESOURCES - FIGURE 14

Humboldt Bay Repowering Project - Photo Simulation of Proposed Project's Publicly Visible Structures In KOP 1 Viewshed



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VISUAL RESOURCES - FIGURE 15 - KOP 2
Humboldt Bay Repowering Project - Existing View From King Salmon Avenue Looking Toward The Project Site



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VISUAL RESOURCES - FIGURE 16

Humboldt Bay Repowering Project - Photo Simulation of Proposed Project's Publicly Visible Structures In KOP 2 Viewshed



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CALIFORNIA ENERGY COMMISSION, ENERGY FACILITY SITING DIVISION, MAY 2008

SOURCE: Revised Simulation From CH2MHill, 11/19/2007

ENVIRONMENTAL VISION

VISUAL RESOURCES - FIGURE 17

Humboldt Bay Repowering Project - Photo Simulation of Proposed Landscaping At Five Years With The Future Removal Of Humboldt Bay Units 1, 2, and 3 In The KOP Viewshed

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CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008
SOURCE: CH2M HILL 2007c (Simulation Showing 75 Foot Exhaust Stacks)

ENVIRONMENTAL

VISUAL RESOURCES - FIGURE 18 - KOP 3
Humboldt Bay Repowering Project - Existing View From Public Shoreline Trail Looking South Toward Project Site



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VISUAL RESOURCES - FIGURE 19

Humboldt Bay Repowering Project - Landscape Character Photo of Public Shoreline Trail Along PG&E Property Looking East

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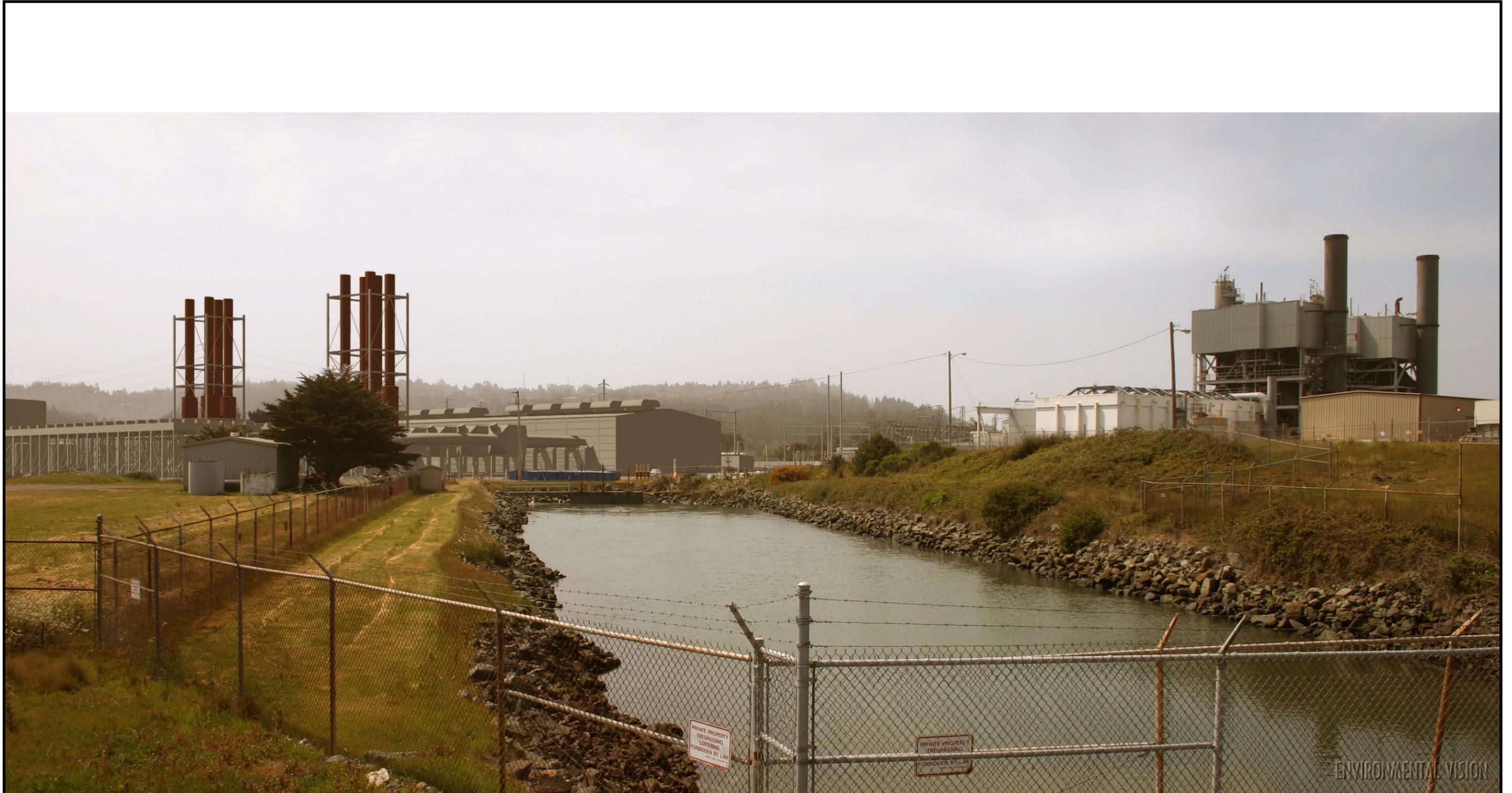
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CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 20

Humboldt Bay Repowering Project - Photo Simulation of Proposed Project's Publicly Visible Structures In KOP 3 Viewshed



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VISUAL RESOURCES - FIGURE 21 - KOP 4
Humboldt Bay Repowering Project - Existing View From Loma Avenue Looking Toward Project Site



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VISUAL RESOURCES - FIGURE 22

Humboldt Bay Repowering Project - Photo Simulation of Proposed Project's Publicly Visible Structures In KOP 4 Viewshed



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VISUAL RESOURCES - FIGURE 23 - KOP 5
Humboldt Bay Repowering Project - Existing View From Spruce Vista Point Looking Southwest Toward Project Site



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VISUAL RESOURCES - FIGURE 24

Humboldt Bay Repowering Project - Photo Simulation Of Proposed Project's Publicly Visible Structures In The KOP 5 Viewshed



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VISUAL RESOURCES - FIGURE 25 - KOP 6

Humboldt Bay Repowering Project - Existing View From The South Spit Wildlife Area Toward Project Site Across Humboldt Bay



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VISUAL RESOURCES - FIGURE 26

Humboldt Bay Repowering Project - Photo Simulation of Proposed Project's Publicly Visible Structures In KOP 6 Viewshed



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ENVIRONMENTAL VISION

WASTE MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Waste generated during construction and operation of the Humboldt Bay Repowering Project or those associated with remediation of existing on-site contamination would not result in any significant adverse impacts if the management measures contained in the Application for Certification (AFC) and the proposed conditions of certification are implemented pursuant to the pertinent laws, ordinances, regulation, and standards.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Humboldt Bay Repowering Project (HBRP) and any hazardous wastes already existing on-site as a result of past activities. Staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes and for potential site remediation. The technical scope of this analysis encompasses solid wastes existing on-site and those generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of the wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- Upon project completion, the site is managed such that contaminants would not pose a significant risk to humans or the environment.
- Any wastes identified on the site that are a result of past activities have been adequately characterized and remediated, where necessary, prior to construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following federal, state, and local environmental laws, ordinances, regulations and standards (LORS) have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment.

Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the HBRP with respect to management of waste.

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

Applicable Law	Description
Federal	
42 U.S.C. § 6922 Resource Conservation and Recovery Act	The RCRA establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding: <ul style="list-style-type: none"> • Record keeping practices which identify quantities of hazardous wastes generated and their disposition, • Labeling practices and use of appropriate containers, • Use of a manifest system for transportation, and • Submission of periodic reports to the Environmental Protection Agency (EPA) or authorized state agency.
Clean Water Act (CWA)	Controls discharge of wastewater to the surface waters of the U.S.
State	
California Integrated Waste Management Act (CIWMA)	Provides an integrated statewide system of solid waste management by coordinating state and local efforts in source reduction, recycling, and land disposal safety. Counties are required to submit Integrated Waste Management Plans to the state.
California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended)	This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency (Cal EPA)) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes. The Humboldt County Department of Environmental Health enforces this Act.
Porter-Cologne water Quality Control Act	Controls discharge of wastewater to surface waters and groundwater of California.
California Fire Code	Controls storage of hazardous materials and wastes and the use and storage of flammable/combustible liquids.
Local	
Humboldt County Integrated Waste Management Plan	Provides guidance for local management of solid waste and household hazardous waste. Responsible for administering and enforcing the CIWMA for solid, nonhazardous waste for HBRP.
Humboldt County General Plan, Public Services and Facilities, Chapter 4, Section 4600	Establishes County policies on reducing waste generation, meeting waste diversion goals, encouraging cleanup of contaminated sites, and ensuring adequate waste disposal capacity for the County's solid waste.

SETTING

The proposed HBRP site would be located at 1000 King Salmon Avenue, Eureka, California, on 5.4 acres of a 143-acre parcel currently occupied by the existing PG&E Humboldt Bay Power Plant. This proposed project would replace the combined 105 MW for the existing Units 1 and 2 and the combined 30 MW for the two Mobile Emergency Power Plants (MEPP) at the Humboldt Bay Power Plant (HBPP) site.

Construction of the proposed HBRP will occur simultaneously with decommissioning activities of Humboldt Bay Power Plant Unit 3. Unit 3 had stopped operating in 1976 and is now in the process of decommissioning and demolition under a Nuclear Regulatory Commission (NRC) SAFSTOR license. The decommissioning process may take up to 12 years and includes the recent completion of construction of an Independent Spent Fuel Storage Installation (ISFSI) on the HBPP property that was necessary for transfer and storage of spent fuel prior to demolition of Unit 3 structures (PG&E 2006a Section 8.16.1, PG&E 2008d).

Phase I and Phase II Environmental Site Assessments, a Historical Site Assessment, and radiological monitoring have been conducted for this site. A discussion of the findings of these assessments and the need for further assessments is included below under the heading "Existing Contamination" in the impacts section.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are addressed in this Waste Management section: potential site contamination and the methods used to handle wastes (Class I hazardous wastes, Class II designed wastes, and Class III municipal solid wastes) during construction and operations. The methods staff uses and the thresholds for determining significance of impacts are different for these two issues.

For any site proposed for the construction of a power plant in California, the applicant must provide sufficient documentation about the nature of any contamination on the site. Staff requires that at the least, a Phase I Environmental Site Assessment (ESA) be prepared and submitted to the Energy Commission for staff's review and evaluation. A Phase I ESA provides a history of use of the site, often as far back as the mid-1800s, and a list of any hazardous waste release within a certain distance of the site. If there is a reasonable potential that the site contains hazardous waste, soil or groundwater would be sampled and analyzed as part of a Phase II ESA.

Staff may utilize either of two approaches or both for determining if hazardous waste present on the site would pose a risk to on-site workers (construction or operations) or the off-site public. The first approach follows standards promulgated by Cal-EPA, principally by the DTSC, the Office of Environmental Health Hazard Assessment (OEHHA), and the Regional Water Quality Control Boards (RWQCB). Staff would compare the levels of contaminants found on-site with standards such as the Cal-EPA

OEHHA California Human Health Screening Levels (CHHSLs). If metals are suspected of being present at unsafe levels, staff would first compare those levels to levels that occur naturally in soil or water as tabulated by DTSC or other federal agencies.

The second approach involves the preparation of a site-specific Human Health Risk Assessment and/or Ecological Risk Assessment. The human health risk assessment would follow Cal-EPA guidelines and must address all affected populations including the most burdened and compromised receptors. Staff would require the applicant to prepare such an assessment and would require some form of remediation if the human health cancer risk exceeded one-in-one million or the non-cancer hazard index exceeded 1.0, per 42 U.S.C. § 6922 (Resource Conservation and Recovery Act), California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended), and the Humboldt County General Plan, Chapter 4, Section 4600, Solid Waste Collection/Disposal. An ecological risk screening evaluation or risk assessment would be required if contaminants might pose a risk to biological receptors. The applicant also would follow Cal EPA and Regional Water Quality Control Board guidelines and if the ecological risks were significant, appropriate mitigation might be required.

Regarding the management of wastes, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods meet the state standards for waste reduction and recycling. Staff then reviews the available off-site treatment and disposal sites available and determines whether or not the proposed power plant's waste would have a significant impact on the disposal sites allotted daily, yearly, or lifetime volume of waste it is allowed to receive. Staff uses a threshold of less than 10 percent impact on a waste disposal facility to determine if the impact would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Contamination

According to the applicant and the 2005 Radiological Environmental Monitoring Report, radioactivity levels at the HBRP site meet the NRC's standards for public use (PG&E 2006a 8.14.1.1 and CH2MHILL 2007a Attachment DR51-1). In addition, the applicant stated that a detailed radiological contamination study will be conducted for the HBRP site and any contaminated soil will be removed before construction of HBRP begins. Applicant asserts that removal of contaminated soil would be under the jurisdiction of the NRC as part of the decommissioning of Unit 3 and not part of the HBRP project. In response to staff's data request #51 (requesting the submittal of this radiological survey of the HBRP site to staff), the applicant has stated that they are willing to accept a condition of certification that would ensure that the radiological survey be conducted and any contaminated soil removed from areas with unacceptable levels of radionuclides before construction of HBRP begins in those areas. In addition, the applicant suggested a modification to the standard Conditions of Certification **Waste-1** and **-2** to address any encounter of unexpected levels of radioactivity during construction activities. Staff agrees with this approach and proposes modifications to the above mentioned conditions of certification as well as a new Condition of Certification **Waste-6** which will require that a radiological survey be conducted and

submitted to the Energy Commission's Compliance Project Manager (CPM) prior to construction of the HBRP including a demonstration that any necessary remediation of contaminated soil has been conducted according to applicable regulations.

A Historical Site Assessment (HSA) was conducted for the Humboldt Bay Power Plant site in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (PG&E 2006a Appendix 8.14-B, and CH2MHILL 2007a Attachment DR57-1). The final HSA classified the HBRP site as a Class 3 area, which is an area not expected to have residual radioactivity, or an area expected to have levels of residual radioactivity sufficiently below the Derived Concentration Guideline Limit (DCGL), which is the level required by NRC for termination of a license. In past surveys of the HBRP site radiological contamination was detected, and it is possible that residual contamination could exist in the roof structure of some buildings. The applicant suggested that this possibility be investigated during any construction activities associated with those structures. Staff's modified Conditions of Certification **Waste-1** and **-2** will also address the possibility of encountering radioactivity on existing structures.

The HSA also noted that a Solid Waste Management Unit (SWMU) containing chemical waste and heavy metals is buried north of Unit 2 in a marked and managed location (PG&E 2006a, 8.14.1.1.2).

A Phase I ESA was conducted for the HBRP site in 2006 by E2 Consulting Engineers in accordance with methods prescribed by the American Society for Testing and Materials (ASTM Standard E 1527-00). The Phase I ESA studied the entire HBRP site and construction laydown areas, the offsite temporary parking area, and the offsite short-term delivery parking area. The HBRP site was divided into 14 areas for the Phase I ESA. Four of these areas were found to have RCRA Clean Closure notices, and two had no "recognized environmental conditions" (RECs) per the ASTM definition. That is, there was no evidence or record of any use, spillage or disposal of hazardous substances on the site, nor any other environmental concern that would require remedial action. The eight remaining areas were identified as potentially having RECs (possibly organic compounds and metals), and therefore preparation of a Phase II ESA was recommended for these areas to assess potential contamination (PG&E 2006a, Section 8.14.1.1.1 and Appendix 8.14A).

The Phase I ESA could not identify the exact location of the Former Drum Storage Area, and so the applicant stated that the waste management plan will address the possibility of encountering contaminated soils when excavating in certain areas of the HBRP site (southeast of the Oil Water Separators, near the fireside waste bin). The Phase I ESA found no RECs in either of the offsite parking areas (PG&E 2006a, Section 8.14.1.1.1).

In response to staff's Workshop Query #21 (requesting a figure showing the locations of sampling points for the Phase II ESA), the applicant submitted Figure WSQ21-1 (CH2MHILL 2007c), which shows the eight areas with potential RECs (identified by the Phase I ESA), an additional seven areas of investigation added during the December 2006 site walk, and the Phase II ESA's sampling locations that correspond to each of these areas. Staff concluded that the sampling locations were adequate.

In response to staff's data requests #49 and #50 (requesting a Phase II investigation and a remediation plan for any areas with identified RECs, respectively) the applicant provided the results of a Phase II assessment (CH2MHill 2007g). The Phase II ESA found several Chemicals of Concern on the site, including Polychlorinated biphenyls (PCBs), arsenic, chromium, Total Petroleum Hydrocarbons (TPH), Polycyclic aromatic hydrocarbons (PAHs), and some Volatile Organic Chemicals (VOCs) and recommended specific actions consisting of soils removal, soil treatment, the installation of groundwater monitoring wells, and further characterization of the chromium levels found on the site to determine the presence or absence of hexavalent chromium. Staff has reviewed these recommendations and concurs with their implementation. Staff proposes Condition of Certification **WASTE-7** that would require the project owner to implement the recommendations of the Phase II ESA.

In addition, the applicant stated that the Humboldt Bay Power Plant NRC license for Unit 3 requires compliance with 10 CFR Part 20 (Standards for the Protection against Radiation) which ensures that workers (including those of HBRP site) are not exposed to radiation above NRC-permitted levels. As part of compliance with the above standards, Radiological Environmental Monitoring Reports are submitted annually and proper radiation protection and management programs are implemented. The NRC regularly inspects and audits the site to ensure compliance with these requirements (CH2MHILL 2007a, Response to DR #51).

Staff concludes that adoption of the proposed Condition of Certification **Waste-6** will ensure that radioactive contamination will be properly investigated and remediated prior to HBRP construction and therefore the risk of radiological exposure is further reduced to less than significant.

Staff also finds that after proper remediation of any contamination identified in the above mentioned investigations (including any remediation recommended by the Phase II ESA), proposed Conditions of Certification **Waste-1** and **Waste-2** (which would require having a Registered Professional Engineer or Geologist with experience in remedial investigation and feasibility studies available for consultation during soil excavation and grading activities) would ensure that any unexpected contamination encountered during construction activities will be properly handled and disposed. In addition, these conditions have been modified to address the unexpected encounter of residual radioactivity in either soil or structures during construction activities.

Construction Impacts and Mitigation

Site preparation and construction of the proposed generating plant and associated facilities would last approximately 18 months and generate both nonhazardous and hazardous wastes in solid and liquid forms. Before construction can begin, the project owner would be required to develop and implement a Construction Waste Management Plan as per proposed Condition of Certification **Waste-5**.

Nonhazardous solid wastes generated during construction would include up to 60 tons of paper, wood, glass, and plastics from packing and insulating materials, empty non-hazardous chemical containers, and waste from the demolition of some existing structures. Approximately 30 tons of metal debris from welding/cutting activities,

packing materials, electrical wiring, and empty non-hazardous chemical containers would be generated during construction. An additional 1,200 tons of metal waste would be generated from the demolition of the transmission tower and other existing structures and piping. Demolition activities would also generate about 3,700 tons of concrete waste (PG&E 2006a, Section 8.14.1.2.1).

All nonhazardous solid wastes would be recycled to the extent possible and non-recyclable wastes would be collected weekly by a licensed hauler and disposed of in a solid waste disposal facility (Class III landfill), as per Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal).

Hazardous wastes anticipated to be generated during construction may include welding materials, batteries, paint, flushing and cleaning fluids, and solvents. The quantities of flushing and cleaning fluids are estimated to be once or twice the internal volume of the pipes cleaned. The quantity of all other hazardous wastes is expected to be minimal (PG&E 2006a Section 8.14.1.2.1).

Wastewater would also be generated during construction, including sanitary waste, equipment washdown, and storm water runoff (see the **Soil and Water Resources** section of this document for a more detailed discussion of this topic). Wastewater would be tested and classified to determine the proper method of disposal (PG&E 2006a, Section 8.14.1.2.1).

Any waste classified as hazardous would be collected at satellite locations and transported daily to the contractor's 90-day hazardous waste storage area, located in the construction laydown area. The wastes thus accumulated would be properly manifested, transported and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies (PG&E 2006a, Section 8.14.4.1).

The applicant would be considered the generator of hazardous wastes at this site during the construction period and therefore, prior to construction, the project owner would be required to obtain a unique hazardous waste generator identification number from the DTSC in accordance with DTSC regulatory authority, as per proposed Condition of Certification **Waste-3**. Staff reviewed the disposal methods described in AFC subsection 8.14.4.1 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-4** to notify the CPM whenever the owner becomes aware of this action.

Operation Impacts and Mitigation

The proposed HBRP would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Before operations can begin, the project owner would be required to develop and implement an Operations Waste Management Plan as per proposed Condition of Certification **Waste-5**.

Nonhazardous Solid Wastes

Nonhazardous solid wastes anticipated to be generated during operation include up to 1,040 cubic yards of waste annually, comprised of maintenance wastes and office wastes. These wastes would be recycled to the extent possible and non-recyclable wastes would be regularly transported offsite to a solid waste disposal facility (PG&E 2006a, Sections 8.14.1.2.2 and 8.14.4).

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during facility operation, and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with a Drainage, Erosion and Sediment Control Plan. Other wastewaters would be sampled to determine their quality and disposed of by the appropriate method (PG&E 2006a, Section 8.14.4.2.2 and 8.14.3.2).

Hazardous Wastes

The applicant would be considered to be the generator of hazardous wastes at this site during operations and thus the project owner's unique hazardous waste generator identification number obtained during construction would still be required for generation of hazardous waste, as per proposed Condition of Certification **Waste-3**. Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, lubrication oil filters, spent SCR catalyst, oily rags, oil sorbents, lead-acid batteries, and chemical cleaning wastes. Table 8.14-1 of the AFC provides a complete list of these wastes, the amounts expected to be generated, and their disposal methods. The amounts of hazardous wastes generated during the operation of HBRP would be minimal, and recycling methods would be used to the extent possible. The remaining hazardous waste would be temporarily stored on-site, per the California Fire Code and Title 22, California Code of Regulations, §66262.10 et seq., and disposed of by licensed hazardous waste collection and disposal companies in accordance with all applicable regulations, per Title 22, California Code of Regulations, §66262.10 et seq. The minimal quantities of hazardous waste generated would not significantly impact the treatment and disposal resources available in California. Furthermore, as in the construction phase, 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-4** to notify the CPM whenever the owner becomes aware of this action.

Impact on Existing Waste Disposal Facilities

Nonhazardous Solid Wastes

Section 8.14.2.3.1 and Table 8.14-2 of the AFC list one California Class III and one Oregon facility that will accept nonhazardous solid wastes from the HBRP project. Both landfills have adequate remaining capacity to handle the solid waste that would be generated by the HBRP (PG&E 2006a, Section 8.14.2.3.1). In total, the two listed facilities possess over 40 million cubic yards of remaining capacity. The volume of solid nonhazardous waste from the HBRP requiring off-site disposal would be a small fraction of the existing combined capacity of the available Class III landfills and would not significantly impact the capacity or remaining life of these facilities.

Hazardous Wastes

Section 8.14.2.3.2 of the AFC discusses the three Class I landfills in California: the Buttonwillow Landfill in Kern County, the Clean Harbors Westmoreland Landfill in Imperial County, and the Kettleman Hills Landfill in King's County. The Kettleman Hills facility also accepts Class II and Class III wastes. Hazardous waste disposal for HBRP would be handled by Chemical Waste Management at Kettleman Hills under their current contract with PG&E. Kettleman Hills and Buttonwillow landfills have a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity, with up to 33 years of remaining operating lifetimes. The Westmoreland landfill is currently non-operational but on reserve due to lack of need for additional hazardous materials disposal capacity in California (PG&E 2006a Section 8.14.2.3.2). The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators and the transport of waste out of state that is hazardous under California law, but not federal law. Hazardous waste treatment and disposal capacity in California is more than adequate to accommodate the waste generated by HBRP. Any additional hazardous wastes in the form of contaminated soils, etc. removed during site remediation will be properly handled as described in a Remedial Action Plan (or equivalent) that will be required by DTSC and proposed Condition **Waste-7**. This plan will be submitted to the Energy Commission Compliance Project Manager for review and approval prior to the generation of any wastes from remedial activities. This additional volume of waste may be treated or landfilled.

CUMULATIVE IMPACTS AND MITIGATION

As proposed, the quantities of nonhazardous and hazardous wastes generated during construction and operation of the HBRP would add to the total quantities of waste generated in Humboldt County and the State of California. This facility would generate an estimated 4,960 tons of solid waste during construction and approximately 1,040 cubic yards per year during operation. This includes approximately 80 tons of hazardous waste and 9,200 gallons of oil water separator waste per year. Recycling efforts would be prioritized wherever practical, thereby reducing the amounts of waste that actually need disposal in landfills.

In section 8.14.4 of the AFC, the applicant states that handling and management of all HBRP waste would follow the hierarchical approach of source reduction, recycling, treatment, and disposal. The HBRP will be included in the Humboldt County's Waste Reduction Program, which provides a solid waste hauler to collect recyclables regularly and deliver them to recycling facilities. The AFC states that Humboldt County is not currently meeting the state mandated goal of 50 percent solid waste diversion/recycling. However, there is adequate capacity available in a variety of treatment and disposal facilities that can accept waste generated by HBRP (PG&E, Section 8.14.3). Therefore staff concludes that these added waste quantities generated by HBRP would not result in significant cumulative waste management impacts.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from the public regarding waste management issues.

In August 2007, the California Coastal Commission (Coastal Commission) expressed concern about the location and impacts from the placement of modular office buildings and a parking lot at the site of old containment ponds and the fire training area at the PG&E Humboldt Bay Power Plant. Although this project is not part of the HBRP before the Energy Commission, suggestions by the Coastal Commission would impact the necessary site remediation that is part of the HBRP. The concern involved potential impacts from the filling of the two old containment ponds and the presence of the nearby fire training area. The Coastal Commission referenced the Phase II study (April 20, 2007) results that show increased levels of metals and semi-volatile organic compounds and suggested that a more detailed cleanup plan is needed as part of the office building/parking lot project.

Response:

The Phase II ESA found several Chemicals of Concern on the site, including PCBs, arsenic, chromium, TPH, PAHs, and some VOCs and recommended specific actions consisting of soils removal, soil treatment, the installation of groundwater monitoring wells, and further characterization of the chromium levels found on the site to determine the presence or absence of hexavalent chromium. Staff reviewed those recommendations and concurs with their implementation. Since staff has determined that remediation was necessary to protect workers and the public as part of the HBRP, staff agrees with the requests of the Coastal Commission that PG&E provide information regarding contamination on the site - including whether the containment pond liners had been compromised – and a detailed description of the remedial actions that are planned. This information is required by proposed Condition of Certification **WASTE-7**.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the HBRP would be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during facility construction and operation. The applicant is required to dispose of hazardous and nonhazardous wastes at facilities approved by the various departments within the Cal-EPA. Because hazardous wastes would be produced during both project construction and operation, the HBRP project would be required to obtain a hazardous waste generator identification number from the DTSC. Accordingly, HBRP would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste Source Reduction and Evaluation Review and Plan must be prepared by the HBRP.

CONCLUSIONS

Management of the wastes generated during construction and operation of the HBRP project and existing on-site contamination would not result in any significant adverse impacts if the waste management measures proposed in the AFC and the proposed conditions of certification are implemented per the pertinent LORS.

If approved, the applicant would identify and remediate any hazardous waste that may be present on site. The applicant would also prepare separate Waste Management Plans for the construction and operation of the HBRP, which would include a description of each waste stream and the management methods planned for each waste. Proposed Condition of Certification **Waste-5** ensures that these plans would be submitted to the CPM and to applicable local agencies prior to site preparation. Staff believes that the project's compliance with all applicable LORS and the conditions of certification proposed by staff would adequately ensure that no significant adverse environmental impacts would result from the management and disposal of project-related waste.

Staff has proposed Conditions of Certification **Waste-1** through **-7** which require that: **1)** the project owner have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; **2)** if potentially contaminated soil is unearthed during excavation at the proposed site, the Registered Professional Engineer or Geologist inspect the site, determine the need for sampling nature, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies; **3)** the project owner obtain a unique hazardous waste generator identification number from the DTSC in accordance with DTSC regulatory authority; **4)** the project owner notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action; **5)** the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM and the Humboldt County Department of Environmental Health; **6)** a radiological survey be prepared and submitted to the CPM prior to the start of construction activities, including a demonstration that any contamination that exceeds regulatory levels has been remediated, and **7)** that the recommendations of the 2007 Phase II ESA be implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the Compliance Project Manager (CPM) for review and approval. The resume shall show experience in remedial investigation and feasibility studies including sites that contain radiological wastes. The Registered Professional Engineer or 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 thirty (30) days prior to the start of site mobilization the project owner shall submit the resume to the CPM for review and approval.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments (including radiation detectors), or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and submit a written report to the project owner and CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Registered Professional Engineer or 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 Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact representatives of the Humboldt County Department of Environmental Health for guidance and possible oversight.

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

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the next Monthly Compliance Report following its receipt.

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

Verification: The project owner shall notify the CPM in writing within ten (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 manner in which project-related wastes are managed.

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

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: Not less than thirty (30) days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM for approval. The Operation Waste Management Plan shall be submitted to the CPM no less than thirty (30) days prior to the start of project operation for approval. The project

owner shall submit any required revisions within twenty (20) days of notification by the CPM. In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year and provide a comparison of the actual methods used to those planned management methods proposed in the original Operation Waste Management Plan.

WASTE-6 Prior to any soil disturbance or the beginning of site mobilization for the Humboldt Bay Repowering Project (HBRP), the project owner shall prepare and submit to the CPM the documents listed below to address remediation of radioactive contamination.

- a) a radiological survey for the HBRP site; and
- b) documentation demonstrating any contamination that exceeds NRC regulatory levels has been remediated in accordance with regulatory requirements.

Verification: At least sixty (60) days prior to any soils disturbance or the beginning of site mobilization for the Humboldt Bay Repowering Project, the project owner shall provide the documents listed above to the CPM for review and approval.

WASTE-7 Prior to any soil disturbance or the beginning of site mobilization for the Humboldt Bay Repowering Project, the project owner shall provide to the CPM for review and approval a Remedial Investigation (RI) report or equivalent detailing site characterization and a Remedial Action Plan (RAP) or equivalent detailing site cleanup methods. The RI plan or equivalent shall include an assessment of the containment pond liners and whether they have been compromised. After implementation of the RAP (or equivalent), the project owner shall submit a report describing that the recommendations of the 2007 Preliminary Phase II Environmental Site Assessment have been implemented and shall include confirmatory sampling and analysis results as described in the RAP (or equivalent).

Verification: At least 120 days prior to any soils disturbance or the beginning of site mobilization for the Humboldt Bay Repowering Project, the project owner shall provide the RI report (or equivalent) and the RAP (or equivalent) to the CPM for review and approval. After remedial activities have been completed and at least sixty (60) days prior to any soils disturbance or the beginning of site mobilization, the project owner shall submit a report describing that the recommendations of the 2007 Preliminary Phase II Environmental Site Assessment have been implemented and shall include confirmatory sampling and analysis results.

REFERENCES

CH2MHILL 2007a – CH2MHill/D. Davy (tn: 38912). Applicant's Responses to CEC Staff's Data Requests 1 - 57. 1/12/2007. Rec'd 1/12/2007.

CH2MHILL 2007c – CH2MHill/D. Davy (tn: 39225). Applicant's Responses to CEC Staff's Data Requests 58 – 78 and Workshop Queries 1 - 22. 2/13/2007. Rec'd 2/13/2007.

CH2MHILL 2007g – CH2MHill/D. Davy (tn: 40109). Preliminary Phase II Environmental Site Assessment, Humboldt Bay Repowering Project, Eureka, California. Rec'd 4/20/2007.

PG&E 2006a – PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC Vol. 1 & 2, 1 AFC CD and 1 Air Modeling CD. 9/29/2006. Rec'd 9/29/2006.

PG&E 2008d – Humboldt Bay Repowering Project (tn: 46222). PG&E's updated schedule for constructing and loading the HBPP Independent Spent Fuel Storage Installation (ISFSI) as transmitted by email from Susan Strachan, consultant for PG&E to John Kessler - CEC. 5/8/2008. Rec'd 5/8/2008.

WORKER SAFETY AND FIRE PROTECTION

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

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Humboldt Bay Repowering Project (HBRP) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by proposed Conditions of Certification **WORKER SAFETY -1, -2, -3, -4, and -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 will 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 (Humboldt Fire District). The proposed facility location is within the service area of the local fire department. The fire risks of the proposed facility do not pose significant added demands on local fire protection services as there are already large amounts of liquid fuel stored and used on-site. In the event of a hazardous materials incident, trained plant personnel would provide the first response and the Eureka Fire Department Regional Hazardous Materials Response Team (EFD HMRT) would be available on-call. Mitigation measures proposed by staff and the applicant will ensure that the HMRT's response is adequate.

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 Final Staff Assessment (FSA) is to assess the worker safety and fire protection measures proposed by the HBRP 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	
29 U.S. Code sections 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).
29 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 §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires 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.
California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.)	Comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The California Building Standards Code incorporates current editions of the Uniform Building Code and includes the electrical, mechanical, energy, and fire codes applicable to the project.
Health and Safety Code section 25500, et seq.	Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.

