

Preliminary Staff Assessment

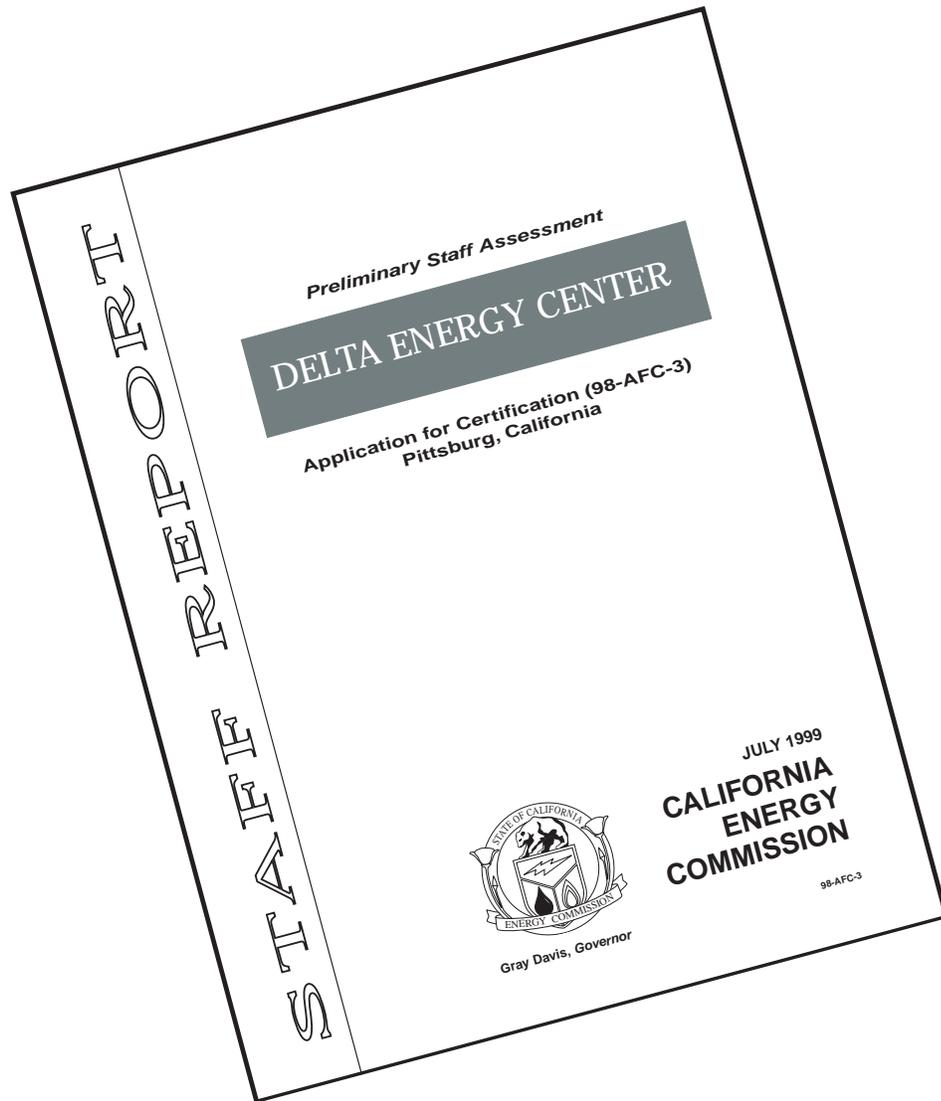
DELTA ENERGY CENTER

**Application for Certification (98-AFC-3)
Pittsburg, California**



Gray Davis, Governor

**JULY 1999
CALIFORNIA
ENERGY
COMMISSION**



CALIFORNIA ENERGY COMMISSION

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EXECUTIVE SUMMARY

The Preliminary Staff Assessment (PSA) presents the California Energy Commission staff's independent assessment of Calpine Corporation/ Bechtel Enterprises' Application for Certification (AFC) for the Delta Energy Center (DEC). The project, as proposed by Calpine/Bechtel, is an 880 MW, natural gas-fired, combined cycle, electric generation facility. The combined cycle design consists of three combustion turbine generators (CTGs), three heat recovery steam generators (HRSGs) with duct burners and a steam turbine generator (STG). The project is proposed to be located on an undeveloped 20-acre parcel at the Dow Chemical Company facility generally north and west of the adjacent Delta Diablo Sanitation District treatment facility in Pittsburg, California.