Local (or locally enforced)	
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies
Emergency Response Plan	Allows response agency to integrate HBRP emergency response activities into any response actions
Business Plan	Provides response agency with overview of HBRP purpose and operations
Risk Management Plan (CUPA)	Provides response agency with detailed review of risks and hazards located at HBRP and mitigation implemented to control risks or hazards
1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	NFPA standards are incorporated into the California Uniform Fire Code. The fire code contains general provisions for fire safety, including: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistant construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code incorporates current editions of the UFC standards.
International Code Council (ICC), International Existing Building Code (IEBC)	By January 2008, the Humboldt Fire District (HFD) states that it will be operating under the new ICC IEBC codes that are currently in the process of adoption in California (Ziemer 2007).
Uniform Fire Code, Article 80 1997	Contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

SETTING

Fire support services to the site will be under the jurisdiction of the Humboldt Fire District #1 (HFD). The closest HFD station and the first responder to the HBRP site is Fire Station #12, approximately 2.5 miles away with an estimated response time of 3-4 minutes. This station is capable of fire rescue, confined space entry, Hazardous Materials (HazMat) spill response, and emergency medical services (PG&E 2006a Section 8.10.1.7.2). The second fire station in HFD is Fire Station #11, located at 3455 Harris Street, approximately 5 miles away with an estimated response time of 7-10 minutes (CH2MHILL 2007a DR WS #54). The HFD staffs their two fire stations with 18 professional firefighters, 18 volunteer firefighters, and 2 administrative personnel. The HFD has three fire engines and one 2,000-gallon water tender. All firefighters are trained to EMT-1 level and some are trained to paramedic level. All professional firefighters are trained in using automated external defibrillators and esophageal tracheal airway devices (PG&E 2006a Section 8.10.1.7.3 and Ziemer 2007).

Due to a mutual aid agreement with the City of Eureka Fire Department, the second responder to the proposed HBRP would be Eureka Station #3, located about 4 miles away with an estimated response time of 5-6 minutes. The third closest station to the HBRP is Eureka Station #1, located about 5 miles away with an estimated response time of 7-8 minutes (Ziemer 2007).

The HFD has indicated that their stations, along with those of the City of Eureka Fire Department (due to the mutual aid agreement between them) are together adequately equipped and staffed to deal with any incident at the proposed facility. The HFD has handled the existing Humboldt Bay Power Plant (HBPP), and feels that the new equipment and design of the proposed HBRP are safer than those of the existing HBPP units 1 and 2. Therefore the proposed HBRP does not present an added burden on the local fire department (Ziemer 2007).

In the event of a hazardous materials incident, the Eureka Fire Department Regional Hazardous Material Response Team (EFD HMRT) may be called, with a response time of about 45 minutes. At staff's request, the applicant has engaged in discussion with the HFD and EFD regarding potential impacts the HBRP may have on their capability to respond to incidences. The applicant has stated that the dialogues have been very productive and that an agreement was reached that PG&E will provide EFD HMRT with new hand-held ammonia detectors and assist them in the preparation of a FEMA grant application for a new hazmat response vehicle (CH2MHILL 2007c, WSQ 22). These measures will enhance the HMRT's ability to respond. Staff therefore concludes that with the fulfillment of the agreement between PG&E and the EFD, the HMRT will be adequately equipped to respond in a timely manner.

In addition to construction and operations worker safety issues, construction of this facility will occur simultaneously with decommissioning activities of Humboldt Bay Power Plant Unit 3. Unit 3 had stopped operating in 1976 and is now in the process of decommissioning and demolition under a Nuclear Regulatory Commission (NRC) SAFSTOR license. The decommissioning process may take up to 12 years and includes the recent completion of construction of an Independent Spent Fuel Storage Installation (ISFSI) on the Unit 3 property that is necessary for storage of spent fuel prior to demolition of Unit 3 structures (PG&E 2006a Section 8.16.1, PG&E 2008d)).

According to the applicant, radiological monitoring has shown that the HBRP site meets the NRC's standards for public use, and therefore workers at HBRP would not have to take special measures to mitigate radiological exposure. In addition, a detailed radiological contamination study would be conducted for the HBRP site and any contaminated soil would be removed before construction of HBRP begins. In the event soil contamination is encountered during construction of the HBRP, proposed conditions of certification **Waste-1** and **Waste-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and
2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are essentially a LORS compliance matter and 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 in each area, the response time, 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 would 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 construction and operation of facilities. Workers at the proposed project 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 HBRP to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers would be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

HBRP encompasses construction and operation of a natural gas fired-facility. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility (see Table 8.16-1 of the AFC for a list of potential hazards).

Construction Safety Orders are published at title 8 California Code of Regulations (CCR) sections 1502, et seq. These requirements are promulgated by Cal/OSHA and are 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 CCR § 1509)
- Construction Fire Protection and Prevention Plan (8 CCR § 1920)
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) would include, but are not limited to:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Protection Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms 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;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Heat and Cold Stress Monitoring and Control Program;
- Pressure Vessel and Pipeline Safety Program;
- Hazardous Waste Program;
- Lead and Asbestos Program;

- General LO/TO Program;
- Subcontractor/External Visitor HSP;
- Hot Work Safety Program; and
- Permit-Required Confined Space Entry Program;

The AFC includes adequate outlines of each of the above programs (PG&E 2006a, Section 8.16.2.3.1) and the outline of a Construction Training Program covering all aspects of construction safety (Table 8.16-3). Prior to the start of construction of HBRP, detailed programs and plans would be provided to the Energy Commission pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at HBRP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Fire Protection and Prevention Program (8 CCR § 3221);
- Personal Protective Equipment Program (8 CCR §§ 3401 to 3411); and
- Emergency Action Plan (8 CCR § 3220); and
- First Aid, CPR, and Automated External Defibrillator.

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) would be applicable to the project. Written safety programs for HBRP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the programs mentioned above (PG&E 2006a, Section 8.16.2.3.2) and the outline of an Operations Training Program covering all aspects of safety during operations (Table 8.16-4). Prior to operation of HBRP, all detailed programs and plans would be provided to the Energy Commission CPM 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. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

The IIPP will include the following components as presented in the AFC (PG&E 2006a, Section 8.16.2.3.2):

- Identity of person(s) with authority and responsibility for implementing the program;
- Establish safety and health policy of the plan;
- Define 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;
- Specify safety procedures; and
- Training and instruction.

Fire Protection and Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC outlines a proposed Fire Protection and Prevention Plan, which is acceptable to staff (PG&E 2006a, Section 8.16.2.3.2). The plan will include the following topics and will address the large amount of diesel fuel that will be stored on-site:

- Determine general program requirements;
- Determine fire hazard inventory, including ignition sources and mitigation;
- Develop good housekeeping practices and proper materials storage;
- Establish employee alarm and/or communication system(s);
- Provide portable fire extinguishers at appropriate site locations;
- Locate fixed fire fighting equipment in suitable areas;
- Specify fire control requirements and procedures;
- Establish proper flammable and combustible liquid storage facilities;
- Identify the location and use of flammable and combustible liquids;
- Provide proper dispensing and determine disposal requirements for flammable liquids;
- Establish and determine training and instruction requirements and programs; and
- Identify personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) for review and approval and to the HFD 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 CCR sections 3380 to 3400). The HBRP operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and 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 protective clothing and equipment:

- Proper use, maintenance, and storage;
- When the protective clothing and equipment are to be used;
- Benefits and limitations; and
- When and how the protective clothing and equipment are to be replaced.

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 CCR § 3220) for all employments and places of employment in California. The AFC contains a satisfactory outline for an emergency action plan (PG&E 2006a, Section 8.16.2.3.2).

The outline lists the following features:

- Establish emergency escape procedures and emergency escape route for the facility;
- Determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- Provide procedures to account for all employees after emergency evacuation of the plant has been completed;
- Specify rescue and medical duties for assigned employees;
- Identify fire and emergency reporting procedures to regulatory agencies;
- Develop alarm and communication system for the facility;
- Establish a list of personnel to contact for information on the plan contents;
- Provide emergency response procedures for ammonia release; and
- Determine and establish training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS apply to the project, called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs listed under the heading Construction Safety and Health Program in this section.

In addition, the project owner would be required to provide personal protective equipment and exposure monitoring for workers in the event they are involved in activities on sites where contaminated soil and/or contaminated groundwater exist as per staff's proposed Conditions of Certification **WORKER SAFETY-1** and-**2**. In addition, staff's proposed conditions of certification found in the **WASTE MANAGEMENT** section of this staff assessment would require:

- the project owner to have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered, and
- if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling and analysis, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies.

These proposed Conditions of Certification would ensure that workers are properly protected from any hazardous wastes presently at the site.

Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980-1993, an average of 1,079 construction workers were killed on the job each year, more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- 15% of workers' compensation costs are spent on construction injuries.
- 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 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. This has been evident in the audits of power plants under construction conducted by the staff in 2005 and 2006. 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 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.

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 and 2006 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 safety professional monitor on-site 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 monitor, hired by the project owner yet reporting to the Chief Building Official (CBO) and Compliance Project Manager (CPM), will serve as an “extra set of eyes” 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 them 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 HBRP, a potential exists for both small fires and major structural fires to occur. Electrical sparks, combustion of diesel fuel oil (a large amount – 634,000 gallons -- will be stored on-site), natural gas, hydraulic fluid, mineral oil, insulating fluid or flammable liquids, explosions, and over-heated equipment, may cause 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 will be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the Humboldt Fire District 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 would rely on both onsite fire protection systems and local fire protection services. The onsite 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 HFD and the EFD through a mutual aid agreement between these jurisdictions (PG&E 2006a, Section 8.16.2.4 and Ziemer 2007).

Construction

During construction, portable fire extinguishers would be located throughout the site no more than 100 feet from any working area, and within 50 feet of locations where flammable or combustible materials are stored. Safety procedures and training will be implemented. In the event of a larger fire that cannot be extinguished using the portable suppression equipment, the HFD would be called (CH2MHILL 2007c, DR WS #52).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric power generating plants), and all Cal-OSHA requirements (PG&E 2006a, Section 10C.6). Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be supplied from a water main on King Salmon Avenue, and would be stored in an onsite storage tank capable of holding the water required for 8-hours of fire suppression. From the firewater storage tank an underground loop system would connect to all fire hydrants and fixed fire suppression systems, with one electric, one Jockey, and one diesel fired pump maintaining water pressure (PG&E 2006a, Section 2.5.12 and Section 10A3.11.2.2). Fire hydrants would be located throughout the site with no more than 250 feet apart in accordance with NFPA 24.

An automatic fire protection system (water spray) would be provided for the control room administrative/maintenance building and a deluge system will be installed at the generator step-up for transformer protection. Portable carbon dioxide extinguishers would be located in areas with sensitive electrical equipment and one portable wheeled dry-chemical extinguisher would be located in the engine area (PG&E 2006a, Section 10C3.9.9). The fire detection system would have fire detection sensors that would trigger alarms and automatically actuate the sprinkler system (see PG&E 2006a Appendix 10C for a detailed description of fire detection and protection equipment).

In addition to the fixed fire protection system, smoke detectors, flame detectors, temperature detectors, and appropriate class of service portable extinguishers and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirement by the NFPA and the UFC and staff has determined that they would ensure adequate fire protection.

The applicant would be required by **Worker Safety-1** and-2 to provide the final Fire Protection and Prevention Program to staff and to the HFD prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services

A state-wide survey was conducted by staff 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 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 AEDs. 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 convert cardiac arrhythmias resulting from industrial accidents or other non-work related causes. Therefore, an additional COC (**WORKER SAFETY-5**) is proposed which would require that a portable automatic external defibrillator (AED) be located on site.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of HBRP combined with existing industrial facilities and expected new facilities to result in impacts on the fire and emergency service capabilities of the HFD, and determined that cumulative impacts were insignificant. The HFD stated that together with the City of Eureka Fire Department they feel adequately staffed and equipped to deal with any incident at the proposed facility (Ziemer 2007). Given the isolated area where the project is proposed to be built, and the lack of unique fire hazards associated with a modern gas-fired power plant, staff concludes that this project will not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from the public or agencies regarding worker safety or fire protection issues.

CONCLUSIONS

Staff concluded that if the applicant for the proposed HBRP 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 **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 proposed project would not have significant impacts on local fire protection services.

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 Humboldt Fire District for review and comment and then to the CPM for approval. If comments are not received from the Humboldt Fire District within 30 days, the project owner shall submit the Construction Emergency Action Plan and the Fire Prevention Plan to the CPM without those comments.

Verification: At least thirty (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 the letter transmitting the Construction Emergency Action Plan and the Fire Prevention Plan to the Humboldt Fire District requesting their comments and shall immediately forward to the CPM a copy of the Fire Department's comments when received.

WORKER SAFETY-2 The project owner shall submit to the CPM for review and approval 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 Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 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 program with all applicable Safety Orders. The Fire Prevention Program and the Emergency Action Plan shall also be submitted to the Humboldt Fire District for review and comment prior to submittal to the CPM. If comments are not received from the Humboldt Fire District within 30 days, the project owner shall submit

the Fire Prevention Program and the Emergency Action Plan to the CPM without those comments.

Verification: At least thirty (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 the letter requesting comments from the Humboldt Fire District and shall immediately forward to the CPM a copy of the Fire Department's comments when received.

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 over-all 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 & 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, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in **WORKER SAFETY-1 and -2** are implemented.

Verification: At least thirty (30) days prior to the start of site mobilization, 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 of replacement.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO.

Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in **WORKER SAFETY-3**, implements all appropriate Cal/OSHA and 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 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 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 thirty (30) days prior to the start of site mobilization 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 1998. 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.

CH2MHILL 2007a – CH2MHill/D. Davy (tn: 38912). Applicant's Responses to CEC Staff's Data Requests 1 - 57. 1/12/2007. Rec'd 1/12/2007.

CH2MHILL 2007c – CH2MHill/D. Davy (tn: 39225). Applicant's Responses to CEC Staff's Data Requests 58 – 78 and Workshop Queries 1 - 22. 2/13/2007. Rec'd 2/13/2007.

PG&E 2006a – PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC Vol. 1 & 2, 1 AFC CD and 1 Air Modeling CD. 9/29/2006. Rec'd 9/29/2006.

PG&E 2008d – Humboldt Bay Repowering Project (tn: 46222). PG&E's updated schedule for constructing and loading the HBPP Independent Spent Fuel Storage Installation (ISFSI) as transmitted by email from Susan Strachan, consultant for PG&E to John Kessler - CEC. 5/8/2008. Rec'd 5/8/2008.

Uniform Fire Code 1997, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

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.

Ziemer, Glenn. Fire Chief, Humboldt Fire District. Personal communications with Shon Greenberg, Risk Science Associates. February 13, 2007.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

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 project. The purpose of the Facility Design analysis is to:

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

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure 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 (PG&E 2006a, Appendix 10). The 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 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Humboldt County, Regulations and Ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

The Humboldt Bay Repowering Project (HBRP) will be located at 1000 King Salmon Avenue, approximately 3 miles south of the City of Eureka in an unincorporated area of Humboldt County. The project will be located on 5.4 acres within a 143-acre parcel currently occupied by PG&E Humboldt Bay Power Plant. The site will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the Application for Certification (AFC), in Appendix 10 (PG&E 2006a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project is built to the applicable engineering codes in order to ensure public health and life safety. The analysis verifies that the applicable engineering LORS have been identified and that the project and ancillary facilities have been described in sufficient detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes Conditions of Certification to monitor and ensure compliance with the engineering LORS and any special design requirements. These conditions allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access. Staff has assessed the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes to use accepted industry standards (see PG&E 2006a, Appendix 10 for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

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

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

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

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 AFC (PG&E 2006a, § 2.7.5) describes a project Quality Program that will be used on the HBRP project to inspire confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits.

Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.1 in Appendix Chapter 1 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 103.3 in Appendix Chapter 1 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, Section 108 in Appendix Chapter 1, 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, consistent with CBC Section 108, pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite the local building authority, Humboldt County, or a third party engineering consultant, to act as CBO for the project. When an entity has been assigned CBO duties, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments have been received from agencies or the public.

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 the project 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 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 [2007 CBC, Appendix Chapter 1, Section 101.2, Scope]. 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 [2007 CBC, Appendix Chapter 1, Section 110, Certificate of Occupancy].

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 drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. 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, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2**, below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

**Facility Design Table 2
Major Structures and Equipment List**

Equipment/System	Quantity (Plant)
Engine Generator Set Foundations and Connections	10
Engine Housing Structure, Foundations and Connections	1
Crankcase Ventilation Foundations and Connections	10
Stack Structure, Foundations and Connections	10
Radiator Set Structure, Foundations and Connections	40
Station Transformer Foundations and Connections	3
Exhaust Gas Silencer Structure, Foundations and Connections	10
Rupture Disc Foundations and Connections	24
DeNox SCR Structure, Foundations and Connections	10
Black Start Unit Foundations and Connections	1
LV Room Structure, Foundations and Connections	1
MV Building/Control Structure, Foundations and Connections	1
Control Room/Office/Work Shop Building Structure, Foundations and Connections	1
Clean LO Tank Structure, Foundations and Connections	1
Used LO Tank Structure, Foundations and Connections	1
Lube Oil Service Tank Structure, Foundations and Connections	1
Fire Fighting Container Structure, Foundations and Connections	1
Fire/Raw Water Tank Structure, Foundations and Connections	1
Diesel Tank Structure, Foundations and Connections	1
Sludge Tank Structure, Foundations and Connections	1
Pump Shelter Structure, Foundations and Connections	1
Oily Water Separator Foundation and Connections	1
Ammonia Storage Tank Structure, Foundations and Connections	2
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

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 [2007 CBC, Appendix Chapter 1, Section 108, Fees; Chapter 1, Section 108.4, Permits, Fees, Applications and Inspections], 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, structural engineer, or civil engineer, as the resident engineer (RE) in charge of the project [2007 California Administrative Code, Section 4-209, Designation of Responsibilities]. 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 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 [2007 CBC, Appendix Chapter 1, Section 104, Duties and Powers of Building Official].

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 [2007 CBC, Appendix J, Section J104.3, Soils Report; Chapter 18, Section 1802.2, Foundation and Soils Investigations]
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC, Appendix J, Section J105, Inspections, and the 2007 California Administrative Code, Section 4-211, Observation and Inspection of Construction (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 [2007 CBC, Appendix Chapter 1, Section 114, Stop Orders].

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 California Administrative Code, Section 4-211, Observation and Inspection of Construction (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, 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, Chapter 17, Section 1704, Special Inspections, Chapter 17A, Section 1704A, Special Inspections, and Appendix Chapter 1, Section 109, Inspections. 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. Observe 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 [2007 CBC, Chapter 17, Section 1704.1.2, Report Requirements]; 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 [2007 CBC, Appendix Chapter 1, Section 109.6, Approval Required; Chapter 17, Section 1704.1.2, Report Requirements]. 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 an alternative site approved by the CPM during the operating life of the project [2007 CBC, Appendix Chapter 1, Section 106.3.1, Approval of Construction Documents]. Electronic copies of the approved plans, specifications, calculations, and marked-up as-built 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) 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, Appendix J, Section J104.3, Soils Report, and Chapter 18, Section 1802.2, Foundation and Soils Investigation.

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 [2007 CBC, Appendix Chapter 1, Section 114, Stop Work Orders].

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, Appendix Chapter 1, Section 109, Inspections, and Chapter 17, Section 1704, Special Inspections. 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 [2007 CBC, Chapter 17, Section 1704.1.2, Report Requirements]. 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 [2007 CBC, Chapter 17, Section 1703.2, Written Approval].

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 of any major structure or component listed in **Facility Design Table 2** of condition of certification **GEN 2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

1. Major project structures;
2. Major foundations, equipment supports, and anchorage; and
3. Large field-fabricated tanks.

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 [2007 CBC, Appendix Chapter 1, Section 109.6, Approval Required];

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 [2007 California Administrative Code, Section 4-210, Plans, Specifications, Computations and Other Data];
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 [2007 CBC, Appendix Chapter 1, Section 106.3.4, Design Professional in Responsible Charge]; and
5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS [2007 CBC, Appendix Chapter 1, Section 106.3.4, Design Professional in Responsible Charge].

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 **Facility Design Table 2** of condition of certification **GEN-2**, above, 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, Chapter 17, Section 1704, Special Inspections, and Section 1709.1, Structural Observations.

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 [2007 CBC, Chapter 17, Section 1704.1.2, Report Requirements]. 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 [2007 CBC, Appendix Chapter 1, Section 106.1, Submittal Documents; Section 106.4, Amended Construction Documents; 2007 California Administrative Code, Section 4-215, Changes in Approved Drawings and Specifications].

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, Chapter 3, Table 307.1(2), 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 **Facility Design Table 2**, condition of certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. 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 [2007 CBC, Appendix Chapter 1, Section 106.1, Submittal Documents; Section 109.5, Inspection Requests; Section 109.6, Approval Required; 2007 California Plumbing Code, Section 301.1.1, Approvals].

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 [2007 CBC, Appendix Chapter 1, Section 106.3.4, Design Professional in Responsible Charge], which may include, but are not limited to:

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

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [2007 CBC, Appendix Chapter 1, Section 103.3, Deputies].

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 **Facility Design Table 2**, condition of certification **GEN-2**, above, 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 [2007 CBC, Appendix Chapter 1, Section 109.5, Inspection Requests].

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 [2007 CBC, Appendix Chapter 1, Section 109.3.7, Energy Efficiency Inspections; Section 106.3.4, Design Professionals in Responsible Charge].

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

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations [2007 CBC, Appendix Chapter 1, Section 106.1, Submittal Documents]. 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 [2007 CBC, Appendix Chapter 1, Section 109.6, Approval Required; Section 109.5, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

A. Final plant design plans shall include:

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

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and

7. lighting energy calculations.
- C. The following activities shall be reported to the CPM in the monthly compliance report:
1. Receipt or delay of major electrical equipment;
 2. Testing or energization of major electrical equipment; and
 3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

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

REFERENCES

PG&E 2006a — PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC
Vol. 1 & 2. 9/29/2006.

GEOLOGY AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G.

SUMMARY OF CONCLUSIONS

The proposed Humboldt Bay Repowering Project (HBRP) is situated in an active geologic environment on the Northern California coast and near the junction of three tectonic plates. As a result of this geologic setting, the site could be subject to extreme levels of earthquake-related ground shaking and possible inundation by a tidal wave. While the potential for earthquake ground rupture is low, for the relatively short project life, the site is on or very near active faults, the locations of which are not precisely established. The effects of strong ground shaking, localized liquefaction, and tsunami inundation must be mitigated, to the extent practical, through structural design as required by the California Building Code (CBC, 2007). Compressible and expansive soils should be mitigated based on the recommendations in the geotechnical report. There are no known viable geologic or mineralogical resources. Paleontological resources have been documented in the general area of the project, though no significant fossils were found during field explorations in the immediate vicinity. The potential impacts to paleontological resources due to construction activities will be mitigated as required by the Conditions of Certification.

Based on this information, it is staff's opinion that the potential 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, is low. It is Energy Commission staff's opinion that the HBRP can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, California Energy Commission (Energy Commission) staff discusses potential impacts of the proposed HBRP regarding geologic hazards and geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there will be no consequential adverse impacts to significant geological and paleontological resources during project construction, operation, and closure and that operation of the plant will not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of proposed conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC) (Pacific Gas & Electric [PG&E], 2006a, §§8.4.5, 8.8.5). The following is a brief description of the current LORS for 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>
Federal	The proposed HBRP is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code Section 2621–2630	Mitigates against surface fault rupture of active faults. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The site is not located within, but is near, a designated Alquist-Priolo Fault Zone.
The Seismic Hazards Mapping Act, Public Resources Code Section 2690–2699	Areas subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches, are identified.
California Coastal Act Sections 30244 and 30253	Section 30244 requires mitigation for adversely impacted archaeological and paleontological resources. Section 30253 requires that risks to life and property that may result from geologic, flood, and fire hazards be minimized and that the “stability and structural integrity” of the site and natural landforms in the surrounding area be maintained.
Public Resources Code Section 25527 and 25550.5(i)	The Warren-Alquist Act requires the California 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. Section 25550.5(i) defines the criteria for a repowering project that involves modification of an existing power plant rather than construction of a new facility.

Applicable Law	Description
California Environmental Quality Act (CEQA), 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 Society for Vertebrate Paleontology, a national organization of professional scientists.
Local	
Humboldt County Zoning Regulations	Requires compliance with a number of development standards. Applicable standards include preparation of and compliance with preliminary geological engineering and soils reports, preparation of a Supplementary Information Report for projects located in coastal zones, and compliance with construction standards in accordance with the Uniform Building Code, Section 2312, Earthquake Regulations, and sections of the California Coastal Act.
Humboldt County General Plan	Requires compliance with construction standards in accordance with the California Coastal Act and preparation of a project geotechnical report. The Plan also specifies design criteria for facilities to be constructed below the 100-year tsunami run-up elevation and within the 100-year flood plain.

SETTING

The proposed HBRP will be constructed on a 143-acre site within the Humboldt Bay Power Plant (HBPP) complex, located on the eastern shore of Humboldt Bay south of Eureka, California. The power plant complex site is currently occupied by an operating 105-megawatt (MW) electrical generating plant, an inoperable nuclear-powered plant, and two 15-MW mobile emergency power plants. The primary power plant consists of steam-driven turbine-generators capable of burning both natural gas and fuel oil. The facility has been in operation for approximately 50 years and is slated for decommissioning following construction of the new power plant. The proposed repowering project is to consist of 10 natural gas-fired reciprocating engine generators and associated air radiator cooling system, exhaust gas silencing stacks, and catalytic reduction system. The facility is designed to produce a total of 163 MW of electricity. The unit will be capable of burning diesel fuel when natural gas supplies are limited or interrupted. Electrical transmission lines will be constructed to connect the new plant to an existing substation on site, and water, sanitary sewer, and high-pressure gas lines will connect to existing pipelines on site. As part of a separate project, an existing, retired, 4,200±-foot-long fuel oil delivery pipe will be removed from the Humboldt Bay Power Plant storage tanks to the pipes’ origin at Olson’s Wharf. From the tanks to the HBPP property line, the pipe will be backfilled with cement-sand slurry, capped, and

abandoned in-place. Beyond the HBPP property, the pipeline will be removed, the trench backfilled and then re-graded, to the extent practical.

REGIONAL SETTING

The HBRP site is located on the eastern shore of Humboldt Bay within the Eel River Basin, which is at the north end of the Coast Ranges geomorphic province (Norris and Webb, 1990). This segment of the northern coast of California is characterized by young and very active tectonism as shown in **Geology & Paleontology Figure 1**. The Mendocino Triple Junction (MTJ), which represents the zone of collision of the northward-moving Pacific Oceanic Plate, the eastward-moving Gorda Oceanic Plate, and the stationary North American Continental Plate, is located approximately 30 to 35 miles south to southwest of Humboldt Bay (Clarke, 1992). The Coast Ranges geomorphic province south of the MTJ is generally characterized by north-northwest-trending right-lateral strike-slip faults similar to the San Andreas Fault Zone. However, north- to northwest-striking, east-dipping thrust and reverse faulting is predominant north of the MTJ in the area that includes the HBRP. The swarms of imbricate thrust faults present in this Cascadia Subduction Zone are the result of collision and subduction of the Gorda Plate beneath the North American Plate. The Seaward Edge of the Cascadia Subduction Zone, which roughly correlates to the zone of contact between oceanic and continental rocks, is located beneath the ocean approximately 35 miles west of Humboldt Bay (CDMG, 1994). An eastward dip of the subduction zone of 10 to 11 degrees has been interpreted, which places the zone at a depth of approximately 8 to 10 miles below Humboldt Bay and the project site (Cockerham, 1984).

The Eel River Basin is a forearc basin associated with Cascadia Subduction Zone tectonics. Continuous sedimentation from the subaerial portion of the North American Plate loads the adjacent offshore crust, which causes isostatic adjustment and subsidence. As much as 12,000 feet of lower Miocene and younger sediments have accumulated in the accretionary prism (Clarke, 1992). Subduction of the oceanic plate has caused the sedimentary rocks to be complexly folded, uplifted, and thrust-faulted at the same time that isostatic subsidence is occurring. The HBRP and Humboldt Bay are located at the southern, onshore end of the forearc basin, which extends approximately 24 miles to the southwest roughly following the Eel River (USGS, 2000).

Nearly all of the major faults and fault zones in the HBRP regional area are northwest- to north-northwest striking reverse faults that dip to the northeast (CDMG, 1994; USGS, 2000). The nearest is the Little Salmon Fault Zone, part of which passes through the project area. The Fault Activity Map of California (CDMG, 1994) indicates that splays within this fault zone in the Humboldt Bay area have been active as recently as 200 to 10,000 years ago (Little Salmon Fault) and 700,000 to 1.6 million years ago (Bay Entrance Fault). The surface trace of the Little Salmon Fault mapped by the California Division of Mines and Geology (CDMG, 1994) is approximately 1.4 miles southwest of the HBRP site and has been projected to be between 4,000 to 5,000 feet below the site (PG&E, 2006a). The Little Salmon Fault is a designated Alquist-Priolo Special Studies Zone (SSZ), but the northern boundary of the zone is about 1 mile south of the HBRP (CDMG, 1991). Other fault zones in the region include the Mad River Fault Zone, which is located 11 miles to the northeast of the HBRP site and has had movement between 200 and 10,000 years ago (the Mad River Fault is also within an Alquist-Priolo SSZ

[CDMG, 1983]), the Goose Lake Fault Zone (Little Salmon Fault of the U.S.G.S., 2000), which is located 9.5 miles to the southwest and has also had movement between 200 and 10,000 years ago, and the Russ Fault Zone, which is located 15.5 miles to the southwest and has had movement between 700,000 and 1.6 million years ago (CDMG, 1994). The Freshwater Fault Zone (also called the Coastal Belt Thrust), located 8.5 miles to the northeast, is an older fault zone with only localized movement in the Quaternary (Clarke, 1992).

Sedimentation in the Eel River Basin is complex due to the continuously changing basin geometry caused by tectonic activity. Vertical and lateral facies changes are rapid, and units are not always laterally extensive. Basement rocks are composed of Paleocene to Eocene Coastal Belt rocks of the Franciscan Complex (Clarke, 1992). Shale and sandstone of the lower to middle Miocene Age Bear River Beds, deposited in continental shelf and slope environments, unconformably overlie the basement rocks. The upper Miocene to middle Pleistocene Wildcat Group, a thick section of shallow marine shales, siltstones and sandstones, was deposited over the Bear River Beds. The uppermost unit of the Wildcat Group, the Carlotta Formation, consists of non-marine sandstone and conglomerates that were deposited as the shoreline regressed westward (Ogle, 1953). The Wildcat Group is unconformably overlain by coastal plain and fluvial sediments of the middle to late Pleistocene Hookton and Rohnerville Formations.

PROJECT SITE DESCRIPTION

The surface material at the HBRP site is 2 to 6 feet of silty clay to sandy, clayey gravel fill that has been placed over marshland on the east shore of Humboldt Bay (Kleinfelder, 2006). The fill was placed over Holocene age bay deposits, which consist of organic-rich clays, silts, and occasional clayey sands that are 2 to 20 feet thick overall. Auger drilling presented in Kleinfelder's 2006 draft geotechnical report indicates that the bottom of the bay deposits ranges from 9 feet deep at the south and west ends to 22 feet deep at the east end within the new facility footprints. The soils are compressible and grade downward from soft or loose to stiff or medium dense. Peat deposits are rare and occur only locally in discontinuous beds.

The Pleistocene Upper Hookton Formation underlies the bay deposits and is divided into three subunits. The uppermost unit is the 1st Bay Clay, which consists of stiff to hard clays, silts, and occasional sands that are 20 to 35 feet thick (Kleinfelder, 2006). Below the clay horizon are the Upper Sand Beds, which are composed of clayey sands, silty sands, and occasional gravels that are 20 to 40 feet thick. The lowermost subunit is the 2nd Bay Clay, which is similar in composition and consistency to the 1st Bay Clay and is 15 to 25 feet thick. Several borings penetrated the medium dense to dense clayey sands, silty sands, and gravelly sands of the Pleistocene Lower Hookton Formation at depths ranging from 80 to 96 feet. Groundwater was encountered at depths of 5 to 6 feet.

Fault traces that are thought to be part of the Little Salmon Fault Zone are present on the west and east edges of the HBRP site. Both are northwest-trending reverse faults, and neither is included in the Little Salmon Fault SSZ (CDMG, 1982 and 1991). Borings suggest approximately 25 feet of down-to-the-southwest offset on the northeast-dipping Buhne Point Fault and the Buhne Point Splay Fault (PG&E, 2006a). The splay is

responsible for uplift of Buhne Hill, located northwest of the site, and is shown well north of the HBRP on Figure 8.4-5 of the Application for Certification (AFC) (PG&E, 2006a). The suspected surface trace of the Buhne Point fault is located roughly 70 to 80 feet southwest of the proposed new power plant boundary. Ten feet of down-to-the-northeast movement has been postulated on the Discharge Canal Fault, which is present on the northeastern boundary of the HBRP site. The geometry of these faults indicates that the HBRP site is on an uplifting structural wedge, and it would suggest that a single fault at depth splays upward into the Buhne Point and Discharge Canal Faults at some depth below the project site. However, perpendicular cross-sections across the site in Kleinfelder's draft soils report (Kleinfelder, 2006) do not show any recognizable offset of units to the depths drilled.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact proper functioning of the proposed facility and include life/safety concerns. The second is 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 with respect to 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 adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to the ability to adequately design and construct the proposed facility. Geologic hazards to be considered include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, and seiches.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

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

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, staff has reviewed geologic and mineral resource maps for the surrounding area, as well as any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. When available, staff also reviews operating procedures of the proposed facility—in particular

ground water extraction and mass grading—to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as site-specific information generated by the applicant for the HBRP. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, conditions of certification are proposed for the project approval, which outlines procedures required during construction to mitigate impacts to potential resources.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, ground rupture and localized liquefaction during an earthquake, tsunami inundation resulting from an offshore earthquake, compression of fine-grained soils, and possible clay expansion represent the main geologic hazards at this site. Proper design can mitigate the potential hazards. Specifically, proposed Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** in the **Facility Design** section and **GEO-1**, presented herein, should mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist within 2 miles of the site. The potential for useful paleontological resources in fill, which represents the upper 2 to 6 feet of soils that will be impacted by project grading, is negligible due to disturbance of the material. Similarly, the potential to encounter significant paleontological resources in the Holocene bay deposits, which is present to depths ranging from 9 to 22 feet within the new construction boundary, is low due to the young age of the sediments. However, paleontological resources below the fill and bay deposits in the Pleistocene Hookton Formation sediments have the potential to be highly sensitive to construction activities and to be very significant. Such important paleontological resources were not observed on the site or nearby areas during construction of the existing power plant facilities or during the paleontological survey conducted for this AFC. However, a vertebrate fossil site has been excavated at Buhne Point (PG&E, 2006a). A total of three fossil sites have been encountered in Hookton Formation sediments within 3 miles of the project site. Since the proposed HBRP will include significant amounts of grading, foundation excavation, pile driving, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high in native materials below fill. This assessment is based on SVP criteria and the confidential paleontological report appended to the AFC. Proposed Conditions of Certification **PAL-1 to PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level.

The proposed conditions of certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards and to protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential is very low for significant adverse direct and indirect impacts from the proposed project to geologic hazards and to potential geologic, mineralogic, and paleontologic resources.

GEOLOGICAL HAZARDS

The AFC (PG&E, 2006a) provides documentation of potential geologic hazards at the HBRP plant site, in addition to some subsurface exploration information. Review of the AFC, coupled with staff's independent research, indicates that the potential for geologic hazards to impact the plant site, during its practical design life, is low.

Staff's independent research included review of available geologic maps, reports, and related data of the HBRP plant site. Geological information was available from the California Geological Survey (CGS), (CDMG), and other governmental organizations.

Faulting and Seismicity

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, 1982, 1983, 1991, and 2003). No active faults are shown on published maps as crossing the boundary of new construction on the proposed HBRP site. The closest mapped active fault is the Little Salmon Fault, a regional reverse fault located 1.4 miles southwest of the proposed energy facility. The next closest active faults are in the Mad River Fault Zone, a regional swarm of imbricate thrusts located 11 miles northeast of the proposed energy facility. Both of these fault zones are designated as Type A faults (CDMG, 1994; ICBO, 1998; PG&E, 2006a).

The California Division of Mines and Geology completed a fault evaluation report on the Little Salmon and Yager faults, presenting the rationale for not including these faults in an Alquist-Priolo Special Studies Zone at that time (CDMG, 1982). Subsequently, the Little Salmon fault was included in a Special Studies Zone, but not in the area around the HBRP site (CDMG, 1991). In the 1982 CDMG report, the author refers to an investigation done by the consulting firm Woodward-Clyde in 1980 at the PG&E Power Plant north of the HBRP site. The Woodward-Clyde report used Carbon-14 dating and geologic reasoning to show that the Buhne Point splay of the Little Salmon fault has not moved in at least 37,000 years. Therefore, by definition that active faults are characterized as those that have moved during the last 11,000 years, the Buhne Point fault, and likely the related Discharge Canal fault, would not be considered active.

The CDMG report (1982) also shows the Buhne Point fault along and parallel to King Salmon Avenue, well west of the proposed HBRP and west of the location shown on Figure 8.4-5 of the AFC (PG&E, 2006a). The CDMG report (1982) does not show or discuss the Discharge Canal fault. The California Coastal Commission, reportedly, has more recent studies verifying that the Little Salmon fault, and presumably its splays (Buhne Point and Discharge Canal faults), are active, with movement possibly as recent as 300 years (Coastal Commission, 2007b).

Unless proven otherwise by specific fault investigations, both the Buhne Point and the Discharge Canal Faults should be considered as active faults, if only on the basis of their dynamic tectonic environment. Linear structures will likely cross the faults and should be designed accordingly, with automatic shut-off systems and flexible crossings, where appropriate.

Geology & Paleontology Figure 2 shows the fault traces of the Buhne Point and Discharge Canal Faults very near the southwest and northeast project boundaries, respectively. The uncertainties with the fault locations are also depicted and indicate that the actual surface trace of either or both faults could lie just within the project site. Neither fault, even in the worst case, would appear to lie within 50 feet of the proposed control room, the only building expected to have human occupancy. The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations, 2001) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. The setback can be reduced if it is demonstrated that no fault splays are present within this 100-foot-wide zone. Non-critical structures can also be designed to withstand ground rupture.

The HBRP site is located on the hanging wall block of the Discharge Canal fault and this block would likely be subject to localized shearing/faulting with movement of any of the faults in this area. For this reason, and the uncertainty of the location of the Discharge Canal fault, the applicant will design occupied and other important structures to accommodate vertical displacement of about 12 inches and lateral offsets of about 4 inches (CH2MHill, 2007f).

The seismic soil profile for this site is Class D. Given that the site is located within 2 kilometers of a known Type A seismic source—faults of the Little Salmon Fault Zone—(ICBO, 1998), high ground acceleration would be expected during the design earthquake.

The estimated peak horizontal bedrock ground acceleration for the power plant is 1.081 times the acceleration of gravity (1.081g) based on 2 percent probability of exceedence in 50 years per 2007 CBC criteria. For this particular site, the ground acceleration is neither amplified nor attenuated by the soils profile so that the Class D modified ground surface acceleration remains 1.081g (USGS, 2008). The high value is reasonable given the location of the HBRP site relative to an active subduction zone and the Mendocino Triple Junction.

It is staff's understanding that the occupied structure (control room) and other structures deemed important to operations, will be designed to tolerate significant ground rupture. Based on known recurrence laterals on the Little Salmon fault, interpreted recurrence laterals on the Buhne Point fault and an estimated offsets recurrence of 12 inches per 8,000 years for the Canal Discharge fault, design offset of one foot vertical and 4 inches lateral will be utilized. No current or proposed building code requires that the structures be serviceable after a major earthquake, only that the occupants can be safely evacuated.

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. Standard penetration tests (SPT) taken during advancement of mud rotary borings generally yielded blow counts of less than 25 blows per foot in the upper 35 feet of the site. These low blow counts, coupled with a high ground water table of 5 to 6 feet, would indicate a moderate to high potential for liquefaction during an earthquake, particularly in the zone of 4 to 14 feet below the ground surface. Sandy soils are more abundant below 35 feet, but blow counts are

greater than 30 blows per foot with only one or two exceptions. Therefore, although liquefaction of localized and discontinuous granular soils may occur, the potential for significant liquefaction at the HBRP site is considered low. This conclusion is supported by the lack of historic settlement and lateral spreading during earthquakes that have produced high peak ground accelerations, such as those that occurred in 1975 and 1994 that produced ground motions of 0.30g and 0.55g, respectively, on the site (PG&E, 2006a). The design-level geotechnical investigation will further evaluate liquefaction potential and provide appropriate recommendations for mitigation. If California adopts the International Building Code prior to design plans approval, the required design peak ground acceleration will be substantially higher and may indicate liquefaction potential in areas considered unlikely under the current code. In either case, the geotechnical consultant (Kleinfelder, 2006) recommends that heavily loaded or settlement sensitive structures be founded on driven pile foundations. The piles will penetrate any liquefiable soils and bear in the dense underlying clays of the Hookton Formation. Depending on spacing, the process of driving piles may densify the loose soil, reducing its liquefaction potential.

Dynamic Compaction

Dynamic compaction of soils results 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.

The potential for dynamic compaction is considered very low since geotechnical exploration borings indicate a fine-grained and clay soils profile above 35 feet and medium-dense to dense and stiff to hard soils below 35 feet.

Hydrocompaction

Hydrocompaction (more commonly known as hydro-collapse) is generally associated with soils that were deposited rapidly and in a saturated state, such as during flash-floods. The soils dry out, leaving in place an unconsolidated material with excessive void spaces. Structures built on soils of this type tend to settle due to the loss of soil and collapse upon the application of water. Because the native and fill soils at the site have been deposited in a relatively compact condition, hydrocompaction is not considered to be a potential problem at the HBRP.

Subsidence

Local subsidence (settlement) may occur where areas that contain compressible soils are subjected to foundation loads. Consolidation tests performed on lean clays and silts in the preliminary geotechnical report (Kleinfelder, 2006) indicate that a significant amount of settlement may occur beneath the heaviest structures. However, these impacts will be mitigated by following the recommendations outlined in the geotechnical report, primarily using deep foundation systems.

A thin, 1-foot-thick peat bed was observed in Holocene bay deposits in one boring during drilling (Kleinfelder, 2006). Peat and other organic-rich materials are considered to be highly compressible because oxidation of the materials causes severe volume

loss. However, organic-rich or equivalent materials were not encountered in other borings on the site and are considered to be localized. Therefore, only a minimal potential exists for subsidence due to consolidation of peat beds.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. The abandoned Table Bluff gas field is located approximately 4 miles southwest of the site, and the Tomkins Hill gas field is located 8 miles to the south (CDC, 2001). There are no known petroleum fields in Humboldt County. Raw ground water for process needs other than once-thru cooling has been extracted from a well on the HBRP property during continuous operation of the existing power generating facilities (PG&E, 2006a). No subsidence due to ground water extraction has been documented for existing facilities. The new power plant will use a closed loop air radiator cooling system, further reducing the potential for subsidence due to ground water withdrawal. Potable water will continue to be obtained from the Humboldt Community Services District.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. The top 5 to 6 feet of native and fill soil above the ground water table commonly contain lean clays with medium expansion potential and could result in some shrink-swell behavior. Mitigation of expansive soil, by over-excavation and replacement of these materials under the proposed structures, is recommended by the draft geotechnical report (Kleinfelder, 2006). The design-level report will provide a more specific evaluation of expansive clays and mitigation options.

Landslides

Landsliding potential at the HBRP site is negligible, since the proposed energy facility is located on a broad, gently sloping to flat-lying estuary on the east shore of Humboldt Bay. The nearest mapped landslides and fault scarps possibly associated with landslide activity are located in steeper terrain approximately 1¾ miles to the east across the Elk River Valley and approximately 1¾ miles south on the west flank of Humboldt Hill (CDMG, 1985). The California Coastal Commission (2005) has identified potential earthquake-induced slope failures in Buhne Point, which is far enough away so as not to affect the HBRP.

Flooding

The HBRP lies on a flat-lying to very gently sloping coastal plain that varies from 8 to 12 feet above sea level. Such area features are commonly inundated by flood events. The Federal Emergency Management Agency (FEMA) has identified the site as lying in Zone A, which is subject to 100-year flooding (FEMA, 1986). Humboldt County has established the base flood elevation for the 100-year flood at +6 feet. The HBRP plant grade would be established at +11 to +12 feet, with finished floor elevations at +13 feet.

Therefore, HBRP would be constructed above the 100-year flood zone (CH2MHill, 2007a).

Tsunamis and Seiches

Humboldt Bay and the proposed HBRP site are in an area that could be inundated by a tsunami. Bernard and others (1994) used computer modeling, based on a magnitude (M_w) 8.4 earthquake occurring within the Cascadia Subduction Zone, to show that a tsunami with an amplitude of 30 feet (10 meters) would inundate the shoreline to a point near the railroad tracks east of the project site. Other studies indicate that the inundation height due to an earthquake-induced tsunami could be 30 to 40 feet at the entrance to Humboldt Bay, 21 to 36 feet at the HBRP site at mean lower low water (MLLW) and 28 to 43 feet at the HBRP site at mean higher high water (MHHW) before considering wave run-up over land (PG&E, 2003). After considering wave run-up, the estimated maximum run-up at the HBRP site could range from about 23 feet at MLLW to 50 feet at MHHW. Because the project site lies within a tsunami inundation zone, the facilities would be constructed in a manner that would minimize the impacts of flooding and potentially high wave forces. All major structures would also be anchored to avoid floatation from buoyancy (PG&E, 2006a, Sec. 8.15.1.3). There is also potential for a seiche wave in Humboldt Bay to impact the operation of the facility, although the anticipated potential impact on the HBRP site would be less than the impact resulting from a 100-year flood.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (CDC, 2001; CDMG, 1962; CDMG, 1980; CDMG, 1985; CDMG, 1990; CDMG, 1998; CDMG, 1999; USGS, 2000). Staff did not identify any geological resources at the energy facility location or at the proposed utility connections. No known petroleum fields exist in Humboldt County; however, two gas fields are located within 10 miles of the project site. The abandoned Table Bluff gas field is located approximately 4 miles southwest of the site, and the Tomkins Hill gas field is located 8 miles to the south (CDC, 2001). No mineralogical resources, including sand, gravel, and precious or base metals, are present in the vicinity of the project. Given the soil profile determined from the geotechnical exploration, there is low potential for this site to have economically valuable sand and gravel or other mineral deposits.

Regarding paleontological resources, Energy Commission staff has reviewed the paleontological resources assessment in Section 8.8 of the AFC (PG&E, 2006a) as well as the confidential paleontologic site report. No paleontological finds have been documented on the HBRP.

Geology at the energy facility footprint location is made up of 2 to 6 feet of fill underlain by Holocene bay deposits and Pleistocene marine and non-marine sediments. Surface man-made fills have negligible paleontological sensitivity due to disturbance of the material; any fossil discovered would lack stratigraphic context. Holocene bay deposits are of low paleontological sensitivity because the sediments are very young and are not likely to be scientifically significant or possess educational value. Construction activities that excavate beneath fill and Holocene bay deposits at depths of 9 feet at the south and west ends to 22 feet at the east end below the existing ground surface would

encounter the Pleistocene Hookton Formation. The Hookton Formation is considered to have high paleontological sensitivity based on the historic occurrence of vertebrate fossils that have yielded important information regarding Pleistocene ecosystems in Northern California.

Three paleontological sites are recorded in each of the following sites: the upper Miocene to middle Pleistocene Wildcat Group and the middle-to-late Pleistocene Hookton Formation (PG&E, 2006a). The locations of these sites are provided in Appendix 8.8A of the AFC, which is confidential and unavailable for general review. Vertebrate fossils recovered from the three Hookton Formation localities include remains of the Columbian mammoth (*Mammuthus columbi*), the American mastodon (*Mammut americanum*), and the Pleistocene bison (*Bison latifrons*), (PG&E, 2006a). The bison remains are significant to the HBRP because the remains were recovered from Buhne Point. Twelve fossil localities are present within the combined area covered by the Eureka and Field's Landing 7½-minute quadrangles (CDMG, 1980; from Ogle, 1953). Only one of these sites, located approximately 6 miles south of the HBRP and near the south shore of Humboldt Bay, is considered to possess scientific significance. The fossil remains are marine molluscan fauna from the Wildcat Formation that include *Saxidomus nuttali* and *Protothaca staminea* (Ogle, 1953). No fossil remains were encountered during the cursory paleontological survey conducted on the HBRP site by W. Geoffrey Spaulding, Ph.D. (PG&E, 2006a). The survey examined surface exposures only. Fossils may be present in certain formations in the subsurface.

Staff has proposed conditions of certification **PAL-1** through **PAL-7** that will enable the applicant to mitigate impacts upon paleontological resources to a less than significant level should they be encountered during construction, operation, and closure of the project. The level of monitoring may be reduced if recommended by the project Paleontologic Resource Specialist (PRS), and agreed to by the CPM, after examination of representative deep excavations.

Construction Impacts and Mitigation

Compressible silts, clays, localized peats, and to a lesser extent, expansive clays present on the site must be addressed during construction (See **Proposed Conditions of Certification, Facility Design**).

As noted above, no viable geologic or mineralogic resources are known to exist in the area. Significant paleontological resources have been documented in Pleistocene sediments within 1.5 miles of the project site so that native materials below the organic-rich Holocene bay deposits may exhibit a high sensitivity rating with respect to containing significant paleontologic resources. The draft geotechnical report indicates that the top of the Hookton Formation ranges from 9 to 22 feet within the limits of new construction (Kleindfelder, 2006). Construction of the proposed project will include grading, foundation excavation, and utility trenching. Staff considers the probability of encountering paleontological resources to be generally low based on the soils profile, SVP assessment criteria, and the shallow depths required for most excavations. However, the AFC (PG&E, 2006a) indicates that the Hookton Formation may be as shallow as 3 feet below the ground surface elsewhere on the HBRP property, based on drilling outside the power plant footprint. Excavations for ancillary facilities and new

pipelines and on-site excavations deeper than 3 feet outside the footprint may have a higher probability of encountering the Hookton Formation and potentially high sensitivity materials. Proposed Conditions of Certification **PAL-1 to PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level.

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

Operation Impacts and Mitigation

Operation of the proposed new gas-fired electricity generating facility should not have any adverse impact on geologic, mineralogic, or paleontologic resources.

CUMULATIVE IMPACTS AND MITIGATION

The proposed HBRP is situated in an active geologic environment. Strong ground shaking, localized liquefaction, and tsunami inundation potential must be mitigated through foundation and structural design as required by the CBC (2007). Compressible materials, expansive clays, and disturbed surface soil, which are present in the man-made fill (upper 2 to 6 feet soils profile) and Holocene bay deposits (to depths of 9 to 22 feet), must be mitigated in accordance with the project geotechnical investigation (Kleinfelder, 2006) and proposed Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** under **Facility Design**. Paleontological resources have been documented in the general area of the project, including at Buhne Point. However, to date, none have been found during construction of the existing Humboldt Bay Power Plant facilities. The potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1 to PAL-7**.

It is staff's opinion that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards, during project design-life, is low and to potential geologic, mineralogic, and paleontologic resources from the proposed project, very low. Because of the potential for very high ground acceleration in this area, and even some potential for surface rupture, it may be prudent to base the design on the more stringent seismic criteria of the International Building Code (ICC, 2003).

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

The proposed conditions of certification are to allow the Energy Commission (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources as no such resources are known to exist at the power plant location or along its proposed linears. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed, and mitigated as required, during construction and operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Public Comments

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

Conformance with the California Coastal Act

Section 30253 of the California Coastal Act states that new development shall: *“Minimize risks to life and property in areas of high geologic, flood and fire hazard.”* The California Coastal Commission (Coastal Commission 2005; Personal Communication, 2007a) has expressed concern that the precise locations of the Buhne Point and Discharge Canal faults are not known. In a data request, the California Coastal Commission asked that the faults be better located or that some assurance be provided that the project will be designed to tolerate ground rupture. In response (CH2MHill, 2007f), the applicant has presented additional data regarding the locations, recurrence intervals and general structure of the Buhne Point and Discharge Canal faults. The HBRP site clearly lies within the hanging wall of the Discharge Canal fault. Even if the Discharge Canal fault trace is east of the HBRP, as it appears to be, movement along any of the faults in the area could produce minor shears/faults in the hanging wall block between the Discharge Canal fault and the Buhne Point fault to the west. For this reason, occupied buildings and other important structures will be designed to accommodate up to 12 inches of vertical offset and 4 inches of lateral offset. This can be accomplished by the use of post-tensioned floor slabs, increased concrete reinforcement, stronger connections, and other standard structural design methods. Design in accordance with these concepts should be effective in “minimizing the risk to life and property.”

CONCLUSIONS

The proposed project would comply with applicable LORS, provided that the proposed conditions of certification are followed. The design and construction of the project would have no significant 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 and **GEO-1** below. Proposed paleontological Conditions of Certification follow. It is staff's opinion that potential to encounter paleontologic resources is very low in the upper 9 feet at the south and west ends to 22 feet at the east end and moderate below 9 to 22 feet. Monitoring intensity may be reduced, at the recommendation of the project PRS and with the concurrence of the CPM, following examination of sufficient, representative deep excavations.

GEO-1 All occupied structures shall be designed to withstand a reasonable level of vertical and horizontal fault offset, directly beneath the building. The design ground rupture shall be for a single event based on geological estimates of total offset along the Canal Discharge fault and probable recurrence intervals. In accordance with the current California Building Code (CBC, 2007), the design would require only that occupants could be safely evacuated but not necessarily that the structure remain serviceable.

Verification: At least 30 days prior to start of grading, the project owner shall submit to the CPM a letter from the project structural engineer describing the offset resistant design and verifying that the design intent is to resist the prescribed magnitudes of horizontal and vertical movement.

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 submit to the CPM to keep on file resumes of the qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

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

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

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;

3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

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

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

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.
2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.
3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the 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 can be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed 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. Prior to work commencing 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 during the next week, until ground disturbance is completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.
2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.
3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that 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 the 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 the monitoring and sampling;
6. A discussion of the 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 meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;
9. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and
10. A copy of the paleontological Conditions of Certification.

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

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all recently employed project managers, construction supervisors, and workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. A CPM-approved video or in-person training may be used for new employees. **[Please revise this condition in accordance with the applicant's proposed changes from their comments on the PSA]**The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any 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 potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such 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 the workers are 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.
3. 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 potentially fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. Unless determined otherwise in the PRMMP, monitoring will not be required for on-site excavations 6 feet deep or less and for linear-related excavations, outside the power plant site, that do not extend more than 3 feet below existing grade. 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 different from the accepted schedule presented 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 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 log of monitoring 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 immediately 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 when construction has been halted due to a paleontological find.

The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports (MCR). The summary shall 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, etc. A section of the report shall include the geologic units or subunits encountered, descriptions of sampling within each unit, and a list of identified fossils. A final section of the report shall address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and 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 the 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 completion and approval of the CPM-approved Paleontological Resource Report (see **PAL-7**). The project owner shall be responsible to pay 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 submitted 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 Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion Worker Environmental Awareness Program Humboldt Bay Repowering Project (06-AFC-7)

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

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

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

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

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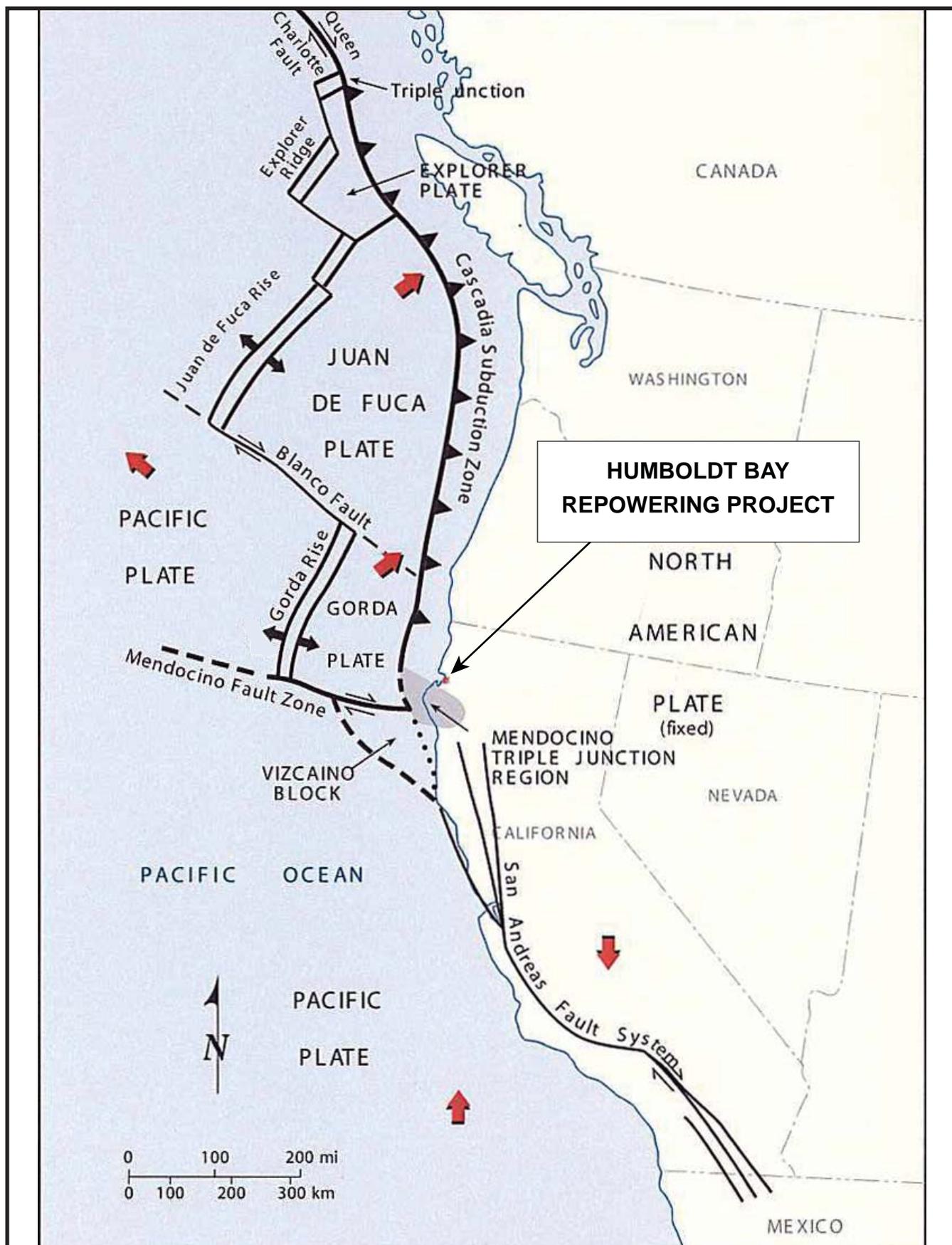
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GEOLOGY & PALEONTOLOGY - FIGURE 1
 Humboldt Bay Repowering Project - Regional Tectonics



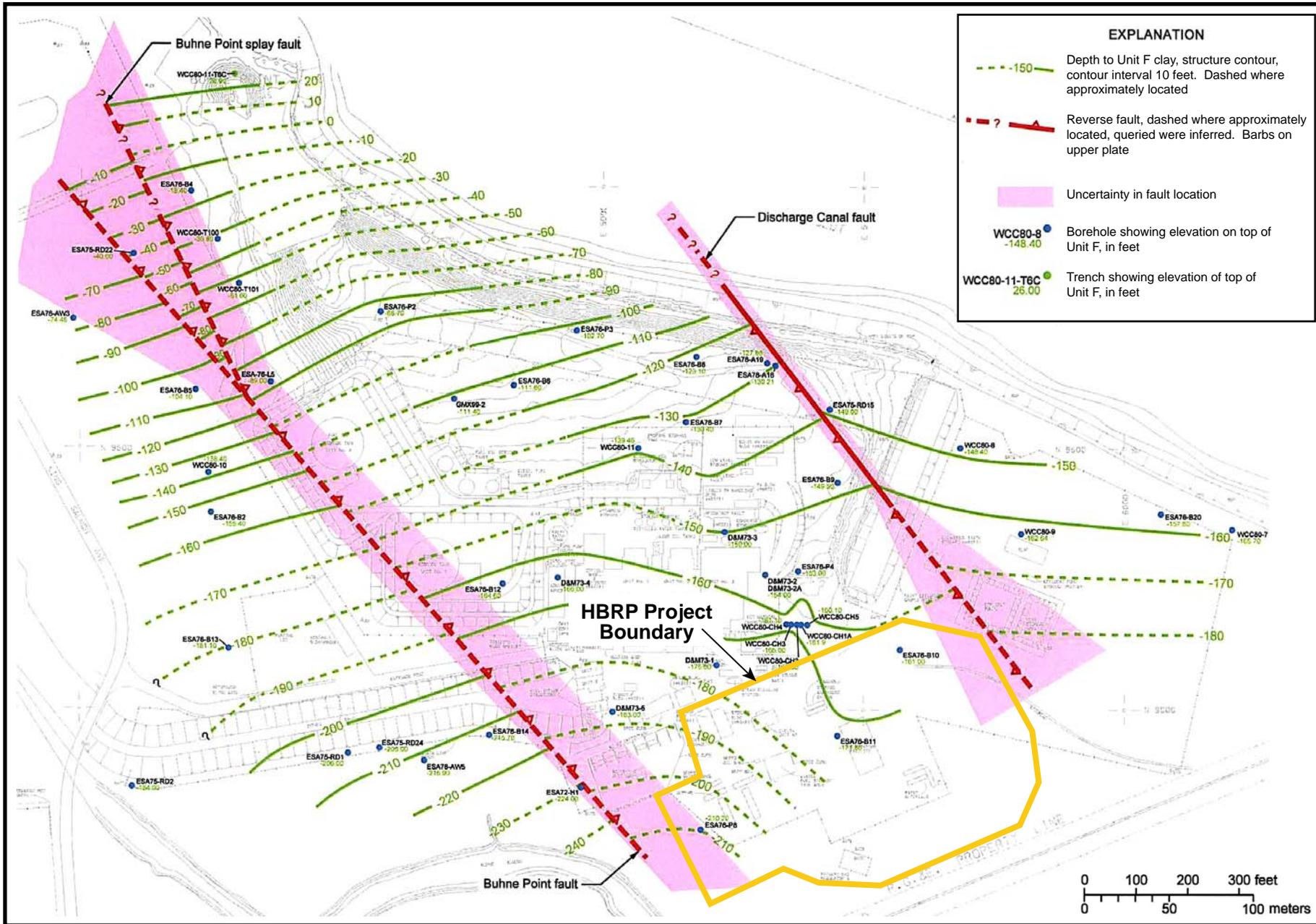
CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2008

SOURCE: AFC Figure 8.4-1

GEOLOGY & PALEONTOLOGY - FIGURE 2
 Humboldt Bay Repowering Project - Onsite Faults

MAY 2008

GEOLOGY & PALEONTOLOGY



POWER PLANT EFFICIENCY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 163 MW of load following and daily cycling electric power, at an overall project fuel efficiency of 47 percent lower heating value (LHV) at loads ranging from 12 to 163 MW. 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 the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

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

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

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

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No Federal, State or local/county laws, ordinances, regulations and standards (LORS) apply to the efficiency of this project.

SETTING

Pacific Gas & Electric Company (PG&E) proposes to construct and operate the 163 MW (nominal net output) HBRP, which would replace the existing 50-year old Humboldt Bay Power Plant (HBPP), serving local load and maintaining local system reliability by providing load following and daily cycling power in the Humboldt Load Pocket. The HBRP would be dispatched by PG&E as required to supplement imported power via the 115 kV transmission line and other local sources of generation (PG&E 2006a, AFC §§ 1.1, 1.2, 2.0, 2.5.2, 2.5.16, 2.7.1, 10.2.2). The applicant intends for the project to

operate year-round, at annual availability from 90 to 97 percent (PG&E 2006a, AFC §§ 2.5.16, 2.7.1, 10.2.2). The project will consist of 10 dual-fuel Wärtsilä diesel cycle reciprocating engine-generator sets and auxiliary equipment. Each engine will be turbocharged and intercooled, and will be equipped with a selective catalytic reduction (SCR) system to control oxides of nitrogen emissions and a combustion catalyst to control carbon monoxide emissions. Each engine's water jacket, intercooler and lube oil will be air cooled by a closed-loop cooling system employing four radiators (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 2.5.4, 2.7.2.1, 2.7.3).

The project will be constructed on 5.4 acres of the 143-acre HBPP site, about three miles south of the City of Eureka in Humboldt County. The site has existing connections to natural gas, electric transmission and ground well water, and access to potable water (PG&E 2006a, AFC §§ 1.1, 2.0, 2.3, 2.4, 2.5.6, 2.5.7.2, 2.7.3.1, 2.7.4, 6.1.1, 6.2, 7.1, 10.2.1).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF ENERGY RESOURCES

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

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

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

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. Under the projected load scenario, the HBRP would burn natural gas at a rate between 125 and 130 million Btu¹ per hour LHV (PG&E 2006a, AFC §§ 2.5.6, 6.1.1). This is a substantial rate of energy consumption, and holds

¹ British thermal units.

the potential to impact energy supplies. Under expected project operating conditions,² electricity will be generated at a full load efficiency of approximately 47 percent LHV (PG&E 2006a, AFC §§ 2.5.3, 6.1.2, 10.3; Wärtsilä 2006).