A new, 3.3-mile, 230 kilovolt (kV) electric transmission line is proposed. This line will interconnect to the electric transmission system at the existing PG&E substation near the Pittsburg Power Plant. The line will be above ground as it runs in front of USS POSCO, then will transition to underground along 8th street. A 0.8-mile underground 13.8 kV line will be built to supply 20 MW of electricity to Dow Chemical. A new 5.2-mile natural gas pipeline will be constructed to provide fuel for the project. The 20-inch gas pipeline will be placed in the existing Dow Chemical right-of-way along the Santa Fe Railroad and will connect to PG&E's main gas line near the Antioch natural gas terminal. Water for the cooling towers will be secondary-treated wastewater from Delta Diablo Sanitation District that will receive additional treatment on the project site to comply with the requirements of the Department of Health Services. A short water supply line will be constructed from Delta Diablo to the project. Water for steam production and domestic uses will be supplied by the Contra Costa Water District and transported in Dow's existing 20-inch pipeline. All plant discharges will be sent back to Delta Diablo Sanitation District for disposal in their existing discharge to New York Slough. Approximately 200,000 lbs/hr of saturated steam will be supplied to Dow Chemical in a 0.7-mile above ground insulated carbon steel pipeline. Condensate will be returned in an uninsulated pipe carried on the same structures.

If the project is approved by the Energy Commission construction is expected to begin immediately after the decision and will take about 22 months. Full-scale commercial operation is expected by mid 2002. Calpine/Bechtel expects a peak work force of approximately 575 personnel on the site during construction. The total construction payroll is estimated to be about \$36 million. Calpine/Bechtel expects to employ 24 full-time plant operators and technicians once the plant is complete with an annual payroll of about \$1.2 million. The capital cost of the project is estimated to be \$350 to \$485 million.

ENERGY COMMISSION JURISDICTION

The Delta Energy Center and related facilities such as the electric transmission lines, natural gas line, steam lines and wastewater lines are under the Energy Commission jurisdiction (Pub. Resources Code (PRC) §§ 25500 et seq.). When issuing a license, the Energy Commission acts as lead state agency (PRC § 25519(c)) under the California Environmental Quality Act (PRC §§ 21000 et seq.),

and its process is functionally equivalent to the preparation of an environmental impact report (PRC § 21080.5).

Staff's primary responsibility is to provide an independent assessment of the project's potentially significant effects on the environment, the public's health and safety, conformance with all applicable laws, ordinances, regulations and standards (LORS), and measures to mitigate any identified potential effects. The analyses contained in this PSA were prepared in accordance with PRC Sections 25500 et seq.; the California Code of Regulations (CCR) Title 20, Sections 12001 et seq.; and the California Environmental Quality Act (PRC §§ 21000 et seq.) and its guidelines (CCR title 14 §§ 15000 et seq.).

The PSA presents preliminary conclusions and conditions of certification for the design, construction, operation and closure of the facility. The analyses contained in this document are based upon information from the AFC and subsequent revisions; responses to data requests; supplemental information from local, state and federal agencies, local citizens and interested parties; existing documents and publications; independent field study and information gained at the three workshops held in Pittsburg.

FEDERAL, STATE, LOCAL AGENCY COORDINATION

Extensive coordination has occurred with numerous local, state and federal agencies. Particularly, Calpine/Bechtel and Energy Commission staff have worked with the City of Pittsburg, City of Antioch, Delta Diablo Sanitation District, the California Independent System Operator (Cal-ISO), the Bay Area Air Quality Management District, California Air Resources Board, U.S. Environmental Protection agency, to identify and resolve issues of concern.

In addition we have coordinated the review and analysis of the project with U.S. Fish and Wildlife Service, Department of Fish and Game, National Marine Fisheries, U.S. Army Corp of Engineers, the Regional Water Quality Board, Pacific Gas and Electric (PG&E), California Unions for Reliable Energy, CAP-IT and the interested residents of the community.

CONCLUSION AND RECOMMENDATIONS

Each technical area assessment in the PSA includes a discussion of the project and the existing environmental setting; the project's conformance with laws, ordinances, regulations and standards (LORS) and whether the facility can be constructed and operated safely and reliably; project specific and cumulative impacts; the environmental consequences of the project using the proposed mitigation measures; conclusions and recommendations; and any proposed conditions of certification under which the project should be constructed and operated, if it is approved.