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (PG&E 2006a, AFC §§ 1.1, 2.0, 2.4, 2.5.6, 2.7.3.1, 6.1.1, 6.2, 10.2.1; App. 6A). Natural gas for the HBRP would be supplied from the existing high pressure³ PG&E natural gas spur line that currently serves the HBPP. This line, in turn, is supplied by a 145-mile extension from a PG&E backbone pipeline to the east. The PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. Additional gas supplies are obtained from wells at nearby Tomkins Hill. This represents a resource of considerable capacity, an adequate source for a project of this size. It is therefore highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

PG&E will deliver the requisite natural gas fuel to the project from the existing PG&E pipeline via a short 10 inch diameter interconnection on the project site (PG&E 2006a, AFC §§ 1.1, 2.4, 6.2). PG&E's gas supply division has issued a Will-Serve Letter verifying that adequate natural gas supplies are available to serve the project (PG&E 2006a, AFC App. 6A). Under normal conditions, this is a resource with adequate delivery capacity for a project of this size. The HBRP, however, requires a backup source of fuel.

Backup Fuel Supply

A unique feature of the HBPP, and of the HBRP that is proposed to replace it, is its need for a backup fuel supply in the event of curtailment or emergency interruption of the natural gas fuel supply. The natural gas supply system that serves Humboldt County and the Eureka area is tenuous, stretching 145 miles across the Coast Range mountains. In the winter, when residential heating consumes large quantities of gas, supplies to industrial users must typically be curtailed. The HBPP, and the proposed HBRP, tend to experience gas curtailment whenever ambient temperatures drop below 50°F. Additionally, landslides and adverse weather conditions occasionally cause loss of service (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 2.5.3, 2.7.3, 2.7.3.1, 2.7.3.2, 6.1, 6.1.1, 6.1.2, 9.3, 9.9.1, 9.9.2, 10.2.1).

In order for the plant to continue to operate, it must be able to switch to an alternate supply of fuel. The HBRP will rely on low-sulfur diesel fuel when gas supplies are inadequate. This fuel is readily available from local suppliers; a four-day supply (634,000 gallons) would be stored in tanks on-site (PG&E 2006a, AFC §§ 2.7.3.1, 2.7.3.2, 6.1.1, 10.2.1).

² Each engine produces power at constant fuel efficiency from approximately 75 percent load (12 MW) to full load.

³ Gas is supplied to the site at a pressure between 170 and 320 psig, then reduced at the power plant to between 90 and 95 psig (PG&E 2006a, AFC §§ 2.5.6, 6.1.1, 6.3).

Given this provision for a backup fuel supply, there is no real likelihood that the HBRP will require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

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

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

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

Project Configuration

The project objective is to serve local load and maintain local system reliability by providing load following and daily cycling power in the Humboldt Load Pocket. The HBRP will be dispatched by PG&E (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 2.5.16, 2.7.1, 9.3, 10.2.2). The project configuration of multiple reciprocating engine-generator sets is consistent with this objective. The HBRP will be configured as 10 engine gensets in parallel, in which up to 16.3 MW of electricity is generated by each of one or more engine gensets. This configuration, with its short start-up time, fast ramping⁴ capability and consistently high fuel efficiency throughout the load range, is well suited to providing intermediate and cycling power. When reduced output is required, one or more engine-generators can be shut down, allowing the remaining machine(s) to produce a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at a less efficient part load output (PG&E 2006a, AFC §§ 1.1, 1.4, 2.0, 2.5.2, 2.5.4, 2.5.16, 2.7.1, 2.7.2.1, 2.7.3, 10.3).

The applicant intends for this facility to operate in intermediate and daily cycling duty at an annual capacity factor from 25 to 74 percent for all 10 engine gensets (PG&E 2006a, AFC § 10.3). This is equivalent to each machine running between 2,147 and 6,497 hours per year.

Equipment Selection

Modern reciprocating engine-generator sets represent highly fuel-efficient electric generating technology. The HBRP will employ 10 Wärtsilä 18V50DF dual-fuel engine gensets operating on natural gas fuel, with diesel oil as a backup fuel. The 50DF engine is one of the most efficient and cleanest-burning such machines available. This engine is nominally rated at 16.6 MW gross (16.3 MW net) at a fuel efficiency exceeding 47 percent LHV (Wärtsilä 2006). The HBRP would actually produce 163 MW net

⁴ Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

(16.3 MW per machine) at a site rated fuel efficiency of 47 percent LHV (PG&E 2006a, AFC §§ 1.1, 2.0, 2.4, 2.5.2, 2.5.3, 6.1.2, 10.3; Wärtsilä 2006).

Efficiency of Alternatives to the Project

Alternative Generating Technologies

Alternative generating technologies for the HBRP are considered in the AFC (PG&E 2006a, AFC §§ 1.4, 9.3, 9.9) and in the **Alternatives** section of this document. Rankine cycle steam boiler units (fueled with coal, oil or natural gas), simple cycle and combined cycle gas turbine units, advanced gas turbine technologies, geothermal, hydroelectric, biomass, waste-to-energy, solar and wind power were all considered. None of the renewable energy technologies offers the year-round dispatch ability required of the HBRP. Coal and heavy fuel oil were ruled out due to supply and pollution concerns. Staff agrees with the applicant that only natural gas-burning technologies are feasible for this project.

Natural Gas-Burning Technologies

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

The Wärtsilä 18V50DF

PG&E would employ 10 Wärtsilä 18V50DF dual fuel engine generator sets in the HBRP (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 2.7.3). The Wärtsilä engine genset chosen is the largest and most efficient such machine now available. This machine is nominally rated at 16.6 MW gross and 47 percent efficiency LHV at ISO⁵ conditions (Wärtsilä 2006). (Staff compares alternative machines' ISO ratings as a common baseline, since project-specific ratings are not available for the alternative machines.)

Where a gas turbine generator's fuel efficiency drops off rapidly when the machine is operated at less than full load, the efficiency of a reciprocating engine such as the Wärtsilä suffers much less at lower output. From 75 percent load to full load, the Wärtsilä's efficiency is nearly constant; at 50 percent load, it drops only to about 90 percent of full-load efficiency. Further, the machine is capable of ramping at high rates. In addition, the Wärtsilä can go from a cold start to full load in ten minutes (PG&E 2006a, AFC §§ 1.4, 2.5.3, 10.2.2, 10.3; Wärtsilä 2006). Such operating flexibility makes this the most capable machine available in its size range for providing the required load following and daily cycling service.

⁵ International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

Alternatives to the Wärtsilä 18V50DF

Alternative machines that might meet the project's objectives are simple cycle gas turbines, and other reciprocating engines.

Gas Turbine Generators

Gas turbine generators that could perform in load following and daily cycling service include the General Electric (GE) LM6000 SPRINT, the Siemens Power SGT-800 and the Pratt & Whitney FT8 TwinPac, which are aeroderivative machines adapted from aircraft engines; and the GE LMS100, a new hybrid machine incorporating both aeroderivative and industrial turbine technology.

The General Electric LM6000PC SPRINT gas turbine generator in a simple cycle configuration is nominally rated at 50.1 MW and 40.5 percent efficiency LHV at ISO conditions (GTW 2006).

The Pratt & Whitney FT8 TwinPac gas turbine generator in a simple cycle configuration is nominally rated at 51.4 MW and 38.4 percent efficiency LHV at ISO conditions (GTW 2006).

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 45 MW and 37 percent efficiency LHV at ISO conditions (GTW 2006).

The GE LMS100, currently available only in simple cycle configuration, is nominally rated at 98.8 MW and 45.1 percent efficiency at ISO conditions (GTW 2006).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LM6000PC SPRINT	50.1	40.5 %
P & W FT8 TwinPac	51.4	38.4 %
Siemens SGT-800	45	37.0 %
GE LMS100	98.8	45.1 %
Wärtsilä 18V50DF	16.3	47 %

Source: GTW 2006, Wärtsilä 2006

While the LMS100 nearly equals the fuel efficiency of the Wärtsilä machine, the Wärtsilä's smaller generating capacity makes it more attractive for load following. The LMS100 has been specifically designed for flexible output and high efficiency at part load; in this respect it nearly matches the Wärtsilä. However, the nearly 100 MW output of the LMS100 limits its flexibility. It can be curtailed only to about 30 MW or so before fuel efficiency drops prohibitively low. The HBRP, however, with 10 reciprocating engines, could be curtailed to about 8 MW without a significant drop in fuel efficiency. An additional consideration is that the LMS100 is not currently available in a dual fuel configuration. Staff agrees with the applicant that a battery of large reciprocating engines is the most appropriate choice for the HBRP.

Reciprocating Engines

The Wärtsilä was selected based on generating capacity (one of the largest available), air emissions, fuel efficiency, cost and schedule concerns. Staff cannot find fault with the applicant's choice of Wärtsilä as its engine supplier.

In conclusion, the project configuration and generating equipment chosen (10 Wärtsilä 18V50DF reciprocating engines) appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

The only nearby project that has been identified that could potentially combine with the HBRP to create cumulative impacts on natural gas resources is the HBPP, consisting of two steam boiler units (Unit 1, 52 MW capacity; and Unit 2, 53 MW capacity) and two trailer-mounted 15 MW simple cycle gas turbines. The PG&E natural gas supply system (combined with diesel fuel as backup) is expected to be adequate to supply both the HBPP and the HBRP during HBRP startup and commissioning without adversely impacting its other customers. Once the HBRP has been declared commercial, the HBPP will be shut down permanently and its air emission permits surrendered (PG&E 2006a, AFC §§ 1.1, 2.0, 2.2.3). Staff believes that the HBRP will create no cumulative impacts on natural gas fuel supplies.

NOTEWORTHY PUBLIC BENEFITS

The applicant proposes to increase the fuel efficiency and decrease overall air emissions of the existing HBPP, while continuing to provide reliable load following and daily cycling power to the Humboldt Load Pocket, by replacing the HBPP with the HBRP (PG&E 2006a, AFC §§ 1.1, 1.7.1, 1.7.3, 2.5.2, 2.5.16, 2.7.1, 9.3, 10.2.2). By doing so in this most fuel-efficient manner, i.e., employing 10 of the most efficient dual fuel reciprocating engine generator sets available, the HBRP will provide a benefit to the electric consumers of Humboldt County.

AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 163 MW of load following and daily cycling electric power, at an overall project fuel efficiency of 47 percent LHV at loads from 12 MW to 163 MW. 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 the project. Staff therefore

concludes that the project would present no significant adverse impacts upon energy resources. No cumulative impacts on energy resources are likely.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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POWER PLANT RELIABILITY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

Pacific Gas & Electric Company (PG&E) predicts an availability factor of 90 to 97 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Humboldt Bay Repowering Project (HBRP) will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** 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 reliability of power generation. While PG&E has predicted an equivalent availability factor from 90 to 97 percent for the HBRP (see below), staff uses typical industry norms as a benchmark, rather than PG&E's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No Federal, State or local/county laws, ordinances, regulations and 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 (Cal-ISO), that purchase, dispatch, and sell electric power throughout the State. How the Cal-ISO and other control area operators will ensure system reliability is an ongoing process; protocols are still being developed and put in place that will allow sufficient reliability to be maintained under the competitive market system. "Must-run" power purchase agreements and "participating generator"

agreements are two mechanisms being employed to ensure an adequate supply of reliable power.

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO.

The Cal-ISO's mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability would prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone an adequate shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff will recommend that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

The applicant proposes to construct and operate the 163 MW (nominal net output) HBRP, which would replace the aging Humboldt Bay Power Plant (HBPP) and ensure local system reliability by providing load following and daily cycling power to the Humboldt Load Pocket (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 9.3, 10.2.2). The project is expected to achieve an availability factor of 90 to 97 percent. The HBRP is intended to operate between approximately 7.5 percent and 100 percent of base load (12 to 163 MW), and is projected to actually operate in load following and daily cycling service at a capacity factor between 25 and 74 percent (PG&E 2006a, AFC §§ 1.4, 2.5.16, 2.7.1, 10.2.2, 10.3).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation [Cal. Code Regs., tit. 20, § 1752(c)]. Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system.

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability.

Measures of power plant reliability are based on its actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (PG&E 2006a, AFC §§ 2.7.1, 10.2.2), the HBRP will be expected to perform reliably.

Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, critical component redundancy, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the HBRP will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (PG&E 2006a, AFC § 2.7.5) 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 programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility used in daily cycling commonly offers adequate opportunity for maintenance work during its downtime. During periods of extended dispatch, however, as could occur if other major generating or transmission assets were disabled, the facility may be required to operate for extended periods. A typical approach for achieving reliability in such circumstances is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (PG&E 2006a, AFC §§ 2.4, 2.5.5, 2.5.13.3, 2.7.2.2, 2.7.2.3; Table 2.7-1). The fact that the project consists of 10 reciprocating engine-generators operating in parallel as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at

slightly reduced output). Further, all plant ancillary systems are also designed with adequate redundancy to ensure continued operation in the face of equipment failure. A backup plant operator's station and a backup station service auxiliary transformer, two 100 percent capacity starting air compressors¹ and three 50 percent service air compressors augment the typical redundancy in the plant control and emergency power systems. Staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

PG&E proposes to establish a preventive plant maintenance program typical of the industry (PG&E 2006a, AFC §§ 2.7.1, 10.2.2). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The HBRP will burn chiefly natural gas from the PG&E system. Natural gas fuel will be supplied to the project via a short 10-inch diameter connection from the existing PG&E high pressure² gas line on the HBPP site (PG&E 2006a, AFC §§ 1.1, 2.0, 2.4, 2.5.6, 2.7.3.1, 6.1, 6.2, 10.2.1; App. 6A). This line, in turn, is supplied by a 145-mile extension spur from a PG&E backbone pipeline to the east. The PG&E natural gas system offers access to adequate supplies of gas from the Rocky Mountains, Canada and the Southwest. Additional gas supplies are obtained from wells at nearby Tomkins Hill. PG&E's gas supply division has issued a Will-Serve Letter verifying that adequate natural gas supplies are available to serve the project (PG&E 2006a, AFC App. 6A). This represents a resource of considerable capacity.

A unique feature of the HBPP, and of the HBRP that is proposed to replace it, is its need for a backup fuel supply in the event of curtailment or emergency interruption of the natural gas fuel supply. The natural gas supply system that serves Humboldt County and the Eureka area is tenuous, stretching 145 miles across the Coast Range mountains. In the winter, when residential heating consumes large quantities of gas, supplies to industrial users must typically be curtailed. The HBPP, and the proposed HBRP, tend to experience gas curtailment whenever ambient temperatures drop below 50°F. Additionally, landslides and adverse weather conditions occasionally cause loss

¹ The Wärtsilä engines are started with compressed air rather than electrically.

² Gas is supplied to the site at a pressure between 170 and 320 psig, then reduced at the power plant to between 90 and 95 psig (PG&E 2006a, AFC §§ 2.5.6, 6.1.1, 6.3).

of service (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 2.5.3, 2.7.3, 2.7.3.1, 2.7.3.2, 6.1, 6.1.1, 6.1.2, 9.3, 9.9.1, 9.9.2, 10.2.1).

In recognition of this inherent lack of reliability of the natural gas supply system, the existing HBPP employs heavy fuel oil and diesel oil, stored in tanks onsite, as backup fuel sources. The HBRP would also utilize liquid fuel, in the form of low-sulfur diesel oil, as a backup fuel source (PG&E 2006a, AFC §§ 1.1, 1.4, 2.0, 2.5.2, 2.7.3, 2.7.3.2, 6.1, 6.1.1, 9.3, 9.9.2, 10.2.1). The Wärtsilä 18V50DF engines to be employed in the HBRP are capable of switching from natural gas to diesel fuel automatically, without interruption, at any output up to and including full load (Wärtsilä 2006). Low-sulfur diesel fuel would be stored onsite in sufficient quantities to ensure reliability in times of natural gas supply curtailment or interruption. Sufficient diesel fuel would be stored (634,000 gallons) to operate the HBRP for four days, and replenishment is readily available from local suppliers (PG&E 2006a, AFC §§ 2.7.3.1, 2.7.3.2, 6.1.1, 10.2.1).

In light of this provision for a backup fuel supply, staff agrees with the applicant's prediction that there will be adequate fuel supply to meet the project's needs.

To protect public health, the project may be limited in how much diesel fuel it may use annually. While this may reduce the project's availability, thus reducing its overall reliability, the likelihood of the project's reaching this limit in any one year is impossible to predict. In light of this unpredictability, staff chooses not to further question project reliability.

Water Supply Reliability

The HBRP would employ two sources of water. Raw water from the existing PG&E well No. 2 on the HBPP site would provide water for industrial uses. These include the engine cooling systems, auxiliary equipment closed cooling water system, fire water tank replenishment and landscape irrigation. Potable water from the Humboldt Community Services District water system would be supplied via a new 4-inch to 6-inch diameter, 1,200 foot long connection to the existing water line along King Salmon Avenue. Potable water would provide for sanitary uses (drinking water, sinks and toilets, emergency eyewashes and safety showers) and act as a backup source of fire water (PG&E 2006a, AFC §§ 1.1, 2.0, 2.4, 2.5.7.2, 2.5.8, 2.7.4, 7.1; App. 7A). Two 2,600 gallon maintenance water storage tanks would store engine coolant during maintenance. Since the engine gensets and auxiliaries are air cooled, plant water consumption is minimal. Staff believes this water source yields sufficient likelihood of a reliable supply of water for the plant's minimal needs. (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 and seiches (waves in inland bodies of water) will not likely represent hazards for this project, but seismic shaking (earthquake), tsunami (tidal wave) and flooding may present credible threats to reliable operation.

Seismic Shaking

Historically, California's power plants have sustained little or no damage in severe earthquakes. Typically, the majority of earthquake damage to power facilities is to switchyards, substations and transmission towers; broken ceramic insulators are a major cause of outages (Schiff 1999). When power plants are put out of service by earthquake, they are typically repaired and available for service before the load is ready to accept power.

During the 1987 Whittier earthquake (M_w 6.1), no power plants were damaged, although the earthquake dropped 750 MW of load, interrupting service to 325,000 customers and damaging 327 of about 2,000 distribution circuits in the area (Richter 1988, pp. 46-48).

After the October 17, 1989 Loma Prieta earthquake (M_w 6.9), service was interrupted to approximately 1.4 million customers; service was restored to all but 70,000 customers within 48 hours. In that earthquake, 1,139 MW of generation tripped off-line at Moss Landing, Hunters Point and Potrero, while approximately 4,150 MW of customer load dropped offline. The only power plant damage was the wiping of two steam turbine bearings at Moss Landing Unit 6 due to loss of electrical power to turbine lube oil pumps (PG&E 1990, p. 5).

The January 17, 1994 Northridge earthquake (M_w 6.7) left over 2.5 million customers in Southern California without power, and outages in other interconnected areas (such as 150,000 customers in rural Idaho). Power was restored to the majority of customers within 12 hours; approximately 93 percent had power within 24 hours, and virtually everyone within 72 hours. The majority of damage occurred in transmission and distribution systems. In general, power generation plants suffered little significant damage and were restored to service within a few hours to two days (Woods & Seiple, 1995).

The HBRP represents an unusually robust power plant layout. The individual Wärtsilä engine generator sets are, in effect, large blocks of steel. Each genset is mounted on springs (to attenuate vibration) on a solid concrete foundation slab, and all connections to the machine for air, coolant, lube oil and electricity are accomplished through flexible connectors. In an earthquake, it is highly unlikely that the individual machines would sustain significant damage. Staff expects that any requisite repairs could be made quickly, restoring the plant to service in short order.

The HBRP site lies in a geologically active area within Seismic Zone 4; see that portion of this document entitled **Geology and Paleontology**. The project will be designed and constructed to the latest appropriate LORS (PG&E 2006a, AFC §§ 2.6.1; Table 10.4-1; App. 10). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being 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 that portion of this document entitled **Facility Design**.

In light of the historical performance of California power plants and the electrical system in seismic events, and of the unusually robust design of the HBRP, staff believes there is no special concern with the HBRP's functional reliability affecting the electric system's reliability due to seismic events.

Tsunami

Due to its location across from the mouth of Humboldt Bay, the HBRP could be subject to inundation in the event of a tsunami. PG&E estimates that a tsunami occurring at high tide could cause water to inundate the site to a height of 28 to 43 feet, and up to 50 feet during a storm (PG&E 2006a, AFC § 8.4.1.4.4). This would surely impact the power plant. To mitigate damage to the plant and any environmental damage due to release of fluids, PG&E proposes to design the plant so that all structures and equipment are anchored to prevent flotation, collapse or lateral displacement (PG&E 2006a, AFC § 2.6.1). Staff believes this to be a reasonable approach; see that portion of this document entitled **Geology and Paleontology**. As explained above regarding earthquakes, the HBRP would represent a physically robust design. Any tsunami damage would likely be quickly repairable. Staff believes there is no special concern with the HBRP's functional reliability affecting the electric system's reliability due to tsunami.

Flooding

While the site lies within a special flood hazard area, flooding should cause no significant concern. PG&E plans to follow Humboldt County guidelines and design the HBRP to an elevation of one foot above existing site elevation; this should provide adequate protection from flooding (PG&E 2006a, AFC § 2.6.1). Staff therefore believes there are no 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 many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (<http://www.nerc.com>). NERC reports the following summary generating unit statistics for the years 2000 through 2005 (NERC 2006):

For Diesel Engine units (all MW sizes):

Equivalent Availability Factor = 94.50 percent

The engines that will be employed in the project are not new technology. Wärtsilä has been in the business of manufacturing power plants since 1834, and is widely regarded as the preeminent manufacturer of large reciprocating engines for marine and power generation duty worldwide. The 50DF series of engine and its predecessors have been on the market for many years. This technology can be regarded as fully mature.

The applicant's prediction of an annual availability factor of 90 to 97 percent (PG&E 2006a, AFC §§ 2.5.16, 2.7.1, 10.2.2) appears reasonable compared to the NERC figure for similar plants throughout North America (see above) and in light of the proposed dispatch scenario (load following and daily cycling duty). Since the plant will consist of 10 parallel engine gensets, maintenance can be scheduled during those times when the full plant output is not required to meet demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

The applicant proposes to replace the aging Humboldt Bay Power Plant (HBPP) and ensure local system reliability by providing load following and daily cycling power to the Humboldt Load Pocket (PG&E 2006a, AFC §§ 1.1, 2.0, 2.5.2, 9.3, 10.2.2). The fact that the project consists of 10 engine generator sets configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate with the nine remaining units.

The reciprocating engines to be employed in the HBRP represent a fully mature technology; they can be expected to exhibit high availability. The applicant's prediction of an equivalent availability factor of 90 to 97 percent appears achievable. Staff believes this should provide an adequate level of reliability.

AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public.

CONCLUSION

PG&E predicts an equivalent availability factor of 90 to 97 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Ajoy Guha, P. E. and Mark Hesters

SUMMARY OF CONCLUSIONS

The Humboldt Bay Repowering Project (HBRP) will replace the existing Pacific Gas & Electric (PG&E) Humboldt Bay Power Plant (HBPP) generating units 1 & 2 and Mobile Emergency Power Plant (MEPP) generating units at the HBPP site. The System Impact study (SIS) and Facilities study (FS) reveal that the interconnection of the new ten HBRP units to the existing 60 and 115 kV PG&E networks in the Humboldt area would have some adverse impacts including new overloads and exacerbating pre-project overloads on the downstream transmission facilities under 2008 contingent emergency system conditions. There would also be system performance issues caused by the HBRP with dynamic stability and low frequency reliability criteria violations during certain contingencies. The mitigation measures planned by PG&E are considered effective to offset the adverse impacts and would ensure system reliability in accordance with the North American Electric Reliability Council (NERC)/Western Electricity Coordinating Council (WECC) & California Independent System Operator (California ISO) planning standards, and are acceptable to staff.

- The proposed interconnection facilities, which include the new HBRP 15 kV switchgear, three dedicated step-up transformers with circuit breakers (CBs), two 60 kV short overhead lines to the existing HBPP 60 kV substation and one 115 kV short overhead line to existing Humboldt Bay-Humboldt 115 kV line, are adequate in accordance to good utility practices and acceptable to staff.
- Reconductoring the 1-mile Humboldt-Harris section of the Humboldt-Eureka 60 kV line is a planned PG&E transmission project based on pre-project overloads on the line, and is not a direct network upgrade requirement for interconnection of the HBRP. Therefore, the reconductoring the line is not a part of the HBRP. The Special Protection System (SPS) equipment and the PG&E 100 MVAR (see Definition of Terms) Static VAR Compensator (SVC) project will be installed within the fence line of the existing substations with no significant or unmitigated impacts.

The HBRP project, therefore, would comply with the Laws, Ordinances, Regulations and Standards (LORS) assuming implementation of the recommended Conditions of Certification. Replacing the existing 50 year old generating units at the HBPP site is necessary to meet the forecasted load demand in the remote coastal area and maintain system reliability. Staff believes that the HBRP along with the PG&E 100 MVAR SVC project would provide additional reactive power supply, better performance for dynamic stability and improved voltage in the local network.

INTRODUCTION

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conforms to all applicable laws, ordinances, regulations and standards (LORS) required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and represent the "whole of the action." In this analysis the discussion of conformance with the applicable LORS is used to identify potential impacts under CEQA.

Energy Commission staff rely on the interconnecting authority for the analysis of impacts on the transmission grid as well as the identification and approval of required new or modified facilities downstream from the proposed interconnection required as mitigation measures. The proposed HBRP would interconnect to the PG&E transmission network and requires analysis by PG&E and approval of the California ISO.

PG&E'S ROLE

PG&E is responsible for ensuring electric system reliability in the PG&E system for addition of the proposed transmission modifications. PG&E will provide the analysis and reports in their System Impact and Facilities studies, and their approval for the facilities and changes required in the PG&E system for addition of the proposed transmission modifications.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO will review the studies of the PG&E system to ensure adequacy of the proposed transmission interconnection. The California ISO will determine the reliability impacts of the proposed transmission modifications on the PG&E transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariffs, the California ISO will determine the "Need" for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. The California ISO will, therefore, review the System Impact Study (SIS) performed by PG&E and/or any third party, provide their analysis, conclusions and recommendations. In this case the California ISO issued their April 13, 2006 preliminary approval letter to PG&E. The September 14, 2006 Facilities study was also performed by PG&E to determine the scope of work and cost estimates. In accordance with the provisions of the Large Generator Interconnection Procedure (LGIP) as in the current California ISO Tariff, on completion of the Operational Study/Procedure based on the commercial operation date (COD) of the new plant, the California ISO will proceed for execution of Large Generator

Interconnection Agreement (LGIA) with the project owner. The California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings if necessary.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, “NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table” and on Section I.D, “NERC and WECC Standards for Voltage support and Reactive Power”. These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).

- North American Electric Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards for Transmission System Contingency Performance. The NERC Reliability standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
- California ISO/FERC Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “Need” for the proposed project where it will promote economic efficiency or maintain System Reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a).

EXISTING FACILITIES AND RELATED SYSTEMS

The existing PG&E HBPP is about 50 years old and nearing the end of its useful life and continued operation would require significant investment and modification. The plant’s dual-fuel (natural gas/oil-fired) steam turbine generator (STG) 52 MW Unit 1 & 53 MW Unit 2 are now connected to the HBPP 60 kV substation and two 15 MW MEPP backup & peaking units running on diesel at the HBPP site are connected to the Humboldt substation (about 5.6 miles northeast of the HBRP) via the Humboldt Bay-Humboldt 115 kV line. At present, about 100 MW of the HBPP is now connected at 60 kV transmission level and 30 MW of existing MEPP generation at 115 kV level. The following existing facilities are in the vicinity of the HBRP project:

- HBPP 60/13.8 kV substation with two 60/13.8 kV transformer banks.
- Humboldt Bay-Humboldt No.1 & No.2 60 kV lines.
- Humboldt Bay-Eureka 60 kV line.
- Humboldt Bay-Rio Dell Jet 60 kV line.

- Humboldt Bay-Humboldt No.1 115 kV line.
- Humboldt 115/60 kV substation with two 115/60 kV transformer banks.

Humboldt County is situated in a remote coastal zone. Besides two 115 kV lines to the PG&E Cottonwood 230/115 kV substation, the Humboldt area electrical network is not interconnected with any suitable high voltage bulk power (230 kV and above) tie line(s) so as to import power from outside into the locality. The mostly radial 60 and 115 kV transmission system with available local generation serves the area's electrical load demand. The area has existing low voltage supply problems. Peak demand in the area occurs in winter (192 MW in 2006) due to heating loads. The limited natural gas supply in the Humboldt Bay area is sometimes constrained. Repowering the existing generating units at the HBPP site with the proposed dual-fueled (natural gas with a diesel pilot or diesel) HBRP is, therefore, necessary to meet the forecasted load demand in the area and maintain system reliability. The HBRP qualifies as a repowering project under the Warren-Alquist Act (Public Resource Code 25550(e)).

In addition to the HBRP, PG&E has a California ISO approved planned project (T945) for installation of a 100 MVAR SVC at the Humboldt substation in replacement of the existing 20 MVAR synchronous condenser by December, 2008. This project will improve voltage support and system stability in the local network and also reduce required Must Run (RMR) generation requirements for the Humboldt area.

PROJECT DESCRIPTION

The proposed HBRP would be located within a 143-acre site at 1000 King Salmon Avenue, Eureka, Humboldt County and within the boundaries of PG&E's existing HBPP complex. The HBRP project would consist of ten 'Wartsila' 18V50DF dual-fuel (natural gas with a diesel pilot- or diesel -fired) reciprocating engine 13.8 kV generators, each with a 16.638 MW gross capacity, for a combined nominal 163 MW generation output.

On completion of the HBRP, the existing HBPP STG Units 1 & 2 will be disconnected from the 60 kV-system and retired. The two existing MEPP units will cease operation, and be disconnected from the 115 kV line and decommissioned. The new plant will provide about 98 MW power to the 60 kV network and about 65 MW power to the 115 kV network. The HBRP would normally run on natural gas and will only run on diesel in the event of natural gas curtailment or its interruption in supply to ensure local system reliability. The project's commercial operation target date is the second quarter of 2010 (PG&E 2006a, sections 1.1-1.3 and pages 1-1 to 1-10).

HBRP 15 KV SWITCHGEAR, EXISTING HBPP 60 KV SUBSTATION AND INTERCONNECTION FACILITIES

The new HBRP 15 KV metal-clad indoor switchgear, which would be housed in a new building adjacent to the existing HBPP substation, would include a 4,000-ampere 13.8 kV bus with four sections (right & left sections and two middle sections) and three 4,000-ampere 13.8 kV sectionalizing circuit breakers (CB). A first set of new three generators would be connected to the right section of the 13.8 kV bus, a second set of three new generators to the left section of the 13.8 kV bus and a third set consisting of

the other four new generators to the two middle sections of the 13.8 kV bus. Each generator would connect to their respective 13.8 kV bus section through a 1,200-ampere CB and 2-500 kcmil bus-duct 15 kV cables.

The first and second sets of generators (three generators for each set) would connect from their respective 13.8 kV bus section to the low voltage terminals of their respective dedicated generation station unit (GSU) 45/60/75 MVA, 60/13.8 kV step-up transformer through a 4,000-ampere 13.8 kV CB and 4-750 kcmil 15 kV cables. The high voltage terminals of the two 60/13.8 kV GSU transformers would be connected to the existing 3,000-ampere 60 kV double bus of the adjacent PG&E HBPP substation by using the existing two switch bays for the HBPP STG units 1 and 2. The facilities interconnecting each GSU transformer to the 60 kV substation would include 1,200-ampere disconnect switches, a 1,200-ampere 60 kV CB and a new 60 kV overhead tie line composed of 715.5 kcmil aluminum conductor on a 75-90 foot high tubular steel pole. The lengths of the two 60 kV overhead tie lines would be 82-feet and 117-feet for the first and second set of generators' interconnection respectively.

The third set of four generators would connect from the 13.8 kV bus sections to the low voltage terminals of its GSU 60/80/100 MVA, 115/13.8 kV step-up transformer through a 4,000-ampere 13.8 kV CB and 5-750 kcmil 15 kV cables. The high voltage terminals of the GSU transformer would be connected directly to the existing Humboldt Bay-Humboldt 115 kV line via a new 1,200-ampere 115 kV CB, 2,000-ampere disconnect switches and a new 115 kV 496-foot long overhead tie line with 715.5 kcmil aluminum conductor on a 50-foot high tubular steel pole.

All the new CBs (13.8 kV, 60 kV & 115 kV) will have 40 kA fault interrupting capacity. Substation improvements would include replacement of the existing 60 kV circuit breakers and disconnect switches, and replacement of the existing 115 kV line steel lattice tower with a tubular steel pole. No new transmission facilities are proposed beyond the fence line of the HBPP complex. On completion of the proposed HBRP, the existing 60 kV CBs for the HBPP units 1 & 2 and 115 kV CB of the two MEPP units would be removed from the substation along with retirement of these four old generating units.

The proposed interconnection would result in two 60 kV lines providing about 98 MW HBRP generation to the 60 kV HBPP substation and a 115 kV line providing about 65 MW HBRP generation on the 115 kV line to the Humboldt substation. PG&E would build, own and operate the 15 kV HBRP switchgear and the interconnection facilities (PG&E 2006a, sections 2.3 & 2.4, page 2-5; Section 5.2, pages 5-1 to 5-2, Figure 5.2-1; PG&E 2006c, pages DA-2 to DA-5).

The configuration of the HBRP switchgear and the interconnection facilities to the existing HBPP 60 kV substation and Humboldt Bay-Humboldt 115 kV line is in accordance with good utility practices and is acceptable to staff.

TRANSMISSION SYSTEM IMPACT ANALYSIS

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility and the control area operator are responsible for insuring grid reliability. For the HBRP, PG&E and California ISO are responsible for insuring grid reliability. In accordance with FERC/California ISO/Utility Tariffs, System Impact and Facilities Studies are conducted to determine the preferred and alternate interconnection methods to the grid, the downstream transmission system impacts and the mitigation measures needed to insure system conformance with performance levels required by utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria (California ISO 2002a and 2007a). Staff relies on the studies and any review conducted by the responsible agencies to determine the effect of the project on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards.

The System Impact and Facilities Studies analyze the grid with and without the proposed project under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies must analyze the impact of the project for the proposed first year of operation and thus are based on a forecast of loads, generation and transmission. Load forecasts are developed by the interconnected utility, which would be PG&E in this case. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), and short circuit duties.

If the studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. If the interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as part of the “whole of the action,” the Energy Commission must analyze these modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT STUDY (SIS) AND FACILITIES STUDY (FS)

The January 20, 2006 PG&E SIS was conducted with a 2008 winter peak, a 2008 summer peak and a 2008 summer off peak full loop case to reflect WECC’s transmission system, forecasted load and generation. The study included California ISO approved PG&E transmission system reliability upgrades that would be operational by winter 2008, and queue generation and transmission projects in the PG&E transmission system higher than the HBRP queue position. The 2008 base cases used in this study were developed from PG&E’s 2004 base cases using 1-in-10 year extreme weather conditions. The study included a Power Flow analysis, a Dynamic stability analysis, a Short Circuit analysis and Substation Evaluation, and a Reactive Power Deficiency analysis. The Power Flow Study was conducted before and after the addition of the HBRP with a winter peak load of 197 MW, a summer peak load of 159 MW and a

summer off peak load of 81 MW for the Humboldt area. The PG&E total system load was considered as 18,261 MW for the winter peak case, 22,745 MW for the summer peak case and 12,759 MW for the summer off peak case (PG&E 2006a, section 5.3, pages 5-11 to 5-12; Appendix 5B, SIS. PG&E 2006c, Pages DA-5 to DA-8; Attachments DA5-2 to DA5-4).

In a letter dated October 27, 2006, PG&E confirmed the validity of the submitted SIS report based on 2008 system conditions for the revised HBRP on-line date of August, 2009 (which was the projected date at that time). PG&E and the California ISO agree that the results of the study for the Humboldt area would not be affected by the one-year difference between the SIS and the on-line date. Because generation and transmission scenarios in the Humboldt area would not change significantly between 2008 and 2009, staff also considers the submitted SIS report acceptable for the HBRP interconnection (PG&E 2006c, Attachment DA5-1).

The September 14, 2006, PG&E Facilities Study (FS) reviewed the SIS, determined the scope of work and provided cost estimates for the HBRP generation tie line facilities. The FS also provided transmission line and substation evaluation, and necessary downstream reliability upgrades in the PG&E system, assuming PG&E would engineer, construct, own and maintain the interconnecting facilities, and also engineer and construct the downstream upgrades (PG&E 2008a).

POWER FLOW STUDY RESULTS AND MITIGATION

The SIS and FS demonstrate that the existing PG&E transmission facilities in the Humboldt area are inadequate to accommodate interconnection of the HBRP, since the addition of the HBRP would have some adverse impacts on the PG&E facilities. The power flow study results have been tabulated in the study report (PG&E 2006a, Appendix 5B SIS, pages 7-8; PG&E 2008a).

Based on the results of the SIS, there are no normal (N-0) overloads identified in the PG&E system due to the interconnection of the HBRP under 2008 winter peak, summer peak and summer off peak system conditions. However, under certain contingencies and 2008 winter peak and summer off peak system conditions, the study identified the following overloads and corresponding mitigation measures (PG&E 2006a, Appendix 5B SIS, pages 15-17; PG&E 2006c, page DA-7; CH2MHILL 2007c):

- **Humboldt-Trinity 115 kV line:** The addition of the HBRP would cause new overloads on this line under 2008 summer off peak system conditions for the Category B outage of the Bridgeville-Cottonwood 115 kV line and the Category C outage of the Bridgeville substation 115 kV bus.

Mitigation: Two options for mitigation of the line overloads were considered by PG&E in their SIS report, either dropping one of the HBRP generating units via a special protection system (SPS) at the Humboldt Bay and Humboldt substations or reconductoring 49-miles of the Humboldt-Trinity 115 kV line with 397 ACSR (see definition of terms). The applicant preferred the SPS mitigation option and dropping one of the HBRP generation units connected to the Humboldt Bay-Humboldt 115 kV

line. The February 22, 2007 California ISO letter subsequently concurred with the technical feasibility of using the selected SPS mitigation. Staff considers the mitigation measure acceptable.

- **Humboldt-Eureka 60 kV line:** The pre-project overloads would remain unchanged due to the addition of the HBRP for selected Category B outages under 2008 summer peak and winter peak system conditions.

Mitigation: The PG&E planned Project T958 approved by the California ISO is not a direct network upgrade requirement for the HBRP interconnection. It involves reconductoring the 1-mile Humboldt-Harris section of the 4.5-mile Humboldt-Eureka 115 kV line with a 650-ampere emergency rated higher size conductor. However, the reconductoring project would mitigate pre-project and potential post-project overloads on this line and is expected to be completed by December 2008. Staff considers the planned mitigation measure acceptable.

- **Humboldt Bay-Eureka 60 kV line:** The pre-project overload would increase marginally due to the addition of the HBRP for the Category C outage of the Humboldt substation 60 kV bus under 2008 summer peak and winter peak system conditions.

Mitigation: The mitigation measures would include the PG&E operational procedures for dropping loads and/or transferring more HBRP units from the 60 kV HBPP substation to the Humboldt Bay-Humboldt 115 kV line and turning on the proposed 100 MVAR SVC at the Humboldt substation. Staff considers the mitigation measures acceptable.

- **Humboldt substation 115/60 kV transformer banks no. 1 & 2:** The pre-project overloads would exacerbate due to the addition of the HBRP for the Category C outage of the Humboldt Bay substation 60 kV bus under 2008 winter peak system conditions.

Mitigation: The mitigation measures would include the PG&E operational procedures for dropping loads and/or transferring more HBRP units from the 60 kV HBPP substation to the Humboldt Bay-Humboldt 115 kV line and turning on the proposed 100 MVAR SVC at the Humboldt substation. Staff considers the mitigation measures acceptable.

- **Bridgeville substation 115/60 kV transformer bank no. 1:** The pre-project overload would exacerbate due to the addition of the HBRP for the Category C outage of the Humboldt substation 115 kV bus under 2008 winter peak system conditions.

Mitigation: The mitigation measures would include the PG&E operational procedures for dropping loads and/or transferring more HBRP units from the 60 kV HBPP substation to the Humboldt Bay-Humboldt 115 kV line and turning on the proposed 100 MVAR SVC at the Humboldt substation. Staff considers the mitigation measures acceptable.

SHORT CIRCUIT STUDY RESULTS AND SUBSTATION EVALUATION

The Short Circuit Study identified that fault currents at the selected substations electrically adjacent to the HBRP in the PG&E system would increase by 1 to 40

percent from the pre-project case due to the addition of the HBRP. The study is used to determine if any equipment in the selected substations would be overstressed by the addition of the HBRP.

The substation evaluation identified no overstressed breakers or other equipment due to the addition of the HBRP. Staff concurs with the evaluation (PG&E 2006a, SIS, Pages 17-18 and 21).

DYNAMIC STABILITY STUDY RESULTS AND MITIGATION

The study results indicated that there would be system performance issues caused by the addition of the HBRP. The HBRP would cause the transmission system to be unstable for the contingency of the Humboldt substation 115 kV bus or the Humboldt-Rio Dell 60 kV line. The study also determined that during the contingency of the Humboldt Bay-Humboldt # 1 60 kV line or the Humboldt Bay-Eureka 60 kV line the system frequency at about fourteen 60 kV buses in the Humboldt area including the HBPP substation would fall below 59.6 Hertz for more than 6 cycles and that would cause violation of the California ISO reliability criteria.

Mitigation: As a mitigation plan, the SIS identified the need for installation of an SPS at the Humboldt Bay and Humboldt substations for curtailing some or all of the HBRP generating units. In a letter dated February 22, 2007, California ISO approved the selected mitigation for the SPS (California ISO 2007a). However, SPS specifications would be written once the design of PG&E Project T945, a 100 MVAR SVC at the Humboldt substation, is completed, because the SVC has the potential to reduce HBRP generation curtailment or possibly eliminate the need to mitigate for dynamic problems. According to the California ISO letter the detailed scope of the SPS will be evaluated and developed during the project implementation/design and construction phase instead of during the Facility study. Staff concurs with the mitigation plan (California ISO, 2007a).

REACTIVE POWER DEFICIENCY ANALYSIS AND MITIGATION

The Power Flow studies indicate that the addition of the HBRP would cause applicable low voltage criteria violations on four 60 kV load buses in the Humboldt area under normal 2008 summer peak load conditions and on one 60 kV load bus during normal 2008 winter peak conditions. Under contingency conditions the study could not identify any low voltage violations. The post-project voltages are marginally below the 0.95 per unit voltage requirement and less than 0.2 percent.

Mitigation: Because the substations with low voltage violations are far away from the HBRP site and the low voltages are forecasted to occur without the HBRP, PG&E decided that the HBRP is not responsible for mitigation of these minor violations. However, the California ISO has approved PG&E's plan, Project T945, to replace the existing 20 MVAR synchronous condenser at the Humboldt substation with a 100 MVAR SVC at the Humboldt substation 115 kV bus by December 2008. As a result, the supply voltage will improve in the area. Staff concurs with the mitigation plan.

CALIFORNIA ISO REVIEW

Based on the results of the PG&E SIS, the California ISO issued their April 13, 2006 preliminary approval letter to interconnect the HBRP to the PG&E system in replacement of the existing PG&E generating units at the HBPP site. The Cali-ISO February 22, 2007 letter confirmed the technical feasibility of installing an SPS for dropping required HBRP generation as a mitigation plan to resolve the identified dynamic stability and low frequency criteria violations and overloads on the Humboldt-Trinity 115 kV line. The September 14, 2006 Facilities study was performed by PG&E to determine scope of the work and cost estimates. On satisfactory completion of the Operational Procedure study based on current COD, the California ISO would proceed for execution of a LGIA with the project owner. The LGIA would comply with LORS, and therefore, would ensure system reliability for interconnection of the HBRP to the California ISO grid and as such compliance with WECC/NERC and California ISO Planning standards (California ISO 2006a, 2007b; PG&E 2006a & 2008a).

DOWNSTREAM FACILITIES

Besides the interconnection facilities which would include the new HBRP 15 kV switchgear, three GSU transformers, two 60 kV CBs and one 115 kV CB, two 60 kV and one 115 kV short overhead tie lines, accommodating the power output of the HBRP would not require any other new downstream transmission lines. Reconductoring the 1-mile Humboldt-Harris section of the 4.5-mile Humboldt-Eureka 60 kV line is a planned transmission project of PG&E according to their annual plan based on pre-project overloads and is not a direct network upgrade requirement for interconnection of the HBRP. The SPS protection equipment for mitigating dynamic performance and overload violations will be installed at the Humboldt and Humboldt Bay substations. The PG&E planned project for a 100 MVAR SVC in replacement of the existing 20 MVAR synchronous condenser would be installed at the Humboldt substation.

CUMULATIVE IMPACTS

Depending on the amounts of generation and loads in the Humboldt area, staff believes that the addition of the proposed HBRP may have some cumulative adverse impacts on the PG&E local radial subtransmission system. The cumulative impacts due to the HBRP, as identified in the SIS, will be mitigated. Staff also believes that the HBRP along with the PG&E 100 MVAR SVC project will have some positive impacts such as meeting the load demand of the Humboldt area and maintaining system reliability, providing additional reactive power, better performance for dynamic stability and voltage support in the local network.

ALTERNATIVE INTERCONNECTIONS AND TRANSMISSION ROUTES

For interconnection of the HBRP's ten new generating units, alternate interconnection options of all ten units to the 60 kV Humboldt Bay substation or to the 115 kV Humboldt substation were considered in the SIS. But system analyses determined that since these interconnection options would have substantial downstream adverse impacts in the local network, the preferred interconnection of the HBRP is with six units to the

existing 60 kV network and the other four units to the existing 115 kV network. This is acceptable to staff according to reliability planning standards.

Since the HBRP will replace and repower the existing HBPP units and MEPP units, the preferred feasible and shortest routes for the new two 60 kV and one 115 kV short interconnecting tie lines to be built within the HBPP substation area were considered preferable to the applicant. This is acceptable to staff. (HBRP 2006a, Section 5.1, Page 5-1 to 5-2 and Section 5.3, Pages 5-6 to 5-8)

CONFORMANCE WITH LORS AND CEQA REVIEW

In this analysis the discussion of conformance with applicable LORS is used to identify potential impacts under CEQA. The SIS and FS demonstrate that there would be some adverse impacts in the PG&E local system for the addition of the HBRP in replacement of the existing HBRP and MEPP generating units. But the appropriate mitigation measures as planned would eliminate the adverse impacts. The interconnection, therefore, would conform to the NERC/WECC and California ISO planning standards, and PG&E reliability criteria.

The proposed new interconnecting facilities including the HBRP 15 kV switchgear, three GSU transformers and circuit breakers, and two 60 kV and one 115 kV short overhead lines would be built according to the NESC standards and GO-95 Rules. The new facilities would be in accordance with good utility practices, would conform to engineering LORS and are acceptable to staff.

The new interconnection facilities, which would be located within the fence line of the existing PG&E HBPP site, would have no significant or unmitigated environmental impacts. Reconductoring the 1-mile Humboldt-Harris section of the Humboldt-Eureka 60 kV line is a planned PG&E transmission project according to their annual plan based on pre-project overloads, not a network upgrade requirement for interconnection of the HBRP. The reconductoring project is therefore not being analyzed as part of the proposed project. The SPS protection equipment for mitigating dynamic performance and overload violations will be installed within the fence line of the Humboldt and Humboldt Bay substations with no or minimal environmental impacts. The PG&E planned project for a 100 MVAR SVC in replacement of the existing 20 MVAR synchronous condenser would be installed within the fence line of the Humboldt substation with no significant or unmitigated impacts.

The HBRP would, therefore, conform to the applicable LORs upon satisfactory compliance of the recommended Conditions of Certifications.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE discipline have been received.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The proposed interconnecting facilities, including the new HBRP 15 kV switchgear, three GSU transformers, two 60 kV CBs and one 115 kV CB, and two 60 kV short overhead lines to the existing HBPP 60 kV substation and one 115 kV short overhead tie line to the existing Humboldt Bay-Humboldt 115 kV line, are adequate in accordance with good utility practices and acceptable to staff according to engineering LORS.
2. The SIS and FS demonstrate that the existing PG&E Humboldt area transmission facilities are inadequate to accommodate interconnection of the HBRP in replacement of the existing HBPP units 1 & 2 and two MEPP units. The adverse impacts include new overloads and exacerbated pre-project overloads on downstream facilities under 2008 contingent emergency system conditions. In addition, system performance issues have been identified for dynamic stability and low frequency reliability criteria violations during certain contingencies. The mitigation measures planned by PG&E and approved by the California ISO include a plan for installation of an SPS and curtailing HBRP generation to offset dynamic violations and new overloads on the Humboldt-Trinity 115 kV line. In order to eliminate the pre and post-project overloads, the mitigation measures include reconductoring the 1-mile Humboldt-Harris section of the Humboldt-Eureka 60 kV line and using the PG&E operational procedures for dropping loads and/or transferring one or more HBRP units from the 60 kV HBPP substation to Humboldt Bay-Humboldt 115 kV line. The mitigation measures are considered effective in eliminating the adverse impacts of the project and ensuring system reliability, and are acceptable to staff. The interconnection of the HBRP, therefore, would comply with the WECC/NERC & California ISO planning standards and PG&E reliability criteria.
3. Reconductoring the 1-mile Humboldt-Harris section of the Humboldt-Eureka 60 kV line is a planned PG&E transmission project based on pre-project overloads on the line, not a direct network upgrade requirement for interconnection of the HBRP. The SPS protection equipment and the PG&E 100 MVAR SVC project will be installed within the fence line of the existing substations with no significant or unmitigated environmental impacts.
4. Based on the results of the SIS, the California ISO has issued their April 13, 2006 preliminary approval letter for interconnection of the HBRP to the PG&E system in replacement of the existing PG&E generating units at the HBPP site. The September 14, 2006 Facilities study was performed by PG&E to determine scope of the work and cost estimates. On satisfactory completion of the Operational Procedure study based on current COD, the California ISO would proceed for execution of a LGIA with the project. The LGIA would comply with LORS, and therefore, would ensure system reliability for interconnection of the HBRP to the California ISO grid and as such compliance with WECC/NERC and California ISO Planning standards.

5. The HBRP would, therefore, conform to the applicable LORS upon satisfactory compliance of the recommended Conditions of Certifications.
6. The existing PG&E Humboldt Bay Power Plant (HBPP) is about 50 years old and nearing the end of its useful life and continued operation would require significant investment and modification. The existing 60 kV and 115 kV local radial transmission system without any suitable bulk power (230 kV and above) tie line(s) and available local generation serve the electrical load demand of the remote Humboldt Bay area. Replacing and repowering the existing old local generating units at the HBPP site is, therefore, necessary to meet the forecasted load demand in the area and maintain system reliability. Staff believes that the HBRP along with the PG&E 100 MVAR SVC project will also provide additional reactive power supply, better performance for dynamic stability and improved voltage in the local network.

RECOMMENDATIONS

If the Commission approves the project, staff recommends the following Conditions of Certification to ensure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATIONS FOR TSE

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Table 1: Major Equipment List
Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action. (1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- A. receipt or delay of major electrical equipment;
- B. testing or energization of major electrical equipment; and
- C. the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

- TSE-5** The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations to the CBO as determined by the CBO.
- A. The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, California ISO standards, National Electric Code (NEC) and related industry standards.
 - B. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to accommodate full output from the project and to comply with a short-circuit analysis.
 - C. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner’s standards.
 - D. The project conductors shall be sized to accommodate the full output from the project.
 - E. Termination facilities shall comply with applicable PG&E interconnection standards.
 - F. The project owner shall provide to the CPM the following except that the project owner may request that the California ISO provide item iii below:
 - 1. The Special Protection System (SPS) sequencing and timing if applicable,
 - 2. A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable,
 - 3. The Operational Procedure/study report based on 2010/current Commercial Operation Date (COD) system conditions (including operational mitigation measures) from the California ISO and/or PG&E.
 - 4. The executed project owner and California ISO Large Generator Interconnection Agreement.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

1. Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, NEC, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.
2. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on “worst case conditions”¹ and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, “High Voltage Electric Safety Orders”, NEC, applicable interconnection standards, and related industry standards.
3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** a) through f) above.
4. The Special Protection Scheme (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.
5. A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable.
6. The Operational Procedure/study report based on 2009/current COD system conditions (including operational mitigation measures) from the California ISO and/or PG&E, or a letter attesting that PG&E has requested that the California ISO provide the study directly to the CPM.
7. The executed project owner and California ISO Large Generator Interconnection Agreement.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes that may not conform to requirements **TSE-5** a) through f), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

Verification: At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes that` may

¹ Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

not conform to requirements of **TSE-5** and request approval to implement such changes.

TSE-7 The project owner shall provide the following Notice to the California ISO prior to synchronizing the facility with the California Transmission system:

- A. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and
- B. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-8 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

1. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.
2. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

3. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

REFERENCES

- California ISO (California Independent System Operator) 1998a. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.
- California ISO (California Independent System Operator) 1998b. California ISO Dispatch Protocol posted April 1998.
- California ISO (California Independent System Operator) 2002a. California ISO Planning Standards, February 7, 2002.
- California ISO (California Independent System Operator) 2006a. California ISO preliminary approval letter dated April 13, 2006 for interconnection of the HBRP. Received 11-3-06 with Data Adequacy supplement dated 11-1-06.
- California ISO (California Independent System Operator) 2007a. California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March, 2007.
- California ISO (California Independent System Operator) 2007b. California ISO letter of February 22, 2007 for confirmation of installing SPS as mitigation. Received 3-9-07 with PG&E Data response to CEC Data Requests 84-85.
- CEC (California Energy Commission) 2006b. Staff's Data Requests 1-57 dated 12-8-06.
- CEC (California Energy Commission) 2006c. Staff's Data Requests 58-78 dated 1-11-07.
- CEC (California Energy Commission) 2007a. Staff's Data Requests 79-85 dated 2-28-07.
- CH2MHILL 2007a. Applicant's response to CEC staff's Data Requests 1-57. Received 1-12-07.
- CH2MHILL 2007c. Applicant's response to CEC staff's Data Requests 58-78 and Feb 1, 2007 workshop queries 1-22. Received 2-13-07.
- PG&E 2006a. HBRP Application for Certification vol1 & 2. Submitted to the California Energy Commission on September 29, 2006. Appendix 5B for System Impact Study.
- PG&E 2006c. Data Adequacy Supplement dated 11-01-06. Submitted to the California Energy Commission on 11-03-2006.

PG&E 2006d. Large maps of Electrical system one line diagrams. Submitted to the California Energy Commission on 11-3-2006.

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DEFINITION OF TERMS

ACSR

Aluminum cable steel reinforced.

AAC

All Aluminum conductor.

Ampacity

Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere

The unit of current flowing in a conductor.

Kiloampere

(kA) 1,000 Amperes

Bundled

Two wires, 18 inches apart.

Bus

Conductors that serve as a common connection for two or more circuits.

Conductor

The part of the transmission line (the wire) that carries the current.

Congestion Management

Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) would not violate criteria.

Emergency Overload

See Single Contingency. This is also called an L-1.

Hertz

The unit for System Frequency.

Kcmil or KCM

Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.

Kilovolt (kV)

A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts.

Loop

An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

MVAR or Megavars

Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)

A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW)

A unit of power equivalent to 1,341 horsepower.

Normal Operation/ Normal Overload

When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition

See Single Contingency.

Outlet

Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis

A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power

Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action Scheme (RAS)

A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SSAC

Steel Supported Aluminum Conductor.

SF6

Sulfur hexafluoride is an insulating medium.

Single Contingency

Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable

Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

SVC

Static VAR Compensator: An equipment made of Capacitors and Reactors with electronic controls for producing and controlling Reactive Power in the Power System.

Switchyard

A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating

See ampacity.

TSE

Transmission System Engineering.

TRV

Transient Recovery Voltage

Tap

A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing

A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild

A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

VAR

Voltage Ampere Reactive, a measure for Reactive power in the power system.

ALTERNATIVES

Testimony of John Kessler

SUMMARY OF CONCLUSIONS

In the analysis of the Humboldt Bay Repowering Project (HBRP), staff examined additional post-combustion emission controls, alternative fuels, alternative energy producing technologies, and eight alternative project sites. Lacking a significant environmental impact associated with the proposed project, these alternatives would not result in an environmentally superior project. Further, the addition of more post-combustion emission controls to those already proposed are not necessary because the proposed project would not result in a significant environmental impact and would conform to air quality rules and standards.

Staff explored developing natural gas or liquefied natural gas storage that could be used in lieu of backup diesel fuel. While staff believes this is technically feasible, these options are not necessary to lessen a significant environmental impact.

Renewable energy producing technologies such as wind and solar cannot provide full-time availability due to the natural intermittent availability of wind and the sun. While HBRP would provide the flexibility to reduce its generation to accommodate wind and solar power generation when it is available, these renewable resources alone would not meet the project objectives of providing a load-following and daily cycling facility to meet electric generation load and reliability requirements in PG&E's Humboldt Service Area. In essence, power from the HBRP is needed to complement the power produced from other local generation sources and imported into the region via the 115-kV transmission system, to rapidly respond to changes in local load and to pickup load should other local generation resources or the transmission be lost. Other modern natural gas-fueled generation technologies were also evaluated including conventional combined cycle and simple cycle combustion turbines (similar to the existing Mobile Emergency Power Plants at Humboldt Bay Power Plant). However, neither of these options were found to be an environmentally superior project.

Of the eight alternative project sites analyzed, they are all appropriately zoned sites and are not located near sensitive receptors or sensitive environmental resources. However, none of the sites are located as favorably near to electrical transmission and natural gas infrastructure as is the HBRP at the existing Humboldt Bay Power Plant (HBPP) site. While all of these alternative sites are served by 60-kV transmission, the existing service is not designed for loads that would be required to export power from the HBRP. Each of the alternative sites considered is located more than 13 miles from the nearest 115-kV transmission line, and would require several miles of new right-of-way, much of it in the Coastal Zone. Construction of a new 115-kV transmission line to serve any of these alternative sites would be costly and there would be potential environmental impacts including loss of wetlands and endangered species habitat, as well as visual resources impacts.

Staff also believes that the “No Project Alternative” is not superior to the proposed project. The No Project scenario would likely delay development of reliable electrical resources required for the region and could impact electrical supply reliability throughout California.

INTRODUCTION

The purpose of staff’s alternatives analysis is to consider whether there are alternatives that could feasibly attain most of the basic objectives of the proposed HBRP and avoid or substantially lessen one or more of the significant effects of the proposed project. If the California Energy Commission (Energy Commission) determines that the proposed project will result in significant adverse impacts and identifies an alternative that meets these criteria, it cannot license the proposed project unless it finds that the benefits of the proposed project outweigh the impacts and that the alternative is infeasible. However, the Energy Commission does not have the authority to approve alternative configurations, require alternative technology designs, or require the applicant to move the proposed project to another location. If the applicant moves its proposed project to one of the alternative sites, Energy Commission staff will analyze any new proposed project site to the same level of detail as the original proposed project site.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Pacific Gas & Electric (PG&E) proposes to replace its existing Humboldt Bay Power Plant (HBPP) Units 1 and 2 and its Mobile Emergency Power Plants (MEPPs). The proposed project falls under the jurisdiction of the California Coastal Commission (Coastal Commission) and thus, is subject to both the Energy Commission’s and Coastal Commission’s laws, ordinances, regulations, and standards (LORS) as specified under the Warren-Alquist Act and the California Coastal Act (Coastal Act). The Energy Commission is the Lead Agency under the California Environmental Quality Act (CEQA).

CEQA

Energy Commission staff is required by agency regulations to examine the “feasibility of available site and facility alternatives to the applicant’s proposal which substantially lessen the significant adverse impacts of the proposal on the environment” (Cal. Code Regs., tit. 20, §1765).

The “Guidelines for Implementation of the California Environmental Quality Act,” Title 14, California Code of Regulations Section 15126.6(a), requires an evaluation of the comparative merits of “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.”

In addition, the analysis must address the No Project Alternative (Cal. Code Regs., tit. 14, §15126.6[e]). The analysis should identify and compare the impacts of the various alternatives, but analysis of alternatives need not be in as much detail as the analysis of the proposed project.

The range of alternatives is governed by the “rule of reason,” which requires consideration only of those alternatives necessary to permit informed decision making and public participation. CEQA states that an environmental document does not have to consider an alternative if its effect cannot be reasonably ascertained and if its implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6[f][3]). However, if the range of alternatives is defined too narrowly, the analysis may be inadequate (City of Santee v. County of San Diego [4th District, 1989] 214 Cal. App. 3d 1438).

WARREN-ALQUIST ACT

The Warren–Alquist Act provides clarification as to when it may not be reasonable to require an applicant to analyze alternative sites for a project. An alternative site analysis is not required as part of an AFC when a natural gas-fired thermal power plant is (1) proposed for development at an existing industrial site, and (2) “the project has a strong relationship to the existing industrial site and therefore it is reasonable not to analyze alternative sites for the project (Public Resources Code 25540.6 [b]).” The HBRP meets these criteria to be considered a repowering project. The existing HBPP site is zoned industrial and has been used to generate power since the 1950s. The HBRP is intended to replace the power currently being produced by the HBPP, which will be decommissioned as soon as the HBRP is commercially operational. Additionally, the site will be used for storage of spent fuel rods at the Independent Spent Fuel Storage Installation Project for an indefinite period into the future. The HBRP can also be considered to have a strong relationship to the existing site considering it will utilize virtually all the existing infrastructure including transmission, natural gas, water, and sanitary sewer systems.

CALIFORNIA COASTAL ACT

The Coastal Act provides guidance for siting a thermal electric generating plant within a coastal zone, stating “new or expanded thermal electric generating plants may be constructed in the coastal zone if the proposed coastal site has been determined by the State Energy Resources Conservation and Development Commission (Energy Commission) to have greater relative merit pursuant to the provisions of Section 25516.1 (Public Resources Code, Div. 15), than available alternative sites and related facilities for an applicant’s service area which have been determined to be acceptable ...” (Public Resources Code, §30264).

In addition, the Coastal Act specifies with regard to location, “Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division (Division 20 – California Coastal Act). However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section ... if 1) alternative locations are infeasible or more environmentally damaging; 2) to do otherwise would adversely affect the public welfare; and 3) adverse environmental effects are mitigated to the maximum extent feasible (Public Resources Code, §30260).

With regard to wetlands, the Coastal Act states, “The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with

other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: 1) new or expanded port, energy, and coastal-dependent industrial facilities..." (Public Resources Code, §30233).

APPROACH

This alternatives analysis uses the following approach, based on guidance in the CEQA Deskbook (Bass et al. 1999, p. 108):

1. Describe the project objectives;
2. Assess the proposed project's significant environmental effects;
3. Develop screening criteria for feasibility of alternatives;
4. Consider a broad range of alternatives, including the No Project Alternative, and select a reasonable range of alternatives that:
 - a. Meet some or all of the project objectives;
 - b. May be located on alternative sites;
 - c. Substantially avoid or lessen one or more of the potential significant effects of the project; and
 - d. Are feasible based on specific economic, social, legal, or technical considerations.
5. Explain why other alternatives have been rejected from evaluation;
6. Provide meaningful evaluation and analysis of environmental impacts of the reasonable range of alternatives and the No Project Alternative in comparison with environmental effects of the proposed project; and
7. Identify the environmentally superior alternative.

PROJECT OBJECTIVES

Based on analysis of the HBRP Application for Certification (AFC), the Energy Commission staff has determined the proposed project's objectives as:

1. Replacing the existing Humboldt Bay Power Plant Units 1 and 2, which are about 50 years old and nearing the end of their useful lives, and the two MEPPs, with a more efficient generation technology;
2. Locating the proposed project near an existing substation and/or key interconnections to both the existing 60-kilovolt (kV) and 115-kV transmission lines and infrastructure for natural gas, water supply, and wastewater disposal;

3. Providing a reliable load-following and daily cycling source of generation within the Humboldt Load Pocket (greater Humboldt County area), where imported power is normally constrained to supply only about half of the existing 196-MW peak load; and
4. Maintaining capability for rapid-response loading of the proposed project in order to maintain service during transmission interruptions and natural gas curtailments.

SUMMARY DESCRIPTION OF PROPOSED PROJECT

The proposed HBRP site is located at 1000 King Salmon Avenue, approximately 3 miles south of the City of Eureka in an unincorporated area of Humboldt County. It would be located on 5.4 acres within a 143-acre parcel currently occupied by the existing (PG&E) HBPP. The proposed project site is zoned Coastal-Dependent Industrial and is within the jurisdiction of the California Coastal Commission. The Coastal Commission relies upon the policies of Humboldt County's local coastal program general plan and zoning ordinance as guidance for issuing its coastal development permits, as does the Energy Commission for LORS determination.

The HBRP site currently contains industrial land, wetlands, Buhne Slough, and cooling water intake and discharge canals associated with the existing HBPP. The proposed project site is bounded on the north by Humboldt Bay, on the west by the King Salmon community, on the east by the Northwestern Pacific Railroad tracks, and on the south by King Salmon Avenue. East of the railroad property are United States Highway 101 (US-101), some rural parcels, and commercial development. South of King Salmon Avenue are wetland areas and the Humboldt Hill residential development. Southwest of Humboldt Hill is the community of Fields Landing. West of the King Salmon community are Humboldt Bay, a sand spit known as South Spit, and beyond the spit, the Pacific Ocean. Within a 1-mile radius of the proposed project is the South Bay Elementary School (approximately 0.35 miles south) and a senior home, the Sun Bridge Seaview Care Center (approximately 0.5 miles east) (HBRP 2006a, pp. 8.6-1 & 8.6-2).

A shoreline trail maintained by PG&E and the Humboldt Bay Harbor Recreation and Conservation District runs along the shoreline on the perimeter of the HBPP property to the northwest. This portion of the trail extends from the King Salmon community south to the wetlands along the bay. This trail represents part of a planned coastal trail system that the California Coastal Conservancy envisions would eventually extend from Oregon to Mexico (HBRP 2006a, p. 8.13-6).

In order to construct the HBRP, it would be necessary to remove several structures associated with the existing Humboldt Bay Power Plant including the painting and sandblasting building, two storage sheds, one 115-kV transmission tower, diesel fuel tanks, and related underground piping and infrastructure (HBRP 2006a, p. 2-1). The HBRP would consist of 10 natural gas-fired Wärtsilä 18V50DF 16.3-megawatt (MW) reciprocating engine-generator sets and associated equipment with a combined nominal generating capacity of 163 MW. Auxiliary equipment would include inlet air filters, gas exhaust silencer stacks, air radiator cooling array, generator step-up and auxiliary transformers, and emergency diesel fuel storage tanks.