In summary we conclude:

- Visual Resources was the only technical area in which the potential for a significant environmental impact was identified. We will continue to work with the City of Pittsburg and Calpine/Bechtel to resolve this matter, if possible.
- We believe the project to be in conformance with all Laws, Ordinances, Regulations and Standards (LORS) with the exception of the City of Pittsburg's General Plan policies regarding visual resource corridors and the height limitation on the property. The City of Pittsburg is in the process of reviewing Calpine/Bechtel's request for a height variance. A similar request was recently granted to the Pittsburg District Energy Facility and we expect a similar outcome for the Delta Energy Center.
- A project alternatives analysis was performed in which six sites were initially reviewed. Each of the six sites had both advantages and disadvantages, but no site was without major defect; either the potential for significant environmental impacts or were potentially infeasible for a variety of reasons. Based on this review, we do not believe that any of the alternative sites are superior to the DEC site nor do we recommend an alternative site to the DEC site proposed by Calpine/Bechtel.
- The analysis of the various technical areas includes proposed conditions of certification under which the project should be constructed and operated, if it is approved. These proposed conditions are necessary to ensure that project specific impacts are reduced to a level of insignificance.

PUBLIC COMMENT

Workshop(s) to discuss the PSA will be scheduled and held in Pittsburg during August and September 1999. All workshops will be publicly noticed 10-14 days in advance. The PSA is a draft document. Therefore, we encourage comment on its accuracy and seek input relating to the analysis, mitigation measures and proposed conditions of certification. Comments will be taken at the workshops or they can be made in writing to Paul Richins, Energy Commission Project Manager, 1516 Ninth Street, MS 15, Sacramento, CA 95814 or by e-mail to: prichins@energy.state.ca.us. Written comments should be received by August 19, 1999. From these comments we will revise this draft document and re-issue it as staff's Final Staff Assessment.

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INTRODUCTION

On September 17, 1998, the partnership of Calpine Corporation and Bechtel Enterprises, Inc. filed a petition requesting that the Delta Energy Center be granted a waiver from the California Energy Commission's Notice of Intention requirements (Docket 98-SIT-5). As a result of the December 2, 1998 hearing, the Energy Commission found that the project qualified for the exemption under Public Resources Code section 25540.6(a)(1). On December 18, 1998, Calpine/Bechtel filed an Application for Certification (AFC) seeking approval from the Energy Commission to construct and operate the 880-megawatt (MW) Delta Energy Center. On February 17, 1999, the Energy Commission found the AFC to be data adequate. Acceptance of the AFC by the Energy Commission initiated staff's review and analysis of the project.

The Energy Commission is responsible for reviewing and ultimately approving or denying all thermal electric power plants, 50 MW and greater, proposed for construction in California. The Energy Commission's facility certification process carefully examines public health and safety, environmental impacts and engineering aspects of proposed power plants and all related facilities such as electric transmission lines, natural gas pipelines and water lines. The Energy Commission's responsibilities are similar to those of a lead agency under the California Environmental Quality Act (CEQA).

The Preliminary Staff Assessment (PSA) presents the Energy Commission staff's independent assessment of Calpine/Bechtel's Application for Certification of the Delta Energy Center (DEC). This draft report is prepared pursuant to Title 20, California Code of Regulations, Sections 1742.5, 1743 and 1744.

Workshop(s) to discuss the PSA will be scheduled and held in Pittsburg during August and September 1999. All workshops will be publicly noticed 10-14 days in advance. The PSA is a draft document. Therefore, we encourage comment on its accuracy and seek input relating to the analysis, mitigation measures and proposed conditions of certification. Comments will be taken at the workshops or they can be made in writing to Paul Richins, Energy Commission Project Manager, 1516 Ninth Street, MS 15, Sacramento, CA 95814 or by e-mail to: prichins@energy.state.ca.us. Written comments should be received by August 19, 1999. From these comments we will revise this draft document and re-issue it as staff's Final Staff Assessment.

ORGANIZATION OF THE REPORT

The PSA describes the following:

- the project and the existing environmental setting;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards;
- the environmental consequences of the project using mitigation measures proposed by Calpine/Bechtel, Energy Commission staff, and federal, state and local agencies;

- the proposed conditions under which the project should be constructed and operated if it is certified;
- project closure; and
- project alternatives.

The assessment contained in this document is based upon information from the DEC Application for Certification (Docket 98-AFC-3) filed on December 18, 1998, supplemental information filed by Calpine/Bechtel, responses to Energy Commission data requests, Calpine/Bechtel's mitigation measures, information from local, state and federal agencies, interested individuals, intervenors, existing documents and publications and independent field studies and research. The PSA presents conclusions and proposed conditions that apply to both the construction and operation of the project.

The PSA contains an Executive Summary, Introduction, Project Description, Project Alternatives and staff recommendation on Need Conformance. The environmental, engineering, and public health and safety analysis of the DEC project is contained in 19 technical areas. Each technical area is included in a separate chapter and are as follows: air quality, public health, worker safety and fire protection, transmission line safety, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, water resources, geology (including geologic hazards, surface water hydrology, paleontological resources, geological 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, witness qualifications, glossary of terms and a list of staff that assisted in preparing this report.