The HBRP would be connected to PG&E's existing HBPP switchyard via 13.8-kV cables and bus work from the generator circuit breakers to new step-up transformers and then via two 60-kV tie lines and one 115-kV tie line into the switchyard. Natural gas would be supplied to the HBRP via an on-site, 10-inch diameter, high-pressure, natural gas pipeline owned and operated by PG&E. Raw water for industrial processes and site landscape irrigation would be supplied from PG&E's existing ground water well via a direct connection to an on-site, 6-inch-diameter water pipeline. Potable water would be supplied from a new 4- to 6-inch-diameter on-site pipeline running 1,200 feet to a connection with the existing Humboldt Community Services District (HCSD) line that runs along King Salmon Avenue (HBRP 2006a, pp. 2-20 & 7-1). Both process and sanitary wastewater would be conveyed to HBPP's existing 4-inch diameter wastewater pipeline, which already interconnects to the HCSD sewer system.

If approved by the Energy Commission, PG&E proposes to initiate construction of the HBRP in Fall 2008. The proposed project is expected to take about 18 months for construction and startup testing and could begin commercial operation as early as the second quarter of 2010 if there are no delays.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS AND AREAS OF IDENTIFIED PUBLIC CONCERN

Staff has concluded that HBRP would not result in any unmitigated significant adverse environmental impact. Staff believes that the public's (as well as staff's) concern for a potential cancer risk associated with the use of diesel as a backup fuel to natural gas has been alleviated by the project modifications proposed by PG&E and the operational constraints contained in staff's proposed Condition of Certification **Public Health-1**. These conclusions are more fully discussed in the Public Health and Air Quality sections of the Final Staff Assessment (FSA).

IDENTIFICATION AND SCREENING OF ALTERNATIVES

Staff used a two-stage process to select alternatives for analysis. First, staff identified a reasonable range of alternatives. Next, staff screened these alternatives to select those that qualified for detailed evaluation. Staff considered alternatives to the proposed project that were identified by several sources, including the applicant, previous environmental documents, and Energy Commission staff.

The following sections first describe alternatives suggested by the applicant. Staff found no additional alternative sites that fully met the proposed project objectives. This FSA presents analysis of eight site alternatives and the No Project alternative.

POST-COMBUSTION EMISSION CONTROLS

The HBRP as currently proposed would include two post-combustion emission controls. The first consists of selective catalytic reduction (SCR), which reduces oxides of nitrogen (NO_x) emissions by injection of aqueous ammonia into the exhaust gas and then utilizes a catalyzing process to convert NO_x into nitrogen and water. The second proposed control would consist of an oxidation catalyst, which reduces carbon monoxide (CO) and hydrocarbon emissions. The proposed emission controls have only

a limited effect in reducing diesel particulate matter (PM), which is the primary constituent contributing to the project's cancer risk. U.S. EPA has indicated to the applicant that the proposed oxidation catalyst may be considered to provide an additional benefit of reducing diesel particulate matter (PM) by 30% on average (SR 2007h). Therefore, the 30% reduction of diesel PM as a result of the oxidation catalyst has been included by applicant and staff in our respective analyses of air quality and public health impacts.

Staff has explored additional emission controls. For smaller scale engines, a diesel particulate filter (DPF) has been effective at reducing diesel PM. However, for engines of a size such as proposed for HBRP, staff has not yet found any applications of DPF as a Best Available Control Technology. Staff has also observed in literature available from Wartsila's website that they are utilizing an electrostatic precipitator (ESP) for particulate removal in a 150 MW diesel engine power plant, after conducting extensive testing from 1999 to 2001 of the control technology. While these emission controls could potentially reduce diesel PM if control systems were available for the size of engine proposed for HBRP, the addition of more post-combustion emission controls to those already proposed is not necessary because the proposed project would not result in a significant environmental impact and would conform to air quality rules and standards.

ALTERNATIVE FUELS

One of the criteria for considering proposals under PG&E's Long-term Request for Offers process was that the project needed to provide on-site storage of alternative fuel that could support operation of the HBRP at capacity for a minimum of 4 days. The HBRP would be subject to natural gas curtailments under PG&E's California Public Utilities Commission (CPUC) Gas Tariff Rule 14 that reserves gas supply to PG&E's core customers when supply is limited (CH2MHill 2006, AFC Section 2.7.3). Staff understands that if curtailments or interruptions in natural gas supply were to occur for longer than 4 days, then the project would rely on fuel being transported by truck as long as necessary to maintain HBRP's power production requirements. If natural gas were to be stored on-site, liquefied natural gas (LNG) would be the most space efficient as it only requires about 1/600th of the volume of compressed natural gas. LNG is stored near atmospheric pressure, but is maintained below -83°C to remain in a liquid state. The transformation from gas to liquid requires cooling to about -160 degrees. LNG is transported in specially designed cryogenic road tankers, and is normally stored in either a membrane (prismatic), spherical or self-supporting prismatic type tank. Above-ground tanks are usually double-wall with extremely efficient insulation between the walls.

If natural gas supplied to HBRP were converted to LNG on site, the project would need an LNG train for gas liquefaction. Use of LNG can result in an increase of energy use due to the energy required to liquefy and transport. However, staff does not expect the incremental increase in energy use would be significant because LNG could serve as primarily the backup fuel supply, and would thus minimize energy required to maintain LNG on site. LNG is not explosive in a liquid state. For an explosion to occur, LNG must first vaporize, mix with air in the proper proportions, and then be ignited.

Staff has only conceptually examined the existing HBPP site to consider possible locations for storage of natural gas or an alternative fuel should this alternative have merit. In addition to the current fuel storage designated locations for the proposed HBRP, there is also potential that space would be available at either the proposed staging area north of the HBRP footprint or where one of two 2.7 million gallon fuel oil tanks is planned for removal. As for offsite storage of natural gas that may be available for trucking to HBRP during gas curtailments, PG&E has indicated that natural gas would be delivered through an existing 10-inch-diameter pipeline that connects to PG&E's backbone transmission line 145 miles away. Natural gas from PG&E's Tomkins Hill wells would also be used by the project (PG&E 2006a, Section 6.0).

Considering the natural gas supply limitation is a function of pipeline capacity when demands are greatest, it may be possible to maintain supply of natural gas to HBRP via truck transportation from the Tomkins Hill well field which is located approximately 8 to 10 miles south of the project, immediately east of U.S. Highway 101 near the intersection of Highway 211. Staff believes that it is feasible to store natural gas on-site and to truck natural gas from the Tomkins Hill well field during natural gas curtailments or interruptions exceeding 4 days. PG&E has estimated that natural gas supply via truck would require up to 27 trips per day (based on 106 trips for 4 days) if transported as LNG and HBRP was operating at full capacity (PG&E 2007b). However, lacking a significant environmental impact, staff does not believe it is necessary to look further at developing natural gas or LNG storage to be used in lieu of backup diesel fuel.

CONSIDERATION OF ALTERNATIVE TECHNOLOGIES

Generation Technologies Eliminated from Detailed Consideration

This FSA also describes alternative technologies that were eliminated from detailed consideration and presents an explanation of why these alternatives were not analyzed. The discussion of these alternative technologies that have been eliminated from further consideration can be found in Appendix A to this section and are listed as follows.

- Conventional Boiler and Steam Turbine;
- Kalina Combined-Cycle;
- Advanced Combustion Turbine Engines;
- Conservation and Demand-Side Management;
- Oil/Natural Gas/Coal;
- Nuclear;
- Geothermal;
- Hydroelectric;
- Biomass;
- Solar; and
- Wind.

Generation Technologies Considered in More Detail

Conventional Combined Cycle

This technology integrates combustion turbine-generators (CTGs) and steam turbine-generators (STGs) to achieve higher thermal efficiencies on the order of 45%. The hot exhaust from the combustion turbine is sent through a heat recovery steam generator (HRSG) to create steam, which is used to drive a STG. Although this technology is able to achieve high thermal efficiencies during optimal conditions and loads, it does not necessarily maintain as high an efficiency across its capacity range as would the reciprocating engine-generator units. Combined cycle technology can also have significant demands for cooling water associated with steam condensation and inlet air cooling to the combustion turbines, if the project is not configured with dry cooling.

One of the proposals received in PG&E's Long-Term Request for Offer was for a combined-cycle project using three LM6000 CTGs, with two of the CTGs configured with HRSGs, and a 26 MW STG for a total capacity of 158 MW. The combined cycle proposal would be located at the existing HBPP site, and would have similar infrastructure needs as HBRP for some elements including transmission and potable water supply. Natural gas supply would be similar to HBRP utilizing the existing supply pipeline, except for the need to compress the natural gas at the site. Process water supply for the combined cycle alternative, primarily to serve cooling needs, was proposed assuming use of reclaimed wastewater from the Eureka wastewater treatment plant located 2 miles north of HBPP, and requiring a new pipeline that would run along the Pacific Northern railroad tracks. The new reclaimed water pipeline could cause more disturbance to wetlands and coastal lands than would be affected by the HBRP. Assuming the combined cycle plant would use an evaporative (wet) cooling process, the combined cycle alternative would also create a visible plume and generate a higher volume of wastewater for treatment and/or disposal. The combined cycle alternative met PG&E's criterion for rapid-response loading and for having capability of using liquid fuel as a backup to natural gas.

PG groups, concluded that the combined cycle alternative was less desirable than the proposed HBRP using reciprocating engine-generators primarily because of the environmental sensitivities of the reclaimed water supply pipeline (PG&E 2006a – Section 9.2 and CH2MHILL 2007c – DR 58). Staff notes that the environmental issues associated with the reclaimed water supply pipeline could be eliminated if the combined cycle technology were configured with an air-cooled condenser (ACC or dry cooling) assuming: a) there was adequate space for the cooling tower; b) ACC did not cause a significant visual or noise impact; and c) that the combined cycle alternative would still be economically viable. Staff believes combined cycled technology is technically feasible at the HBRP site, and could be used with only natural gas fuel if sufficient natural gas were stored on-site. While staff believes the combined cycle alternative would meet the Project Objectives as listed previously in this Alternatives section, lacking a significant environmental impact, an alternative generation technology is not necessary to lessen an impact.

Simple Cycle Combustion Turbine

This technology would utilize combustion turbine-generators (CTGs) likely arranged in a group of three units to meet the capacity needs of the HBRP. Simple cycle technology which ranges in efficiency during optimal conditions from about 37 – 40%, would not achieve as high a thermal efficiency as would the proposed HBRP at 47% or as compared to combined cycle which would be on the order of 45% efficient. The simple cycle technology would not maintain as high an efficiency across its capacity range as would the reciprocating engine-generator units. Simple cycle technology can also have demand for cooling water associated with inlet air cooling to the combustion turbines, if the project is not configured with dry cooling.

Two of the proposals received in PG&E's Long-Term Request for Offer were for simple cycle projects using three LM6000 CTGs for a total capacity of 147 MW. The simple cycle proposals would be sited at the existing HBPP site, and would have similar infrastructure needs as HBRP for some elements including transmission and potable water supply. Natural gas supply would be similar to HBRP utilizing the existing supply pipeline, except for the need to compress the natural gas at the site. Process water supply for the simple cycle alternative, primarily to serve inlet air cooling needs, was proposed in both cases assuming use of reclaimed wastewater from the Eureka wastewater treatment plant located 2 miles north of HBPP, and requiring a new pipeline that would run along the Pacific Northern railroad tracks. The new reclaimed water pipeline could cause more disturbance to wetlands and coastal lands than would be affected by the HBRP. Assuming the simple cycle plant would use an evaporative (wet) cooling process, the simple cycle alternative would also create a visible plume and generate a higher volume of wastewater for treatment and/or disposal. The simple cycle alternative met PG&E's criterion for rapid-response loading and for having capability of using liquid fuel as a backup to natural gas.

PG&E's evaluation, as confirmed by the CPUC and its Procurement Review Group made-up of varied stakeholders including ratepayer advocacy groups, concluded that the simple cycle alternative was less desirable than the proposed HBRP using reciprocating engine-generators primarily because of the environmental sensitivities of the reclaimed water supply pipeline (PG&E 2006a – Section 9.2 and CH2MHILL 2007c – DR 58). Staff notes that the environmental issues associated with the reclaimed water supply pipeline could be eliminated, if like the combined cycle technology, the simple cycle technology were configured with an air-cooled condenser (ACC or dry cooling) assuming: a) there was adequate space for the cooling tower; b) ACC did not cause a visual impact; and c) that the simple cycle alternative would still be economically viable. Staff believes simple cycle technology is technically feasible at the HBRP site and could be used with only natural gas fuel if sufficient natural gas were stored on-site,. While staff believes the simple cycle alternative would appear to meet the Project Objectives as listed previously in this Alternatives section, lacking a significant environmental impact, an alternative generation technology is not necessary to lessen an impact.

CONSIDERATION OF ALTERNATIVE SITES

For comparison purposes, and to meet the requirements of CEQA and Title 20, alternative sites were identified that could feasibly attain most of the proposed project's basic objectives.

According to the AFC, the applicant used the criteria listed below to identify the proposed project site and alternatives. Staff believes these criteria are appropriate for a screening level analysis of proposed project site alternatives. The primary criteria include the following factors:

1. Proximity to existing substation – The proposed project site should be located adjacent to or near an existing substation where constructing additional transmission lines would be minimal or would not be necessary;
2. Proximity to natural gas transmission lines – The proposed project site should be located adjacent to or near high-pressure natural gas transmission lines;
3. Environmental viability – The proposed project site should have few or no environmentally sensitive areas and should allow development with minimal environmental impacts;
4. Size – The proposed project should be located on a parcel large enough to accommodate the proposed project site; and
5. Zoning – The proposed project site should be located on a parcel zoned for industrial land use.

Alternatives Figure 1 shows the location of the proposed HBRP and the alternatives evaluated in this FSA.

COMPARATIVE EVALUATION OF ALTERNATIVE SITES

Palco Scotia: This brownfield site was identified through a local source, who indicated that a portion of the lumber operation taking place on this 10-acre site could come up for sale in the near future. It is located west of US-101 and zoned Industrial. However, the distance required to connect to 60- or 115-kv transmission lines is 0.6 mile and 21.2 mile, respectively. The distance to a natural gas pipeline would be 2.3 miles.

Eel River Mills: This 9.7-acre site is zoned industrial and located in a rural area just north of the community of Rio Dell. It is also located immediately north of the Eel River and adjacent to the US-101 to the north. This parcel is an abandoned log landing for the former Eel River Lumber Mill (the adjacent mill is also abandoned). The distance to a 60-kv transmission line is 1.7 miles. A natural gas pipeline is located adjacent to the site.

Carlotta North: This 14.7-acre site is located in a rural location along the north side of State Route 36 (SR-36) and is zoned for Heavy Industry. Most of this site is occupied by Yager Creek and its riparian zone, and there does not appear to be enough remaining

acreage for the HBRP. The site is also occupied by a sawdust incinerator, trailer, and miscellaneous equipment. A 60-kv transmission line serves a small substation located across Yager Creek from the site. A natural gas pipeline runs on the south side of SR-36, approximately 0.5 miles away. Rural residential and agricultural uses surround the site.

Palco Carlotta: This site consists of approximately 40 acres and is located directly across SR-36, south of the Carlotta North site and is zoned Industrial. It is a fenced utility yard and appears to be underutilized. It is cleared, portions are graveled, and a small amount of logging equipment and timber handling facilities are present. A 60-kv transmission line is located approximately 0.2 miles from the site, and natural gas is located approximately 0.1 miles from the site. Rural residential and agricultural uses surround the site.

Alton-Hydesville: This 5.3-acre alternative site is zoned Heavy Industry and is located along the south side of SR-36, about midway between the cities of Alton and Hydesville. It consists of an abandoned chipping mill and is surrounded by agricultural uses. A 60-kv transmission line is located approximately 1.5 miles from the site, and natural gas is located adjacent to the site.

Palco Fortuna: This 7.6-acre site is the former log deck of the Palco Fortuna mill, now vacant, and is zoned for Heavy Industry. It is surrounded by mostly urban and suburban land uses of the City of Fortuna (shopping strip-malls) and by US-101 to the west. A 60-kv transmission line and an electrical substation are located approximately 1 mile to the east of the site. A natural gas pipeline runs adjacent to the site along US-101. The City of Fortuna currently has plans to rezone and redevelop this parcel for commercial uses.

Samoa Pacific: This 31.4-acre site is located on the Samoa Peninsula adjacent to the existing Samoa pulp and chip mill. It consists of sparsely vegetated sand dunes and is zoned General Industrial. A 60-kv transmission line serves the site, but connection from the site to natural gas would require construction of a 7.4-mile long pipeline. Open space and industrial uses surround the site.

Samoa Fairhaven: This 43.9-acre site is located on the Samoa Peninsula, adjacent to the existing Fairhaven biomass power plant. It is vacant and zoned as General Industrial. It is served by 60-kv transmission, but connection to natural gas would require construction of a 7.9-mile long pipeline. Open space and industrial uses surround the site.

ANALYSIS – ALTERNATIVE SITES

Although there are appropriately zoned sites that are not located near sensitive receptors or sensitive environmental resources, none of these alternative sites are located as favorably near to electrical transmission and natural gas infrastructure as is the HBRP at the existing HBPP site. While all of these alternative sites are served by 60-kV transmission, the existing service is not designed for loads that would be required to export power from the HBRP.

Each of the alternative sites considered is located more than 13 miles from the nearest 115-kV transmission line (the nearest, Palco Fortuna, is 13.3 miles; the farthest, Palco

Scotia, is 21.2 miles). Construction of a new generation tie-line to serve any of these alternative sites with 115-kV transmission would require several miles of new right-of-way, much of it in the Coastal Zone. In order to supply the Humboldt load pocket in the manner that is required, a new 115-kV transmission line would likely need to interconnect at either the Humboldt Substation located in Eureka or at the existing HBPP substation. The cost of building this line would be very high and potential environmental impacts include loss of wetlands and endangered species habitat, as well as visual resources impacts.

In addition to requiring the construction of a 115-kV generation tie-line, the two Samoa Peninsula alternative sites would require construction of more than 7 miles of natural gas pipeline. While much of this construction would be placed in existing roadway utility corridors, connection with the existing natural gas trunk line near US-101 in Arcata would require horizontal directional drilling under several major waterways that drain into the north end of Arcata Bay, running the risk of damaging sensitive fish and invertebrate habitat.

The costs of transmission right-of-way acquisition, design, construction, and environmental mitigation would likely range from about \$10 - \$30 million depending on the alternative (based on a typical transmission line unit cost of about \$1 million per mile). These costs coupled with undetermined environmental effects that would likely include loss of wetlands and endangered species habitat, as well as visual resources impacts, leads staff to conclude that none of the alternative sites would be environmentally superior.

NO PROJECT ALTERNATIVE

The No Project Alternative under CEQA assumes that a project is not constructed. The CEQA Guidelines state that “the purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impact of not approving the proposed project” (Cal. Code Regs., tit. 14, §15126.6[i]).

If the proposed HBRP were not built, the existing HBPP Units 1 and 2 and MEPPs would continue operation in order to support the electrical demand in the Humboldt load pocket. The existing units would continue to convert fuel to electricity at a 13,981 British thermal units per kilowatt (btu/KWh) heat rate, 33% less efficient than the proposed HBRP and, as a result, significant fuel reduction savings would not be realized. In addition, the proposed HBRP’s 83% reduction in ozone precursors, 77% reduction in PM₁₀ precursors, and 34% reduction in CO₂ air emissions, compared with the existing units, would not be realized. The existing ocean water once-through cooling system would continue to operate, using 52,000 gallons per minute (gpm) of ocean water from Humboldt Bay.

The No Project Alternative would not meet the proposed project objectives. It would not serve the growing needs of Humboldt County and California’s businesses and residents for economical, reliable, and environmentally sound generation resources.

CONFORMANCE WITH THE COASTAL ACT

The following sections of the Coastal Act refer to consideration of alternatives. Staff provides analysis of the HBRP's conformance with each section as follows:

Section 30264 of the Coastal Act provides guidance for siting a thermal electric generating plant within a coastal zone, and states:

“new or expanded thermal electric generating plants may be constructed in the coastal zone if the proposed coastal site has been determined by the State Energy Resources Conservation and Development Commission [Energy Commission] to have greater relative merit pursuant to the provisions of Section 25516.1 (, than available alternative sites and related facilities for an applicant’s service area which have been determined to be acceptable ...” (Public Resources Code, §30264).

Staff believes the proposed HBRP at the location of the existing HBPP is a superior project compared to constructing the same project at available alternative sites. The alternative locations would likely be more environmentally damaging due to the need to construct both a new 115-kV transmission line that would be at least 13 to 21 miles long depending on the location of the alternative, and in most cases also a new natural gas line. In comparison, HBRP would not require any new infrastructure extending offsite, except for a potable water line that would connect immediately outside of the HBPP boundary on King Salmon Avenue.

Section 30260 of the Coastal Act provides guidance with regard to HBRP's location, and states:

“Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division [Division 20 – California Coastal Act]. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section ... if 1) alternative locations are infeasible or more environmentally damaging; 2) to do otherwise would adversely affect the public welfare; and 3) adverse environmental effects are mitigated to the maximum extent feasible (Public Resources Code, §30260).

HBRP would be located within the existing HBPP site as encouraged by this section of the Coastal Act. In addition, alternative locations would likely be more environmentally damaging due to the need to construct both a new 115-kV transmission line that would be at least 13 to 21 miles long depending on the location of the alternative, and in most cases also a new natural gas line. In comparison, HBRP would not require any new infrastructure extending offsite, except for a potable water line that would connect immediately outside of the HBPP boundary on King Salmon Avenue. If staff's proposed conditions of certification are adopted by the Energy Commission, all adverse effects of the proposed project would be mitigated to the maximum extent feasible and the project would not result in any significant environmental impacts.

Section 30233 of the Coastal Act addresses potential impacts to coastal waters and wetlands and states:

“The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: 1) new or expanded port, energy, and coastal-dependent industrial facilities...” (Public Resources Code, §30233).

The applicant designed the HBRP to minimize impacts to wetlands and has proposed measures to mitigate unavoidable impacts to wetlands (PG&E 2006a, pp. 8.2-36, 8.2-47 to 8.2-55). The applicant’s proposed mitigation measures include restoration of wetland habitats disturbed during construction, restoration of historic wetlands on the PG&E property that have previously been filled, enhancement of existing wetlands on the property, and implementation of best management practices and erosion control measures (PG&E 2006a, p. 8.2-47). PG&E’s plans are documented in its Buhne Point Wetlands Preserve Mitigation and Monitoring Plan for the HBRP. Staff believes HBRP is a new or expanded energy facility that is coastal-dependent as a result of the existing infrastructure currently serving HBPP that will also serve HBRP, and the need to store spent fuel for an indefinite period associated with the decommissioning of the nuclear Unit 3.

SUMMARY AND COMPARISON

Staff has explored a range of reasonable alternatives to the project, and to the location of the project, examining if there are any alternatives that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen a significant adverse environmental impact. Lacking a significant environmental impact associated with the proposed HBRP as concluded by staff in this FSA, it is not necessary to identify an alternative that would lessen a significant impact. However, in order to demonstrate the proposed project’s conformance with the Coastal Act as it pertains to Alternatives, staff has considered a reasonable range of alternatives and has found none superior to the project. Alternative site locations would likely be more environmentally damaging due to the need to construct a new 115-kV transmission line that would be at least 13 to 21 miles long depending on the location of the alternative, and in most cases also a new natural gas line. In comparison, HBRP would not require any new infrastructure extending offsite, except for a potable water line that would connect immediately outside of the HBPP boundary on King Salmon Avenue.

APPENDIX A: ALTERNATIVES CONSIDERED BUT ELIMINATED

ALTERNATIVE TECHNOLOGIES

This section describes alternatives that did not satisfy the screening criteria for inclusion in a more detailed analysis, and include the following:

- Conventional Boiler and Steam Turbine;
- Kalina Combined-Cycle;
- Advanced Combustion Turbine Engines;
- Conservation and Demand-Side Management;
- Oil/Natural Gas/Coal;
- Nuclear;
- Geothermal;
- Hydroelectric;
- Biomass;
- Solar; and
- Wind .

These alternatives, and the reasons for their not being considered in detail in this analysis, are addressed below.

Conventional Boiler and Steam Turbine

This technology, currently in place at the HBPP, burns fuel in the furnace of a conventional boiler to create steam. The steam is utilized by driving a steam turbine-generator, condensed, and returned to the boiler. This outdated technology is only able to achieve thermal efficiencies up to approximately 36% when utilizing natural gas, compared to about 47% for the reciprocating engine generator units. Due to this low efficiency and the large amount of space that it would require, this technology was eliminated from consideration.

Kalina Combined-Cycle

The Kalina combined-cycle is similar to the conventional combined-cycle, with the exception that a mixture of ammonia and water is used in place of pure water in the steam cycle. This technology potentially increases combined-cycle thermal efficiencies by several percentage points. However, since this technology is still in the development stage and has not been commercially tested, it was removed from consideration. In addition, this technology was not proposed as part of the LTRFO; therefore, it could not be considered by PG&E in its evaluation.

Advanced Combustion Turbine Engines

The steam-injected gas turbine (STIG), the intercooled steam-recuperated gas turbine (ISRGT), the chemically, recuperated gas turbine (CRGT), and the humid air turbine (HAT) cycle are combustion turbines designed to enhance thermal efficiency by injecting steam or staged firing. The STIG is less efficient than other technologies, uses large amounts of de-ionized water and is only able to achieve thermal efficiencies up to approximately 40%. The ISRGT, CRGT, and HAT are not yet commercially available. All of these technologies were removed from consideration. In addition, these technologies were not proposed as part of the LTRFO; therefore, they could not be considered by PG&E in its evaluation.

Conservation and Demand-Side Management

Conservation and Demand-Side Management consists of a variety of approaches, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. Public Resources Code Section 25305(c) states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. The forecast that addresses this issue is the Energy Commission's *Integrated Energy Policy Report*. Thus, conservation and demand-side management is not included in this analysis.

Oil/Natural Gas/Coal

These technologies are commercially available and could be implemented. However, because of relatively low efficiency, they emit a greater quantity of air pollutants per kilowatt-hour generated than technologies that are more efficient. The cost of production is generally high relative to combined-cycle/natural gas-fired technologies.

Nuclear

California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high-level radioactive waste has been demonstrated. To date, the Energy Commission is unable to make the findings of disposal feasibility required by law for this alternative to be viable in California. The technology, therefore, is not currently implementable.

Geothermal

The north coast area of California in the vicinity of Humboldt County has a low potential for geothermal resources to support power production development (DOE 2007).

Hydroelectric

While hydropower does not require burning fossil fuels and may be available in California, this power source can cause significant environmental impacts, due primarily to the inundation of many acres of potentially valuable habitat and the interference with fish movements during their life cycles. Streams and rivers of the state are already appropriated and developed to a large degree, if not protected from development by wild and scenic river designations. In addition, planning and permitting time is on the order of 10 years.

As a result, it is extremely unlikely that new large hydropower facilities could be developed and permitted in California within the next several years (Aspen 2001).

Biomass

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source) or agricultural waste. The fuel is usually burned in a combustion process to generate steam. Due to the nature of their fuel, biomass facilities generate substantially greater quantities of air pollutant emissions than natural gas burning facilities, and typically require significant quantities of water associated with steam condensation cooling requirements. In addition, biomass plants are typically sized to generate less than 20 MW, which is substantially less than the capacity of the 163-MW HBRP project. At the peak of the biomass industry, 66 biomass plants were in operation in California, but as of 2001, only about 30 direct-combustion biomass facilities were in operation (CEC 2004c). These power plants would have potentially significant environmental impacts of their own. Biomass fuels are not locally available in sufficient quantities to make them a practical alternative fuel to meet the capacity needs of the HBRP. The thermal efficiency of biomass generation is similar to that of the existing Units 1 and 2 at HBPP on the order of 37%, and compared to the proposed HBRP technology with a thermal efficiency averaging about 47%, would therefore be about 30% less efficient than the proposed project. The steam turbine technology used for most biomass generation is also not capable of rapid start and load changes, as would be needed in the absence of the existing Mobile Emergency Power Plants to respond to natural gas curtailments or interruptions in importing electricity from the 115 kV transmission systems.

Solar

There are two types of solar generation: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation involves the conversion of solar radiation to thermal energy, which is then used to run a conventional steam power system. Solar thermal is a viable alternative to conventional generation systems and, depending on the technology, is suited to either distributed generation on the kW scale or to centralized power generation on scales up to several hundred MW. Solar thermal systems use three designs to generate electricity: parabolic trough concentrating collectors, power tower/heliostat configurations, and parabolic dish collectors. Parabolic trough and power tower systems typically run conventional power units, such as steam turbines, while parabolic dish systems power a small engine at the focal point of the collector.

PV power generation involves the direct conversion of light to electricity. PV is best suited to distributed generation uses rather than centralized power generation. PV is the most capital intensive of any alternative generation technology (Aspen 2001). PV power systems consist of solar electric modules (built from PV cells) assembled into arrays of varying sizes to produce electric power proportional to the area of the array and the intensity of the sunlight. PV arrays can be mounted on either the ground or on buildings. They can be installed on dual-purpose structures such as covered parking lots.

Solar resources would require large land areas in order to generate 163 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure such as the desert areas of California, central receiver solar thermal projects require approximately 5 acres per MW, so 163 MW would require approximately 815 acres. One square kilometer of PV generation (400 acres) can produce 100 MW of power, so 163 MW would require approximately 652 acres. Either of these technologies would use significantly more land area than the area required for the proposed HBRP.

Although air emissions are significantly reduced or eliminated for solar facilities, these facilities can have significant visual effects. Solar generation results in the absence or reduction in air pollutant emissions and visible plumes. Water consumption for solar generation is substantially less than for a geothermal or natural gas-fired plant because there is no thermal cooling requirement. However, development over a large area could affect numerous biological resources and would require careful analysis of potential impacts from either solar or PV generation at such a scale.

Like all technologies generating power for sale into the state's power grid, solar thermal facilities and PV generation require near access to transmission lines. Large solar thermal plants must be located in desert areas with high direct normal insolation, and in these remote areas, transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar thermal power and photovoltaic power generation would not successfully meet the proposed project objectives.

Wind

Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40% of the wind's kinetic energy into electricity. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW. California's 1,700 MW of wind power represents 1.5% of the state's electrical capacity (Aspen 2001).

Although air emissions are significantly reduced or eliminated for wind facilities, these facilities can have significant visual effects. Wind turbines have also caused bird mortality (especially for raptors) resulting from collision with rotating blades, although this effect is more noted in the Altamont Pass area than in other parts of the state.

Developing wind resources would require large land areas in order to generate 163 MW of electricity. Depending on the size of the wind turbines, wind generation "farms" generally can require between 5 and 17 acres to generate one megawatt (CEC 2004a). A 163-MW plant would therefore require between 815 and 2,771 acres. The lack of available transmission access is an important barrier to wind power development (Beck et al. 2001). California has a diversity of existing and potential wind resource regions that are located near load centers such as San Francisco, Los Angeles, San Diego, and Sacramento (CEC 2004b). Shell WindEnergy is proposing to construct the Bear River Wind Power Project in Humboldt County, which would consist of 30 to 35

wind turbine-generators with an aggregate generating capacity of 60 to 70 MW (HCCDSD 2007). Wind energy as a renewable resource, would contribute to PG&E's Renewable Portfolio Standard (RPS), in which the CPUC has designated that a minimum of 20% of PG&E's generation resources are to be provided by renewable resources by 2010. While wind energy is a potential renewable resource available in Humboldt County, wind energy technologies alone cannot provide full-time availability and reliability for meeting customer demands in the Humboldt Load Pocket due to the natural intermittent availability of wind resources. Therefore, wind generation technology alone would not meet the proposed project objectives. However, the proposed design of HBRP with ten generating units and the ability to operate efficiently over nearly the full range of its 163 MW capacity, would be able to operate as a complement to renewable energy resources when they are developed and able to supply power to the Humboldt load pocket.

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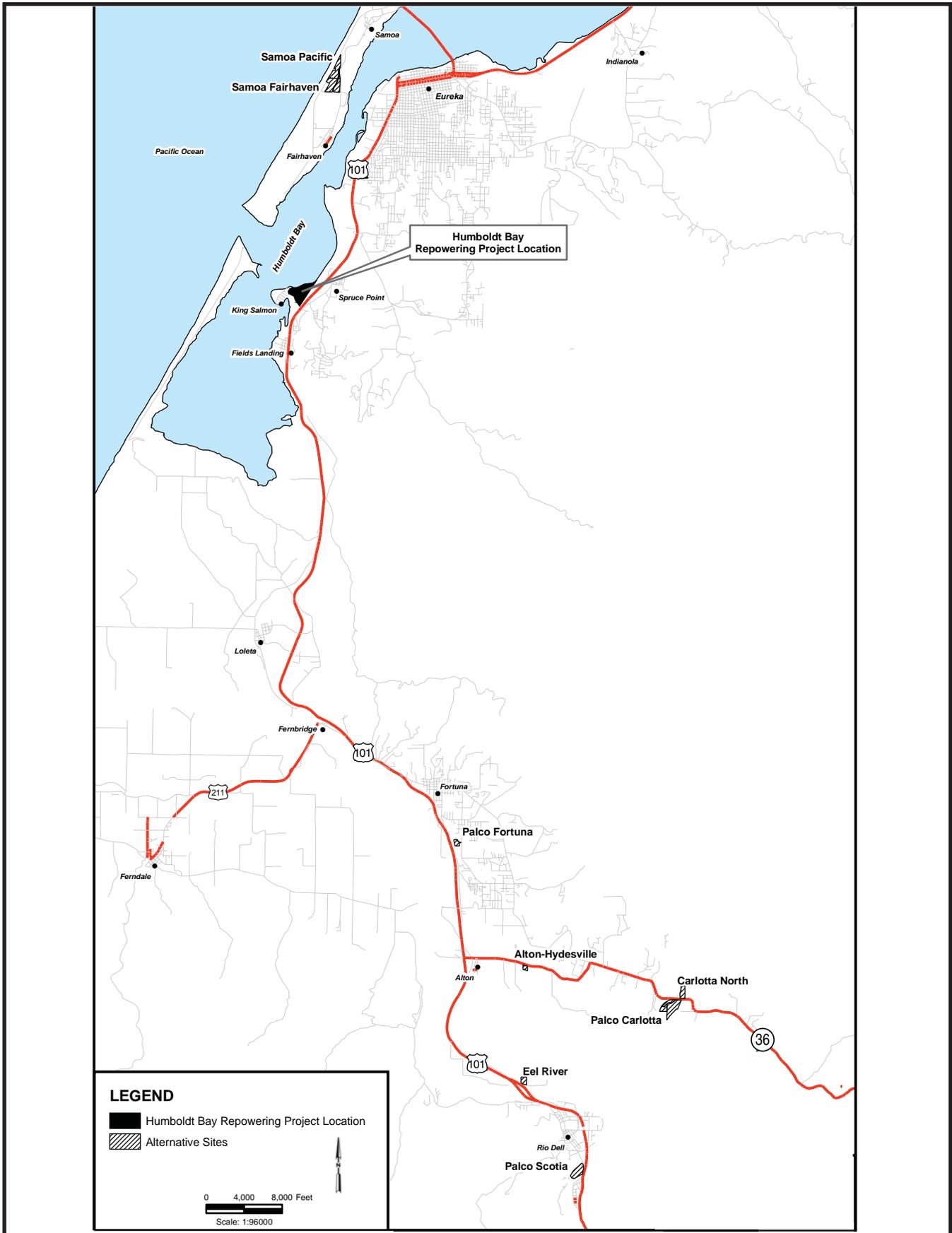
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ALTERNATIVES - FIGURE 1

Humboldt Bay Repowering Project - Alternative Sites



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MAY 2008

SOURCE: AFC Figure 9.6-1

GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Chris Davis

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:

1. set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
2. set forth the requirements for handling confidential records and maintaining the compliance record;
3. state procedures for settling disputes and making post-certification changes;
4. 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;
5. establish requirements for facility closure plans; and
6. 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 to an insignificant level. 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 to preconstruction activities at the site to allow for the installation of 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. Fencing for the site is also considered part of site mobilization. Walking, driving or

parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION GROUND DISTURBANCE

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site and for access roads and linear facilities.

CONSTRUCTION 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.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. 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, where 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 CPM will oversee the compliance monitoring and shall be 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, and ownership or operational control;
4. documenting and tracking compliance filings; and

5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission 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.

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 will be to assemble both the Energy Commission's and the 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 to confirm that they 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 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 of the 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 delegate 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 onsite 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, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

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, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. providing 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 (e.g., 90, 60 and 30-days) 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 involved condition(s) of certification by condition number and include 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.

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 submittals shall be addressed as follows:

**Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, it shall so request in its submittal cover letter and include a detailed explanation of the effects on the project if this 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 shall be included with the project owner's **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be 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 (e.g., 30, 60, 90 days) 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 starting 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. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner 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; and
7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

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 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 this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and eight copies 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, 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 (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);
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.

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 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, 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 Dockets Unit 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. The amount of the fee for FY2007-2008 was \$17,676. The initial payment is due on the date the Energy Commission adopts the final decision. You will be notified of the amount due. 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 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 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 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, Insignificant Project Changes 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 **insignificant project changes** as specified below. 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, 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. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

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 takes approximately one month to complete, and requires public notice and approval by the full Commission.

Insignificant Project Change

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff's intention to approve the modification unless substantive objections are filed.

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. This process usually takes less than five working days to complete.

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.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

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 this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This procedure 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 procedure 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 process. The procedure for informal dispute resolution is as follows:

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 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 and 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 provide an initial report, within 48 hours, followed by a written report filed within seven days.

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; and
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 conclusions 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 1237.

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 Startup of Reciprocating Engines	
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 by the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until all of the following activities/submittals have been completed: <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.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit 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

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings: _____
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date 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: _____ Date: _____

(Attach additional pages and supporting documentation, as required.)

PREPARATION TEAM

HUMBOLDT BAY REPOWERING PROJECT PREPARATION TEAM

Executive Summary	John S. Kessler, P.E.
Introduction	John S. Kessler, P.E.
Project Description	John S. Kessler, P.E.
Air Quality.....	Brewster Birdsall, P.E., QEP and Matthew Layton, P.E.
Biological Resources.....	N. Misa Ward
Cultural Resources.....	Beverly E. Bastian
Hazardous Materials Management.....	Alvin J. Greenberg, Ph.D. and Rick Tyler
Land Use.....	Amanda Stennick
Noise and Vibration	Steve Baker
Public Health.....	Alvin J. Greenberg, Ph.D.
Socioeconomic Resources	Joseph Diamond, Ph. D.
Soils and Water Resources.....	Ellen Townsend-Hough and John S. Kessler, P.E.
Traffic and Transportation	Jason Ricks
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Visual Resources	Mark R. Hamblin
Waste Management.....	Alvin J. Greenberg, Ph.D.
Worker Safety and Fire Protection	Alvin J. Greenberg, Ph.D. and Rick Tyler
Facility Design.....	Shahab Khoshmashrab
Geology and Paleontology	Dal Hunter, Ph.D., C.E.G.
Power Plant Efficiency.....	Steve Baker
Power Plant Reliability.....	Steve Baker
Transmission System Engineering	Ajoy Guha, P.E. and Mark Hesters
Alternatives	John S. Kessler, P.E.
General Conditions including Compliance Monitoring & Facility Closure	Chris Davis
Project Secretary.....	Mineka Foggie

DECLARATION OF
John S. Kessler

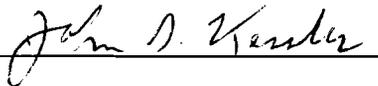
I, John S. Kessler, declare as follows:

1. I am presently a consultant to the California Energy Commission for the Siting Office of the Energy Facilities Siting Division as a Project Manager.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared staff testimony on **Alternatives, Executive Summary, and Soil and Water Resources** for the Humboldt Bay Repowering Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 14, 2008

Signed: _____



At: Sacramento, California

JOHN S. KESSLER
Kessler and Associates, LLC
2801 Shady Lane, Pollock Pines, CA 95726
Ofc: (530) 644-2010, Fax: (530) 644-2051
Email: zephyr@innercite.com

PROFESSIONAL EXPERIENCE:

Mr. Kessler is a licensed Civil Engineer in California with over 28 years experience in water supply and power generation, which includes planning and managing projects with responsibilities in operations, maintenance, environmental assessment, licensing, regulatory compliance, permitting and project management.

May 2000 - Present: Principal - Kessler and Associates

Established Kessler and Associates to provide engineering, regulatory and operating services related to energy and associated water supply projects;

California Energy Commission (CEC) – Application for Certification (AFC) Licensing Process
Project Management and Soil & Water Resource Assessments of Proposed Gas-Fired Generating Facilities (Serving as Project Manager or Technical Lead to assess all potential soil and water resource impacts and/or evaluate water supply/cooling alternatives for the following projects:)

- Humboldt Bay Repowering Project, 06-AFC-7, Serving as the Project Manager of the AFC licensing process before the CEC for the Humboldt Bay Repowering Project (HBRP); The HBRP is a proposed 163-MW facility to replace aging generating units of Humboldt Bay Power Plant.
- Victorville 2 Hybrid Power Project, 07-AFC-1, Serving as the Project Manager of the AFC licensing process before the CEC for the Victorville 2 Hybrid Power Project (Victorville 2); which is a proposed 563 MW facility integrating combined cycle and solar-thermal technology.
- Walnut Creek Energy Park, 05-AFC-2; Co-authored Staff Assessment;
- Vernon Power Plant, 06-AFC-1; Co-authored Staff Assessment;
- Los Esteros Critical Energy Facility, 01-AFC-12; Authored Staff Assessment and coordinated the resolution of storm water discharge issues into Coyote Creek with responsible agencies including City of San Jose, Santa Clara Valley Water District, San Francisco RWQCB, and the U.S. Army Corps of Engineers;
- San Francisco Electric Reliability Project, 04-AFC-01; Authored initial Staff Assessment;
- Blythe Energy Project Transmission Line Modifications, 99-AFC-8, Co-authored Staff Assessment/Environmental Assessment;
- Blythe II Energy Project, 02-AFC-01; Prepared a Water Supply & Cooling Alternatives Analysis;
- San Joaquin Valley Energy Center, 01-AFC-22; Co-authored Staff Assessment;
- Palomar Power Plant, 01-AFC-24; Supported soil and storm water testimony;

- Tesla Power Plant, 01-AFC-21; Prepared Water Supply Alternatives Analysis, and coordinated closely with local agencies to demonstrate the feasibility of using recycled water; The final Commission decision adopted our recommendation to require use of recycled water;
- Inland Empire Energy Center, 01-AFC-17; Co-authored Staff Assessment;
- Russell City Energy Center, 01-AFC-7; Co-authored Staff Assessment;
- East Altamont Energy Center, 01-AFC-6; Prepared a Water Supply Alternatives Analysis, and coordinated with agency representatives to demonstrate the feasibility of using recycled water; The final Commission decision adopted our recommendation to require use of recycled water;
- Valero Cogeneration Project, 01-AFC-05, Co-authored Staff Assessment;
- Avenal Power Plant, 01-AFC-20; Co-authored Staff Assessment before project was suspended;
- Baldwin Hills – Supported Evidentiary Hearings before being withdrawn by the applicant;

CEC – Assessment of Alternative Generation Technologies

Served as the author of the Hydropower Chapter discussing the status of development, potential for new development, costs, and deployment constraints including environmental effects, in comparison to development of gas-fired generation technologies;

CEC - Water Discharge Assessment of Coastal Power Plants – Executive Order 22-01

Served as Project Manager of Water Resources to assess the generation curtailments resulting from regulatory-required cooling water discharge limitations at various coastal thermal power plants;

CEC - Environmental Performance Report of California's Electric Generation Facilities

Co-authored the 2001, 2003 and 2005 Water and Biological Resources Sections, providing research and analysis of trends in power plant water resource utilization affected by technological changes, improved environmental safeguards, regulatory influences in market development, and diminishing supplies of fresh water;

CEC – California/Mexico Border Energy Issues – 2005 EPR White Paper

Authored the Water Chapter evaluating water quality and supply issues associated with existing and planned energy infrastructure along the U.S-Mexico border, finding that power plant water demands threaten to compromise our most fundamental needs, securing enough water to sustain life and food production;

CPUC – EIR for PG&E's Application for Authorization to Divest its Hydroelectric Generating Facilities and Related Assets - Served as Hazards Section Leader and Team Member of the Public Services and Utilities Section in preparing the EIR for considering PG&E's divestiture of its entire hydroelectric system; The environmental assessment included evaluating the safety and potential risks of PG&E's dams throughout its hydroelectric system in Northern California.

DWR – Oroville Relicensing

Prepared a description of operations for the Oroville Complex, in support of the FERC Relicensing process to understand project constraints and opportunities for modified operations to enhance natural resource protection, water supply and power generation.

Utica Power Authority – Dam Safety and Project Management Services

Serving as UPA’s dam safety engineer and project manager of environmental compliance and special construction projects; The projects include managing natural resources, and planning maintenance and construction improvements to water conveyance and storage facilities.

El Dorado Irrigation District – Engineering, Regulatory Permitting and Compliance Services

Assessed condition of the 23-mile El Dorado Canal water conveyance system, proposing a range of maintenance and capital improvements including cost estimates; Am currently preparing Standard Operating Procedures and facilitating employee training for project O&M, and preparing license compliance plans for protection of natural resources;

September 1995 – April 2000: Hydroelectric Director - El Dorado Irrigation District

Overall responsibilities included managing operation, maintenance, construction and regulatory activities and the acquisition of the El Dorado Hydroelectric Project from PG&E to EID; Construction activities included managing improvements to the penstock and powerhouse, replacing and relining sections of the penstock, and replacing turbine nozzle bodies, jet deflectors, governors, hydraulic oil systems and associated plant controls. Planning and feasibility studies included evaluating alternatives for replacing canal sections and a diversion dam which incurred flood damage and resulted in approximately \$30 million in capital replacement.

Aug. 1993 – Sept. 1995: Project Engineer - Northern California Power Agency

Managed planning of various enhancements and aquatic resource studies associated with the North Fork Stanislaus River Hydroelectric Project and relicensing studies associated with the Angels and Utica Projects; Coordinated initial development phases of new biomass energy from the Gridley Rice Straw Project for prototype development testing in the production of ethanol;

July 1984 – August 1993: Hydro Supervisor – Pacific Gas & Electric Company

Managed the operations, maintenance, capital improvements and regulatory compliance activities for the El Dorado and Chili Bar Hydroelectric Projects; Responsibilities included planning, estimating and managing numerous water conveyance and dam maintenance/capital projects;

Aug. 1979 – July 1984 - Hydraulic Engineer and Hydrographer/Hydrologist - PG&E

Managed various capital projects within PG&E’s and its water district/agency partner’s hydroelectric systems, including the low level outlet repair of New Bullards Bar Dam, that required several weeks of underwater construction. Also forecasted snowpack runoff and planned water storage and conveyance schedules for optimizing hydro generation production as integrated with PG&E’s other generation and power import sources;

EDUCATION AND PROFESSIONAL CERTIFICATES:

- State Of California Professional Civil Engineer, License No. C034897;
- B.S. Civil Engineering, University Of California, Davis, June 1979;
- A.A. Diablo Valley College, Pleasant Hill, June 1976;

HONORS AND AWARDS:

- 2001 Outstanding Performance Award from the State of California - Energy Commission;
- 1999 Outstanding Achievement Award for Transfer of the El Dorado Hydroelectric Project from PG&E to the El Dorado Irrigation District;

PROFESSIONAL ASSOCIATIONS:

- American Society of Civil Engineers

DECLARATION OF
J. Brewster Birdsall

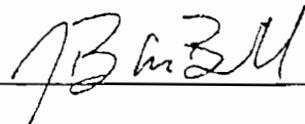
I, J. Brewster Birdsall, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as an Air Quality Specialist and Project Manager to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the final staff testimony on Air Quality for the Humboldt Bay Repowering Project Licensing Case Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

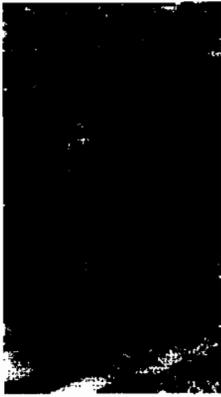
I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 2, 2008

Signed: _____



At: San Francisco, California



Aspen Environmental Group

BREWSTER BIRDSALL, P.E., QEP
Senior Associate, Air Quality and Engineering

ACADEMIC BACKGROUND

M.S., Civil Engineering, Colorado State University, 1993
B.S., Mechanical Engineering, Lehigh University, 1991

PROFESSIONAL EXPERIENCE

Mr. Birdsall is an environmental scientist who specializes in air quality and noise analyses for land development related projects and air quality risk assessments. He has nine years of consulting experience with expertise in environmental impact assessment under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and the Clean Air Act. His focus is on air permitting, and air quality and noise-impact modeling, which includes field monitoring for traffic and other community noise sources.

Aspen Environmental Group

2001 to present

Mr. Birdsall's project experience at Aspen includes the following:

Technical Studies for CEC Contract – Review of Power Plant AFCs. Mr. Birdsall assists the California Energy Commission (CEC) as a technical specialist by reviewing and providing testimony on Applications for Certification (AFC) for new power plants throughout California.

- **Tesla Power Plant.** Lead technical staff for air quality assessment and analyst of visible plumes for new 1,120 MW combined cycle power plant and 11-mile recycled water pipeline in rural eastern Alameda County near Tracy.
- **Inland Empire Energy Center.** Lead technical staff for air quality assessment for new 670 MW combined cycle power plant near Romoland in Riverside County.
- **Palomar Energy.** Lead technical staff for air quality assessment and supporting staff for cooling system studies for new 540 MW combined cycle power plant in northern San Diego County.
- **Kings River Conservation District Peaking Power Plant.** Lead technical staff for air quality assessment of new 97 MW simple cycle power plant in Fresno County.
- **Avenal Energy.** Lead technical staff for air quality assessment and analyst of visible plumes for large new combined cycle power plant near Avenal in Kings County.
- **Blythe Energy Project Phase II.** Lead technical staff for air quality assessment for new 520 MW combined cycle power plant and affiliated 118-mile transmission line, in the Mojave Desert and Coachella Valley of Riverside County.
- **Russell City Energy Center.** Lead technical staff for noise assessment of new 600 MW combined cycle power plant adjacent to shoreline recreational areas in Hayward.
- **Los Esteros Critical Energy Facility.** Lead technical staff for noise assessment and analyst of visible plumes for new 180 MW simple cycle power plant adjacent to recreational areas in San Jose.

- **Environmental Performance Report.** Technical review and editorial assistance for environmental portion of the first Integrated Energy Policy Report for the Governor and Legislature.
- **Air Quality Compliance.** Technical staff for analysis of modifications to permit conditions at the Moss Landing Power Plant. Prepared independent analysis of permit requirements and environmental consequences of increasing the capacity of the Midway-Sunset Cogeneration Project.
- **Alternative Cooling Technology Studies.** Supporting staff for analyses of dry cooling and hybrid cooling alternatives for the Cosumnes Power Plant and Palomar Energy Project. Coordinated and edited documentation from design engineers and other specialists.

For the California Public Utilities Commission:

- **San Onofre Nuclear Generating Station and Diablo Canyon Power Plant, Steam Generator Replacement Projects.** Currently serving as Deputy Project Manager for Environmental Impact Reports on the proposed improvements to these controversial nuclear power plants. Preparing certain administrative and technical portions of reports and coordinating the environmental documents with team of analysts.
- **Miguel-Mission 230 kV #2 Transmission Line.** Conducted the air quality and noise review for a system that would reduce transmission constraints between San Diego County and generators within the U.S. and Mexico. Provided oversight of the engineers studying impacts to traffic and transportation and the transmission system design.
- **Jefferson-Martin 230 kV Transmission Line.** Prepared air quality and noise studies for construction and operation of a 27-mile transmission line through urban and rural San Mateo County. The project is proposed to meet the projected electric demand in the Cities of Burlingame, Millbrae, San Bruno, South San Francisco, Brisbane, Colma, Daly City, and San Francisco.
- **Viejo System Transmission Project.** Prepared air quality, noise, and traffic analyses for construction of a controversial transmission improvement project in suburban south Orange County.
- **Looking Glass Networks Telecommunications Project.** Prepared the air quality and noise analyses for this Initial Study/Mitigated Negative Declaration (IS/MND) evaluating proposed fiber optic connections throughout the San Francisco Bay and Los Angeles areas, and developed programmatic mitigation measures for implementation of the metropolitan area network.

Presidio Trust, Presidio of San Francisco. Provided impact analysis for demolition, rehabilitation, and infill construction within the Public Health Service Hospital District, within the Golden Gate National Recreation Area and adjacent to sensitive San Francisco residences. Provided technical support and peer review of noise and vibration analyses related to the Doyle Drive Reconstruction through the Presidio of San Francisco. Involved protecting natural sounds consistent with National Park Service policy.

California State Lands Commission, Monterey Accelerated Research System Cabled Observatory. Providing technical analysis of air quality and noise effects of installing new underwater equipment in Monterey Bay. Supporting efforts of marine biologists with analysis of underwater noise.

California State Lands Commission, Concord-Sacramento Pipeline. Provided technical analysis of air quality and noise effects of constructing a new 20-inch, 70-mile petroleum products pipeline, including upgrades to storage tank facilities in Concord and distribution systems in West Sacramento.

California Department of Water Resources, Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project. Provided assessment of air quality and noise impacts for construction of upgrades.

Ventura County Resource Conservation District, Casitas Springs *Arundo Donax* Removal Demonstration Project. Prepared estimates of community noise impacts and air quality assessment for cutting and removing non-native plants for improving flood control along the Ventura River.

Technical Support for U.S. Army Corps of Engineers. Analyzed construction noise and air quality effects and described applicability of general conformity rule for various flood control improvements in Arizona and Southern California.

Technical Support for Los Angeles Unified School District. Provided technical analysis of air quality and noise effects for school expansion, play area expansion, and temporary classroom projects, including reviews of cumulative, regional air quality consequences of temporary projects.

EIP Associates

1998 to 2001

As a Senior Environmental Scientist at EIP Associates, Mr. Birdsall performed comprehensive analyses of air quality and noise impacts for Environmental Impact Reports/Statements and independent studies. His projects at EIP included:

- **Bay Area Rapid Transit District, Oakland Airport Connector EIS/EIR.** Prepared noise impact evaluation and mitigation strategies. Conducted community noise monitoring and assessment according to Federal Transit Administration methodology.
- **Presidio Trust Implementation Plan EIS and Letterman Complex Supplemental EIS.** Prepared community noise impact assessment and traffic noise mitigation strategies. Air quality management policy consistency analysis. The plan was awarded the 2003 Outstanding Land Use Plan from the Association of Environmental Professionals.
- **San Francisco International Airport, Offshore Runway Construction Concepts, AGS Design Team.** Conducted preliminary environmental review of design and construction concepts for runway expansion. Prepared emission control strategies for general conformity rule.
- **Sacramento Metropolitan Airport Master Plan EIS/EIR, Sacramento County Department of Environmental Review and Assessment.** Baseline emission inventory and regulatory constraints.
- **Desert Resorts Regional Airport, Thermal, Riverside County.** Emission inventory and general conformity determination for runway extension and taxiway improvements.
- **San Joaquin Area Flood Control Agency, Stockton Areawide Flood Control Projects.** Reviewed emission inventories and retroactive general conformity rule applicability for construction activities.
- **Alameda County Flood Control and Water Conservation District, Zone 7, Altamont Water Treatment Plant EIR.** Analyzed air quality and community noise effects of three potential water plant sites in remote eastern Alameda County.
- **Santa Clara Valley Water District, Coyote Watershed, Lower Silver Creek Project.** Analyzed air quality and community noise effects for Initial Study/Environmental Assessment of constructing flood control improvements and habitat restoration.
- **University of California, Davis.** Prepared campuswide health risk assessment update, which included toxic air contaminant emission inventory and dispersion modeling using ISC.

- **University of California, Berkeley.** Prepared initial air quality and noise technical studies for Long Range Development Plan Update EIR and analyses for Northeast Quadrant Science and Safety Project (Stanley Hall replacement building) EIR.
- **Merced County, Draft University Community Plan.** Prepared air quality and noise background studies and policy discussion papers for the new Merced Campus of the University of California.
- **Allegro Jack London Square Project, SNK Development.** Provided expert testimony on the pile driving noise impacts to residents in a revitalized, high-density City of Oakland neighborhood. Conducted field surveys with City Staff and evaluated compliance with City noise ordinance.
- **Maranatha High School and Playing Fields Project, City of Sierra Madre.** Prepared the community noise technical study for a new private high school with outdoor amphitheater and athletic facilities. Characterized noise from events to determine impact level on sensitive residential community.
- **State Route 275 Modification Project, City of West Sacramento.** Prepared noise technical studies on the realignment of the State Route 275 Modification Project. Required assessment of new traffic noise impacts caused by rerouting traffic to grade level in close proximity of existing sensitive land uses and identification of feasible measures to insulate lodging uses.
- **City of Mountain View, Whisman Road Transit Oriented Development MND.** Deputy Project Manager for Negative Declaration related to high-density office development at the Middlefield-Ellis-Whisman Superfund Site. Prepared various technical sections, managed traffic subconsultant, and coordinated preparing the environmental documents with the city staff.

Trinity Consultants

1994 to 1998

Mr. Birdsall prepared compliance strategies, evaluated modeled impacts, and negotiated air permits while a Project Supervisor at Trinity Consultants, an environmental firm specializing in air quality.

- **Browning-Ferris Gas Services.** Coordinated nationwide Title V program implementation, secured numerous new source and operating permits, supported rollout of federal new source performance standards for municipal solid waste landfills and landfill gas to energy facilities.
- **Newmont Mining Joint Venture, Batu Hijau Project.** Environmental impact studies for open-pit metallic mineral mining facility and independent power production facility. Included noise assessment for "greenfield" power plant and air quality impacts evaluation in complex, coastal terrain.
- **Questar Pipeline, TransColorado Pipeline Project.** Secured new source permits for air quality effects related to construction and operation of major natural gas pipeline including compressor stations.
- **Coastal Field Services, Altamont Gas Plant.** Negotiated Title V operating permits for upstream natural gas processing plant and associated field compressor stations.
- **Solvay Soda Ash Joint Venture.** Developed particulate matter modeling protocol with State agency.
- **Potlatch Corporation.** Facilitywide emission inventory and permitting for a wood products plant. Included regionwide analyses of ambient air quality standards and resolving existing modeled violations.

NOISE IMPACT ASSESSMENT MODELS

- Federal Highway Administration Traffic Noise Model
 - California Department of Transportation Traffic Noise Model (SOUND32)
 - FTA Transit Noise Assessment and Mitigation Methodology
-

AIR QUALITY MODELING EXPERTISE

MVEI/EMFAC; URBEMIS; CALINE4; SCREEN; ISC; CTDM; TANKS; Landfill Gas Emissions Model.

ADDITIONAL TRAINING AND COURSES

- Fundamentals of Noise and Vibration for the California Energy Commission
- Expert Witness Training, California Energy Commission
- Co-Instructor, Air Permitting Issues for Municipal Solid Waste Landfills, Trinity Consultants
- Fundamentals of New Source Review Workshop, Air and Waste Management Association
- Title V and Compliance Assurance Monitoring Workshops, Air and Waste Management Association
- NATO Advanced Studies Institute, Wind Climates in Cities

PROFESSIONAL AFFILIATIONS AND AWARDS

- Professional Engineer (Mechanical, California #32565)
- Qualified Environmental Professional, Institute of Professional Environmental Practice (#03030005)
- 2001 Outstanding Performance Award presented by the California Energy Commission
- Air and Waste Management Association since 1994

PUBLICATIONS

Smith, P.J., J.B. Birdsall, and P.E. Delamater. "A Discussion of Air Permitting Issues for Landfill Gas-To-Energy Projects." 88th Annual Meeting and Exhibition of the Air and Waste Management Association, San Antonio, Texas, 1995.

Meroney, R.N., D.E. Neff, and J.B. Birdsall. "Wind-Tunnel Simulation of Infiltration Across Permeable Building Envelopes: Energy and Air Pollution Exchange Rates." 7th International Symposium on Measurement and Modeling of Environmental Flows. International Mechanical Engineering Congress and Exposition, San Francisco, California, 1995.

Birdsall, J.B. and R.N. Meroney. "Model Scale and Numerical Evaluation of Tracer Gas Distribution Due to Wind-Forced Natural Ventilation." 9th International Conference on Wind Engineering, New Delhi, India, 1995.

Birdsall, J.B. Physical and Numerical Simulation of Wind-Forced Natural Ventilation, MS Thesis, Colorado State University, Fort Collins, Colorado, 1993.

**DECLARATION OF
MATTHEW S. LAYTON**

I, **MATTHEW S. LAYTON** declare as follows:

1. I am presently employed by the California Energy Commission in the **ENVIROMENTAL OFFICE** of the Energy Facilities Siting Division as a **SENIOR MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on greenhouse gases in the **AIR QUALITY** section for the **HUMBOLDT BAY REPOWERING PROJECT** Final Staff Assessment on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently therefo.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____

14th May 08

Signed: _____

Matthew Layton

At: _____

Sacramento, California

MATTHEW S. LAYTON

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Experience Summary

Twenty five years of experience in the electric power generation field, including regulatory compliance and modification; research and development; licensing of nuclear, coal-fired, peaking and combined cycle power plants; and engineering and policy analysis of regulatory issues.

Education

B.S., Applied Mechanics, University of California, San Diego.

Registered Professional Engineer - Mechanical, California.

Experience

1987-present – Senior Mechanical Engineer, Systems Assessment and Facilities Siting Division, California Energy Commission. Review and evaluate power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:

- Air quality resources and potential impacts, and mitigation measures;
- Public Health; and
- Transmission Line Safety and Nuisance.

Prepared Commission demonstration project process; contributed to the Energy Technology Status, Energy Development, and Electricity Reports; Project Manager for demonstration projects; evaluated demonstration test plans, procedures, data and reports; disseminated test results; and managed research and development contracts.

1983-1986 -- Control Systems Engineer, Bechtel Power Corporation. Managed a multi-disciplined effort to environmentally qualify client's safety related nuclear plant equipment. Performed analyses, calculations and reviews against vendor test reports, NRC guidelines and plant normal and postulated accident conditions. Initiated purchase orders for testing and formulated test objectives and test plans. Developed and implemented plant equipment maintenance and surveillance program based on test results, vendor recommendations and industry operating experiences. Trained client in environmental qualification engineering analysis and equipment maintenance program. Prepared client for NRC audits and presentation.

1981-1983 -- Engineer, GA Technologies, Inc. Supervised design and procurement of full-scale test assembly used to evaluate design changes to operating reactor graphite core assembly. Conducted experiment to determine the relationship of graphite oxidation rate to water concentration, temperature, and helium pressure. Environmentally qualified essential and safety related nuclear power plant equipment to comply with NRC guidelines.

**DECLARATION OF
N. Misa Ward, Senior Biologist**

I, N. Misa Ward, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Energy Facilities Siting Division as a Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on Biological Resources for the Humboldt Bay Replacement Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 5/6/08 Signed: 

At: Sacramento, California

N . M I S A W A R D

EDUCATION

University of Georgia, Athens 2000

- M.S. Botany (Biology)

California Polytechnic State University, San Luis Obispo 1997

- B.S. Biological Sciences, Botany Concentration, *Magna Cum Laude*

WORK EXPERIENCE

California Energy Commission

May 2006 - Present

Senior Biologist (Planner II – Energy Facilities Siting)

- Develop and present oral and written testimony on energy-related environmental analyses and land use planning, natural resource management, energy facility siting issues.
- Identify, describe, and analyze policy, regulatory, electric transmission corridor planning, and biological resource issues related to construction and operation of electrical energy production facilities and associated electric transmission systems, alternative energy technologies including wind and geothermal facilities, and Commission programs.
- Conduct project management and team leadership, assist with budgeting, and coordinate work of contract personnel for the Order Instituting Informational proceeding pursuant to the California Public Resources Code on the Development of *Statewide Guidelines for Reducing Wildlife Impacts from Wind Energy Development*.
- Coordinate multi-agency input as well as write and edit sections for the *Guidelines*, which were identified as a priority policy issue in the Commission's 2005 *Integrated Energy Policy Report*.
- Consult with and advise Office Managers, Division Chiefs, Executive Office and Commissioners and their advisers on electricity-related siting and planning subjects.
- Evaluate compliance with conditions of certification related to biological resources.
- Coordinate with biological resource protection and management agencies, environmental organizations, universities, and special interest groups to ensure input into Commission programs.
- Organize and conduct public workshops and meetings concerning Commission projects.
- Review information for *Environmental Performance Report* updates.

California Native Plant Society (CNPS)

Rare Plant Program Advisor (Volunteer)

June 2006 – July 2007

- Serve on job search committee, screen applications, and interview references.
- Train interim, Program Assistant Rare Plant Botanist in key Program areas as described in the job below.
- Consult on rare plant science activities, priorities, and data issues.

Rare Plant Botanist (Program Lead)

March 2004 – June 2006

- Manage Rare Plant Program's plant science activities and establish yearly, quarterly and daily priorities, including natural resource management activities
- Supervise and monitor work of consultants, volunteers and interns
- Provide leadership and project management equivalent to a Planner II – Energy Facilities Siting
- Monitor species affected by development, including intra- and inter-state electric transmission corridors.
- Provide advice and data to consultants working for large electricity companies on utility transmission planning alternatives analysis and natural resource management.
- Conduct timely data entry and quality control of the CNPS rare plant database.
- Coordinate and expand interagency botanists group, network of local and regional rare plant experts, and consult with chapter Rare Plant Coordinators.
- Research status, nomenclature, distribution, abundance, and endangerment for the CNPS Inventory of Rare and Endangered Plants of California.

- Compile and disseminate concise technical reports on rare plants for public agencies, conservationists, consultants, researchers, media, and others.
- Develop oral presentations and write articles in CNPS publications regarding program activities.
- Organize meetings to facilitate yearly program evaluation.

EDA W, Inc.

Sacramento Office

October 2001 – April 2004

Biologist (Botanist)

- Identify, describe, and analyze policy, regulatory, electric transmission corridor planning, and biological resource issues related to construction and operation of electrical energy production facilities and associated electric transmission systems, and alternative energy technologies including geothermal facilities as well as other development.
- Apply knowledge of local, state, and federal laws, ordinances, regulations, and standards on biological resources.
- Authored numerous environmental impact analyses, rare plant survey reports, floristic inventories, restoration monitoring reports, and wetland delineations related to land use planning, natural resource management (equivalent to a Planner I – Energy Facilities Siting).
- Primary biologist responsible for analysis of wetlands on a large inter-state electric transmission corridor.
- Conduct alternatives analysis for utility transmission corridor planning and utility intertie projects.
- Conduct botanical surveys in a variety of habitats throughout California (and southern Oregon) to facilitate environmental planning for both public agency and private sector clients, including electric utility companies.
- Document and map rare plants and sensitive habitats using traditional field mapping or GPS.
- Determine potentially suitable habitat areas, perform jurisdictional wetland delineations, characterize plant communities and ecological processes/functions, and make impact assessments based on field data and previously reported information.
- Apply knowledge of existing laws on biological resources through CEQA/NEPA document and other report preparation.

Office of the Registrar

University of Georgia

February 2000-October 2001

Administrator and Web Content Manager

- Designed and created the first comprehensive on-line tutorial for the University's registration system.
- Facilitated the design of a new Registrar website and served as a technical writer and editor.
- Determined honors eligibility for combined degree students and coordinated commencement ceremony.
- Assisted in the reporting and organization of student statistics using the Registrar Systems database.

Botany Department

University of Georgia

January 1999 - August 2000

Plant Taxonomy Laboratory Instructor

- Coordinated course organization and content with lecture instructor and collected plant material for labs.
- Delivered lectures on plant morphology and identification, dichotomous key construction, field collection techniques and plant classification.
- Led field trips to greenhouses, state botanical gardens, and local natural areas.
- Composed keying and identification tests and graded graduate student plant collections and field notebooks.

Plant Anatomy Laboratory Instructor

- Prepared anatomical slide demonstrations using fresh plant material and delivered lectures.
- Authored, administered, and graded lab exams.
- Provided weekly written feedback on lab reports and developed study guides for exams.

Molecular Systematics Laboratory Instructor

- Demonstrated the use of current phylogenetic analysis software and web-based bioinformatics resources.
- Created lab exercises and user-friendly help documents for computer programs.

- Directed and evaluated graduate student class research projects.

Biological Sciences Department Cal Poly, San Luis Obispo August 1996 - June 1997
Field Botany Teaching Assistant (Volunteer)

- Identified and collected California native plants in diverse plant communities on extended field trips.
- Administered and graded exams in both field and lab settings.
- Led review field trips and prepared specimens for study.

Introductory Biology Teaching Assistant

- Designed, proctored and graded weekly lab practical exams.

Student Academic Services Cal Poly, San Luis Obispo August 1994 - June 1997
Biology of Plants and Fungi Supplemental Instructor

- Mediated student discussion sessions.
- Delivered brief review lectures and wrote practice exams.

Biology and Botany Study Group Leader

- Tutored introductory biology, botany, and plant taxonomy.
- Guided plant identification field trips.
- Taught study strategies and learning techniques.

Tutoring Program Assistant

- Assign students to appropriate study groups and tutors.
- Maintain database of students, tutors, and study groups.
- Answer questions related to academic assistance program.
- Completed data entry of student surveys for program evaluation statistics.

OTHER RELEVANT EXPERIENCE

<i>Energy Commission- Sponsored Training</i>		2006-2007
▪ Applied Project Management		
▪ Time Management and Organizing Skills		
▪ Essential Facilitation		
▪ Business Writing and Grammar Skills		
▪ Management and Leadership Skills		
▪ Expert Witness Training		
<i>Plants of the Tropics Course</i>	<i>Fairchild Tropical Garden, FL</i>	1999
<i>Tropical Plant Systematics Course</i>	<i>Organization for Tropical Studies, Costa Rica</i>	1998
<i>Wrigley Botanical Garden Internship</i>	<i>Catalina Island, CA</i>	1996

RESEARCH AND PUBLICATIONS

The California Native Plant Society Rare Plant Program and Inventory. Poster presentation, Botany 2004 conference of the American Bryological and Lichenological Society, American Fern Society, American Society of Plant Taxonomists and Botanical Society of America.

Ward, M. and A. Howald. 2005. The California Native Plant Society's Rare Plant Program: 37 Years of Plant Science. *Fremontia*. 33(2): 17-23.

Rare Plants of the Ione Formation in California. Poster presentation on rare plant survey results, regulatory status, and natural history for the Botany 2003 Conference.

Ward, N.M. and R.A. Price. 2002. Phylogenetic Relationships of Marcgraviaceae: Insights from three chloroplast genes. *Systematic Botany* 27(1): 149-160.

Ward, N.M. 2000. Master's Thesis: Molecular Systematics and Evolution of Marcgraviaceae.

Werner, N.M. and R.A. Price. 2000. Phylogeny and morphological evolution of Marcgraviaceae: Insights from three chloroplast genes. *American Journal of Botany* 87(6 Suppl.): 183.

Werner, N.M. 1997. Undergraduate Thesis: A Plant Survey of Bitter Creek National Wildlife Refuge.

**DECLARATION OF
Beverly E. Bastian**

I, **Beverly E. Bastian**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Cultural Resources**, for the Humboldt Bay Replacement Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 5, 2008 Signed: Beverly E. Bastian
At: Acramento, California

Beverly E. Bastian
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education

School	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	A.B.D.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	A.B.D.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Energy Facilities Siting Division, Environmental Office, Biological and Cultural Unit,
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; developing mitigation measures to reduce to insignificant any impacts to significant cultural resources; providing expert testimony on my analyses and findings in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefilling assistance to applicants, reviewing the CEQA documents of sister state agencies; consulting and advising cultural resources specialists in sister state agencies; coordinating and reviewing the work of Commission cultural resources consultants; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian II, Cultural Resources Division, Cultural Resources Support Unit
Major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

*Department of Social Sciences, American River College
Instructor (part-time), American History*

2000 to 2002

Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate ability to organize information, to speak effectively to the public, and to train and direct other personnel.

*Department of Sociology and Anthropology, University of Mississippi
Archaeologist, Center for Archaeological Research*

1987 to 1989

All tasks for the completion of the historical archaeological part of an archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc.

1984 to 1987

Historical Archaeologist and Project Manager, Environmental Unit

All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

*Tennessee Valley Authority (personal services contract)
Historical Archaeologist (self-employed)*

1979 to 1981, 1983-1984

All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log-cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects

1966 to 1981

Professional Societies

Register of Professional Archaeologists, #10683
Society for Historical Archaeology
National Council on Public History

Vernacular Architecture Forum
Society for California Archeology
California Council for the Promotion of History

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

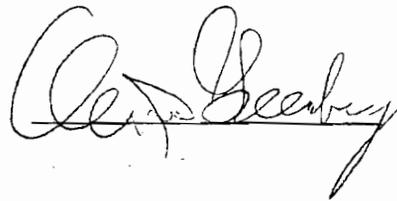
1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on the **Public Health, Hazardous Materials Management, Waste Management, and Worker Safety/Fire Protection** sections for the **Humboldt Bay Repowering Project** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 14, 2008

At: Sacramento, California

Signed:

A handwritten signature in black ink, appearing to read "Alvin J. Greenberg", written over a horizontal line.

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP
Principal Toxicologist**

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

- B.S. 1969 Chemistry, University of Illinois Urbana

- Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California,
San Francisco

- Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of
California, San Francisco

- Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation
Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002

Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001

Member, State Water Resources Control Board Noncompliant Underground
Tanks Advisory Group

January 1999 – June 2001

Member, California Air Resources Board Advisory Committee on Diesel
Emissions

January 1994 - September 1999

Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic
Cleanup Program Advisory Committee

September 1998

Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997

Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996

Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995

Member: California Department of Toxic Substance Control Site Mitigation
Program Advisory Group

January 1989 - February 1995

Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992

Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxic Substances Control Review Committee, Cal-EPA

September 1990 - February 1991

Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988

ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987

California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987

Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987

Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986

Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985

Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983

Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present

Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984

Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983

Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979

Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975

Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a "background" report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. In August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the

Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead oxide contaminated soil at DOD facilities.

Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Ballard Canyon Air Pathway Analysis and Human Health Risk Assessment, Santa Barbara County, Ca. (September 2000)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Infrastructure Security

For the past three years, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has

interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan will be used by all power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He has also led an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Sites with RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of \$750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on

another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara.

Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca. (March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms.

Examples

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill,. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),

- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- San Francisco Energy Reliability Project, San Francisco, Ca. 2004-present. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials
- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

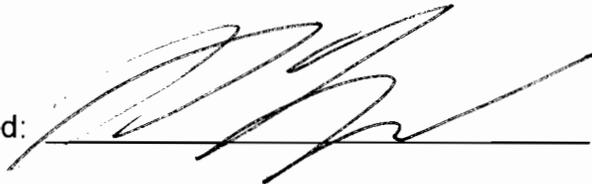
**DECLARATION OF
Rick Tyler**

I, Rick Tyler declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Energy Facilities Siting and Environmental Protection Division as a Senior Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I supervised the preparation of testimony on the Hazardous Material Management and Worker Safety and Fire protection sections, for the Humboldt Bay Repowering Project based on my independent analysis of the Application for Certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.
6. I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 15, 2008

Signed: _____

A handwritten signature in black ink, appearing to read 'RT', is written over a horizontal line. The signature is stylized and cursive.

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998- Present California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985- Jan. 1998 California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL
AFFILIATIONS/
LICENSES

Past President, Professional Engineers in California
Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS,
PROFESSIONAL
PRESENTATIONS
AND
ACCOMPLISHMENTS

Authored staff reports published by the California
Air Resources Board and presented papers regarding
continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than \$500,000.

RES.RT

DECLARATION OF

Amanda Stennick

I, Amanda Stennick declare as follows:

1. I am presently employed by the California Energy Commission in the Office of the Systems Assessments and Facilities Siting Division as an Environmental Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the **LAND USE** section for the Humboldt Bay Repower Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 5, 2008

Signed: 

At: Sacramento, California

AMANDA STENNICK

EDUCATION

B.A. 1986 University of California, Davis, Urban and Economic Geography

WORK EXPERIENCE

April 1998
present **Planner II.** California Energy Commission, Energy Facilities Siting and Protection Division.

Provide technical analysis of proposed energy planning, conservation, and development programs on land use and socioeconomic resources. Specific tasks include the analysis of potential land use and socioeconomic impacts, identification of mitigation measures, presentation of oral and written testimony for hearings on siting cases, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Recent work includes preparation of agenda and other materials for staff's environmental justice training seminar; research in the areas of demographics and poverty for environmental justice in siting cases; review of environmental justice legislation; research on energy and environmental justice issues specific to US/Mexico Border; as part of a team, authored the 2000 Quality Control Responsibilities for Division Products; authored the Environmental Justice sections for the 2001, 2003, and 2005 Environmental Performance Report; technical lead for land use section for 2005 Environmental Performance Report; CEQA review and comment on Cabrillo LNG Deepwater Port Facility NOI/NOP, City of Pittsburg Trans Bay Cable Project, and EIS/EIR for LNG facility in the Port of Long Beach.

Oct. 1993
to April 1998 **Planner I.** California Energy Commission, Energy Facilities Siting and Protection Division.

Provide technical analysis of proposed energy planning, conservation, and development programs on land use and socioeconomic resources. Specific tasks include the analysis of potential impacts, identification of mitigation measures, presentation of oral and written testimony for public hearings on siting cases, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Other work includes participation in the environmental justice task force; preparation of environmental justice white paper presented to Commissioners; research and preparation of discussion on discount rates and net present value for the SFEC siting project; preparation of socioeconomic section on 1996 Quincy Library Group Report; preparation of forestry section on 1997 CEC Global Climate Change Report; demographic research for environmental justice issues in siting cases.

1992
to
1993

Project Manager/Environmental Analyst/Planner. Beak Consultants.

Environmental Planner for EIR/EA for the Mammoth County Water District. Analyzed potential impacts resulting from lake water transfers and maintenance of in-stream flows in the Mammoth Lakes Basin; prepared land use, socioeconomics, recreation, and public services and utilities sections of EIR/EA; provided team project management.

Environmental Planner for an Effluent Treatment Plant EIR for Simpson Paper Company in Humboldt County. Authored land use, socioeconomics, recreation, public services and utilities, cumulative impacts sections, and mitigation monitoring; provided team project management.

Environmental Planner for Folsom/SAFCA Reoperation. Work involved determining parameters of project description with respect to water modeling, project geographic boundaries, and agency jurisdictional boundaries; ensured compliance with federal, state, and local plans and policies; provided team project management.

1990
to
1992

Environmental Analyst/Project Manager. ECOS. Inc.

Project Manager/Planner. EIR for a Planned Development, General Plan Amendment, and rezone request for a 504-acre Business and Industrial Park expansion for the Port of Sacramento. Prepared work scope and budget for Public Improvements Plan and Specific Plan for an 80-acre Mixed Use/Water Related development, including a Mitigation Monitoring Plan and Statement of Overriding Considerations for the City of West Sacramento. Specific tasks included coordination with subcontractors on technical sections of EIR, meetings with Assistant Port Director and City staff to present Public Improvements Plan, Specific Plan, tentative parcel map, and critical project phasing; and discussion with CDFG and Port staff on regional approach to mitigation for project-impacted endangered species.

Project Manager/ Planner. EIR for the Wildhorse Residential/Recreational Planned Development for the City of Davis. Specific tasks included CEQA compliance, writing technical sections on land use, project alternatives, and cumulative impacts, and determining appropriate project alternatives based on traffic models and allowable housing densities.

Project Manager. Yolo County Powerline Ordinance. Project tasks included developing siting policies and mitigation measures for placement of powerlines and substations in Yolo County.

1989
to
1990

Assistant Planner. Sacramento County Planning Department.

Principal Author. Energy Component of the Public Services and Facilities Element of the Sacramento County General Plan. Coordinated work efforts with the CEC, SMUD, and PG&E to develop environmental and siting policies for energy facilities and transmission lines; identified environmental impacts and appropriate mitigation measures.

1987
to
1989

Planner/Assistant Planner. Yolo County Community Development

Planning liaison for Homestake Mining Company's McLaughlin Mine. Conducted meetings on the Technical Review Panel's environmental monitoring of HMC's McLaughlin Mine; prepared staff reports on the implementation of use permit phasing on water quality and impacts of the tailings pond on biologic resources; organized site visits to monitor the revegetation plan and other mitigation measures as specified in the use permit; presented oral and written staff reports to the Planning Commission.

1988

Consultant. Pan Pacific Energy Development Corporation.

Consulting job to develop a regional energy plan for rural areas of developing countries including decentralized non-fossil fuel power plants in agricultural regions. Attended IREC and AWEA International Conference in Honolulu.

PROFESSIONAL AND CONTINUING EDUCATION

1988 California Environmental Quality Act (UC Davis)
1989 Subdivision Map Act (UC Davis)
1991 Fiscal Impact Analysis (UC Davis)
1994 APA Conference (San Francisco)
1994 Environmental Justice Conference (UC Berkeley)
1998 California Environmental Quality Act (California Energy Commission)
1999 Roundtable on Environmental Justice US/Mexico Border
2000 Local Agency Formation Commission - LAFCO (UC Davis)
2005 Geographic Information System – GIS (UC Davis)
2006 Mapping Your Community GIS and Community Analysis (Sacramento, CA)

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals
American Planning Association

DECLARATION OF Steve Baker

I, Steve Baker, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Energy Facilities Siting Division as a Senior Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Power Plant Efficiency, Power Plant Reliability, and Noise and Vibration**, and supervised preparation of the staff testimony on **Facility Design and Geology and Paleontology**, for the Humboldt Bay Repowering Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 5, 2004 Signed: 

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-three years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Long Beach--Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California —
No. M27737 expires 6/30/08

Professional Experience

1990 to Present--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

1987 to 1990--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

1981-1986--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

1974-1981--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

**DECLARATION OF
Joseph Diamond Ph. D.**

I, Joseph Diamond, declare as follows:

1. I am presently employed by the California Energy Commission as a Planner II-Economist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on Socioeconomics for the Humboldt Bay Repowering Project (HBRP) based on my analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 5/5/2008 Signed: Joseph Diamond Ph.D.

At: Sacramento, California

Joseph Diamond Ph. D.
Work: (916) 654-3877

Ph.D. with experience in economic policy.

BUSINESS AFFILIATION

California Energy Commission
1516 9th St. MS-40
Sacramento, CA 95814

EDUCATION

Michigan State University	Ph.D.	Resource Development
University of Rhode Island	M.A.	Economics
University of New Hampshire	B.A.	Economics

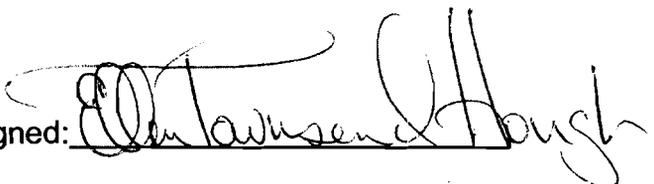
**DECLARATION OF
Ellen Townsend-Hough**

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Energy Facilities Siting Division as an Associate Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on Soils and Water Resources for the Humboldt Bay Repowering Project (HBRP) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 15, 2008

Signed: 

At: Sacramento, California

Ellen Townsend-Hough

SUMMARY

I am a chemical engineer with over 20 years of experience. My professional career has afforded me many unique growth and development opportunities. Working knowledge of the California Environmental Quality Act. Strength in analyzing and performing complex engineering analyses. Also worked as a policy advisor to a decision-maker for three years.

PROFESSIONAL EXPERIENCE

Writing

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems
- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects
- Provides licensing recommendations and function as an expert witness in regulatory hearings.
- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.
- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure
- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.
- Assist with on-site audits and inspection to assure compliance with Commission decisions.
- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.
- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.
- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.
- Represent Commissioner's position in policy arenas and power plant siting discussions.
- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.
- Wrote speeches for the Commissioner's presentations.

EMPLOYMENT HISTORY

2002-Present	Associate Mechanical Engineer	CEC Sacramento CA
1999-2002	Advisor to Commissioner	CEC Sacramento CA
1989-1999	Associate Mechanical Engineer	CEC Sacramento CA
1992-1993	Managing Partner	EnvironNet Sacramento CA
1988-1989	Sales Engineering Representative	Honeywell Inc Commerce CA
1987-1988	Chemical Engineer	Groundwater Technology Torrance CA
1985-1986	Technical Marketing Engineer	Personal Computer Engineers Los Angeles CA
1985-1985	Energy Systems Engineer	Southern California Gas Company Anaheim CA
1980-1985	Design and Cogeneration Engineer	Southern California Edison Rosemead CA
1975-1980	Student Chemical Engineer	Gulf Oil Company Pittsburgh PA

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education

*Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer*

References furnished upon request.

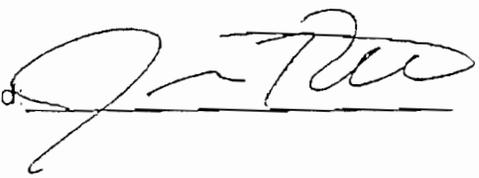
DECLARATION OF
JASON RICKS

I, Jason Ricks, declare as follows:

1. I am presently a consultant to the California Energy Commission for the Siting Office of the Energy Facilities Siting Division as a Traffic and Transportation Specialist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the **Traffic and Transportation** section for the Humboldt Bay Repowering Project Final Staff Assessment based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 5-8-08

Signed: 

At: Sacramento, California



JASON W. RICKS
Associate Environmental Scientist

ACADEMIC BACKGROUND

M.S. Environmental Public Health, Tulane University, New Orleans, LA, 1998
B.S. Biology, Alma College, Alma, MI, 1994

PROFESSIONAL EXPERIENCE

Mr. Ricks has over 10 years of professional environmental science and health and safety experience. He has spent the past five years working as a Project Manager and analyst for environmental reviews under CEQA and NEPA, working on over 30 infrastructure, public facility, and development projects. Mr. Ricks specializes in NEPA and CEQA project management and documentation with a particular focus in traffic and transportation, environmental contamination, and hydrology analysis

Aspen Environmental Group

2006 to present

- **Tehachapi Renewable Transmission Project EIR/EIS.** Mr. Ricks is serving as the Issue Area Coordinator for physical science technical sections for a joint EIR/EIS for the California Public Utilities Commission (CPUC) and USDA Forest Service for an extensive series of transmission system upgrades spanning Kern, Los Angeles, and San Bernardino Counties. Mr. Ricks is preparing the traffic and transportation analysis and as well as managing the Physical Sciences team in analyzing potential impacts to air quality; noise; geology, soils, and paleontology; environmental contamination; hydrology; fire prevention and suppression; and traffic and transportation.
- **Antelope Segments 2 and 3, 500-kV Transmission Project.** Mr. Ricks conducted analysis and prepared the Traffic section of the EIR for the CPUC.
- **Antelope-Pardee 500-kV Transmission Project.** Mr. Ricks conducted analysis and prepared the Traffic section of the joint EIR/EIS for the California Public Utilities Commission (CPUC) and USDA Forest Service.
- **California Energy Commission (CEC), Technical Assistance in Application for Certification Review.** Aspen is assisting the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Ricks is serving as a technical specialist for traffic and transportation for several power plant projects:
 - **Chevron Power Plant Replacement Project.** Mr. Ricks conducted analysis and prepared the traffic portion of the Initial Study for the Chevron Power Plant Replacement Project at the existing Chevron Refinery in Richmond, CA.
 - **Carrizo Energy Solar Farm.** Mr. Ricks is preparing the traffic and transportation portion of the Staff Assessment for a new solar thermal power plant in Luis Obispo County.
 - **Chula Vista Energy Upgrade Project.** Mr. Ricks is preparing the traffic and transportation portion of the Staff Assessment for upgrading and expanding an existing peaker plant.
 - **Humboldt Bay Repowering Project.** As technical senior, Mr. Ricks managed the analysis of the traffic portion of the Staff Assessment for replacement of a natural gas fired generator at the existing Humboldt Bay Power Plant.

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Division as a Staff Toxicologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Transmission Line Safety and Nuisance** for the Humboldt Bay Repowering Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 5/13/08 Signed: Odoemelam

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

- 1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology
- 1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.
- 1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989

The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

**DECLARATION OF
Mark R. Hamblin**

I, **Mark R. Hamblin** declare as follows:

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Energy Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I prepared the staff testimony for the Visual Resources section for the proposed Humboldt Bay Repowering Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 14, 2008 Signed: Mark R. Hamblin
At: Sacramento, California

MARK R. HAMBLIN

Summary

Public administrator/land use planner with 15 years experience addressing land use development matters of concern to citizens and government leaders. Expertise in interpreting public policy pertaining to land use and environmental assessment. Demonstrated ability in working with individuals, and on teams involved in the development permitting process.

Professional Experience

California Energy Commission, Sacramento, CA.

Planner II

November 2000 to present.

Prepares an independent technical analysis in the area(s) of land use, traffic & transportation, and visual resources to inform interested persons and to make recommendations to the Energy Commission regarding the consequences of a natural gas fired power generation plant proposal; reviews information provided by the applicant and other sources to assess the environmental effects of a proposal as required by the California Environmental Quality Act (CEQA), and the California Energy Commission siting regulations; evaluates project in accordance with federal, state and local laws, ordinances, regulations, standards (LORS); coordinates proposal with federal, state and local agencies; conducts field studies; oversees technical consultant(s); participates in public workshop(s) on proposal; presents sworn testimony during evidentiary hearings; implements compliance monitoring programs for projects approved by the Energy Commission to ensure that power plants are constructed and operated according to the conditions of certification of their license.

Yolo County Planning and Public Works Department, Woodland, CA.

Associate Planner

June 1992 to October 2000.

Advised and assisted individuals in the processing of land use requests (general plan amendments, conditional use permits, subdivision maps, etc.); reviewed information provided by the applicant and other sources for consistency with the state zoning and planning law, the county General Plan, the county government code, and the requirements of the CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission and/or county board of supervisors; board of supervisors liaison, and planning department staff person to citizen and inter-agency committees (county airport advisory committee, county habitat conservation plan steering committee, and community general plan citizen advisory committee(s)); drafted zoning ordinances and regulations; prepared environmental assessment documents in accordance with CEQA and NEPA (National Environmental Protection Act); hired and supervised consultants; executed county zoning administrator duties; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use issues and development proposals in the County.

Yolo County Community Development Agency, Woodland, CA.

Assistant Planner

January 1991 to June 1992.

Advised and assisted individuals in the processing of land use requests; reviewed information provided by the applicant and other sources for consistency with the county

General Plan, the state and county government code, and the requirements of CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission; drafted zoning ordinances; prepared environmental assessment documents in accordance to the CEQA; supervised consultants; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Tulare County Planning and Development Department, Visalia, CA.

Planning Technician II

March 1988 to January 1990.

Advised and assisted individuals in the processing of land use requests, specifically special-use permits, variances, parcel and subdivision maps; reviewed information provided by the applicant and other sources for consistency with the county General Plan, the state and county government code, and the requirements of CEQA; collected and evaluated information for presentation in a staff report on the proposed land use request for consideration by the county zoning administrator, site plan review committee, or planning commission; prepared environmental assessment documents in accordance with CEQA; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Education

University of California, Davis Extension. Coursework in California Land Use Planning and the California Environmental Quality Act 1988 to 1995.

Cosumnes River College. Coursework in Television and Radio Broadcasting 1990 to 1991.

California State University, Bakersfield. Master of Public Administration; August 1988. Concentration in Public Policy. Coursework in Business Administration and Political Science.

California State University, Sacramento. Bachelor of Science in Public Administration; May 1984. Concentration in Human Resources Management.

Porterville College. Associate in Arts Social Science; May 1982. Coursework in Administration of Justice.

Awards

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the "21 Day, 4, 6, and 12 Month Processes Team." California Energy Commission.

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the "Expedited 4 Month AFC/SPPE Team," California Energy Commission.

**DECLARATION OF
SHAHAB KHOSHMAHRAB**

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Facility Design** for the **Humboldt Bay Repowering Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 5, 2008

Signed: 

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting-- California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer -- Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer -- Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

**DECLARATION OF
Dal Hunter, Ph.D., C.E.G.**

I, **Dal Hunter, Ph.D., C.E.G.**, declare as follows:

1. I am presently employed by Black Eagle Consulting, Inc. under contract with the California Energy Commission Energy Facilities Siting and Environmental Protection Division as an engineering geologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the **Humboldt Bay Repowering Project (06-AFC-7)**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 5, 2008

Signed: 

At: Black Eagle Consulting, Inc.
Reno, Nevada



exp. 3.31.09

Robert D. Hunter, Ph.D., C.E.G.

Engineering Geologist

Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Earth Science – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal, including testimony and compliance monitoring)
- Magnolia Power Project (including compliance monitoring)
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring)
- Riverside Energy Resource Center (Phases I and II)
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Sun Valley Energy Project
- El Centro Unit 3 Repower Project
- AES Highgrove Project
- South Bay Replacement Project
- Vernon Power Plant

- Humboldt Bay Repowering Project
- Victorville Power Project
- Carlsbad Energy Center
- San Gabriel Generating Station
- Orange Grove
- Chula Vista Energy Upgrade
- Carrizo (Solar)
- Kings River
- Canyon Power Plant
- Sentinel Peaker Project
- Beacon Solar Project
- Otoy Mesa Generating Project (compliance monitoring)
- Mountainview Power Plant Project (compliance monitoring)
- Consumes Power Plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)
- Niland Power Project (compliance monitoring)
- Panoche Power Plant (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.
- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.
- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

**DECLARATION OF
AJOY GUHA**

I, **Ajoy Guha**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Energy Facilities Siting Division as an Associate Electrical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **Humboldt Bay Repowering Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 5-14-08

Signed: 

At: Sacramento, California

RESUME

AJOY GUHA
Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:

MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:

REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.

Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.

Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.

Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges, scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.

Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.

Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.

Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

**DECLARATION OF
Mark Hesters**

I, Mark Hesters, declare as follows:

1. I am presently employed as a Senior Electrical Engineer at the California Energy Commission in the Engineering Office of the Energy Facilities Siting Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Transmission System Engineering** for the Humboldt Bay Repowering Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 14, 2008

Signed: _____



At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has sixteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

**DECLARATION OF
CHRIS DAVIS**

I, Chris Davis, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting Office of the Energy Facilities Siting Division as a Compliance Project Manager (Classification: Planner II).
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the Compliance General Conditions and Closure Plan section for the Humboldt Bay Repowering Project Final Staff Assessment based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 5, 2008

Signed: 

At: Sacramento, California

Chris Davis

California Energy Commission
1516 Ninth St., MS-2000
Sacramento, California 95814
(916) 654-4842

Professional Experience

***January 2008
to present***

***California Energy Commission
Planner II Compliance Project Manager*** – Direct technical staff in tasks related to power plant project design, construction, operation, and associated environmental issues. Negotiate agreements between power plant operators, public agencies, and community groups. Consult with engineering, legal and technical staff to identify and resolve technical issues.

2007-2008

***California Energy Commission
Energy Specialist I*** – Education and outreach for the New Solar Homes Partnership (NSHP) and the Building Standards Office. Developed fact sheets on proposed changes to the 2008 building standards and a tutorial on how to use the PV Calculator to figure photovoltaic system power production and expected incentives. Wrote a case study, articles and Web pages explaining various aspects of the NSHP program, Certified by CalCERTS (California Energy Rating and Testing Services) as a Home Energy Rating System (HERS) rater for photovoltaic systems. Organized, developed materials for, and staffed Energy Commission booth/tables for conferences put on by California Building Energy Consultants (CABEC), California Building Officials (CALBO) and International Air Conditioning Institute (IHACI).

2005-2007

***State Water Resources Control Board
Information Officer I*** – Liaison between State Water Board, Central Valley Regional Water Board and media, as well as and media. Issues included waste (NPDES) permits, groundwater contamination and treatment, once-through cooling, emerging contaminants, contaminated beaches, stormwater, and areas of special biological significance off the California coast. Worked with reporters from the LA Times and other major California news organizations.

2001-2005

California Energy Commission

Information Officer I – Joined the Energy Commission media office during California's power crisis. Liaison between CEC and media on the subject of power plant licensing. Wrote news releases about projects as they reached each milestone in the siting process, including a number of releases for Governor's office about new facilities going on-line. Initiated and developed Power Plant Fact Sheet, in cooperation with Siting Office manager. Served as 2004 president of the State Information Officers Council.

2000-2001

Department of Consumer Affairs, Bureau of Automotive Repair

Information Officer I – Bureau of Automotive Repair (BAR) Communications Team Leader. Worked with media throughout California for extremely successful launch of the Smog Check Consumer Assistance Program to aid residents whose cars failed the smog test. Updated and wrote Smog Check fact sheets. Worked with DMV to include Smog Check information with car registration renewal notices.

1994-2000

Metro Networks, Sacramento

News Bureau Chief – My staff of 17 provided anchored newscasts and network wire stories for 19 Sacramento, Stockton and Modesto radio stations. Liaison with local television stations and phone company for broadcast circuits. Kept all electronic equipment operating. Developed proposals and signed radio state affiliates.

1983-1994

KZAP, Sacramento

News & Public Affairs Director – Won 12 broadcast news awards, ran internship program, wrote and edited annual FCC-required Issues/Programs report. Served as president of the Sacramento Valley Broadcasters Association (1993-1994) and Capital Radio-Television News Directors Association (1988-1994).

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE
STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE
HUMBOLDT BAY REPOWERING PROJECT
BY PACIFIC GAS AND ELECTRIC COMPANY

Docket No. 06-AFC-7
PROOF OF SERVICE
(Revised 3/21/2008)

INSTRUCTIONS: All parties shall 1) send an original signed document plus 12 copies OR 2) mail one original signed copy AND e-mail the document to the web address below, AND 3) all parties shall also send a printed OR electronic copy of the documents that shall include a proof of service declaration to each of the individuals on the proof of service:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 06-AFC-07
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

Jon Maring
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245 Market Street
San Francisco, CA 94105
J8m4@pge.com

Susan Strachan
Environmental Manager
Strachan Consulting
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APPLICANT'S CONSULTANTS

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Sacramento, CA 95814
sgalati@gb-llp.com

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CH2M HILL Project Manager
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833
ddavy@ch2m.com

INTERESTED AGENCIES

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California Coastal Commission
45 Fremont, Suite 2000
San Francisco, CA 94105-2219
tluster@coastal.ca.gov

Paul Didsayabutra
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151 Blue Ravine Road
Folsom, CA 95630
PDidsayabutra@caiso.com

Electricity Oversight Board
770 L Street, Suite 1250
Sacramento, CA 95814
esaltmarsh@eob.ca.gov

INTERVENORS

ENERGY COMMISSION

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KAREN DOUGLAS
Commissioner and Associate Member
kldougl@energy.state.ca.us

Gary Fay
Hearing Officer
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John Kessler
Project Manager
jkessler@energy.state.ca.us

Lisa DeCarlo
Staff Counsel
ldecarlo@energy.state.ca.us

Mike Monasmith
Public Adviser's Office
pao@energy.state.ca.us

DECLARATION OF SERVICE

I, Mineka Foggie, declare that on May 15, 2008, I deposited copies of the attached Final Staff Assessment, in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Original Signature in Dockets
MINEKA FOGGIE