Each of the 19 technical area assessments includes a discussion of:

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable)

FEDERAL, STATE AND LOCAL AGENCY COORDINATION

In preparation of the PSA, three publicly noticed workshops were held in Pittsburg to discuss various issues of the project including air quality, hazardous materials, transmission system engineering, alternative routes of the above ground and below ground portions of the transmission line, natural gas line, land use, public health, noise, vapor plume modeling and visual resources. The workshops were well attended by local agencies including the City of Pittsburg, City of Antioch, Delta Diablo Sanitation District, the Bay Area Air Quality Management District and the Cal-ISO.

Extensive coordination has also occurred with the numerous local, state and federal agencies that have an interest in the project. Particularly, Energy Commission staff and Calpine/Bechtel have worked with the City of Pittsburg, City of Antioch, Delta Diablo Sanitation District, the California Independent System Operator (Cal-ISO), the Bay Area Air Quality Management District, California Air Resources Board, and the U.S. Environmental Protection agency, to identify and resolve issues of concern. In addition we have coordinated the review and analysis of the project with U.S. Fish and Wildlife Service, Department of Fish and Game, National Marine Fisheries, U.S. Army Corp of Engineers, the Regional Water Quality Control Board, Pacific Gas and Electric (PG&E), California Unions for Reliable Energy, CAP-IT and the interested residents of the community.

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PROJECT DESCRIPTION

The project, as proposed by Calpine/Bechtel, is an 880 MW, natural gas-fired, combined cycle, electric generation facility. The combined cycle design consists of three combustion turbine generators (CTGs), three heat recovery steam generators (HRSGs) with duct burners and a steam turbine generator (STG). The plant will also provide 200,000 lbs/hr of saturated steam and about 20 MW of electricity to Dow Chemical. The project is proposed to be located on an undeveloped parcel at the Dow Chemical Company facility generally north and west of the adjacent Delta Diablo Sanitation District treatment facility.

The site is located within the city limits of Pittsburg at the border of the City of Antioch. The project will occupy approximately 20 acres of a 129.53-acre parcel of land (Assessor Parcel No. 073-230-042-1) owned by Dow Chemical. An additional 12 acres will be used for construction lay down area. The site is currently undeveloped and designated General Industry (IG) on the City of Pittsburg General Plan Land Use Map. According to the General Plan, the IG land-use classification is defined to include "large areas of major industrial manufacturing uses, including the existing operations such as USS-POSCO (formerly U.S. Steel) and Dow Chemical."

A new, 3.3-mile, 230 kilovolt (kV) electric transmission line is proposed. This line will interconnect to the electric transmission system at the existing PG&E substation near the Pittsburg Power Plant (this interconnection point is also referred to as the Pittsburg "switchyard"). The line will be above ground as it runs in front of USS POSCO, then will transition to underground along 8th street. A 0.8-mile underground 13.8 kV line will be built to supply electricity to Dow Chemical. A new 5.2-mile natural gas pipeline will be constructed to provide fuel for the project. The 20-inch gas pipeline will be placed in the existing Dow Chemical right-of-way along the Santa Fe Railroad and will connect near to PG&E's Antioch natural gas terminal. Water for the cooling towers will be secondary-treated wastewater from Delta Diablo Sanitation District that will receive additional treatment on the project site to comply with the requirements of the Department of Health Services. A short water supply line will be constructed from Delta Diablo to the project. Water for steam production and domestic uses will be supplied by the Contra Costa Water District and transported in Dow's existing 20-inch pipeline. All plant discharges will be sent back to Delta Diablo Sanitation District for disposal in their existing discharge pipe. Approximately 200,000 lb/hr of saturated steam will be supplied to Dow Chemical in a 0.7 mile above ground insulated carbon steel pipeline. Condensate will be returned in an uninsulated pipe carried on the same structures.

If the project is approved by the Energy Commission, construction is expected to begin immediately after the decision and will take about 22 months. Full-scale commercial operation is expected by mid 2002. Calpine/Bechtel expects a peak work force of approximately 575 craft laborers, supervisory, support and construction management personnel on the site during construction. The average work force over the entire 22-month construction period is estimated to be about 186 personnel. The total construction payroll is estimated to be about \$36 million.

Calpine/Bechtel expects to employ 24 full-time plant operators and technicians once the plant is complete with an annual payroll of about \$1.2 million. The capital cost of the project is estimated to be \$350 to \$485 million.

ELECTRIC TRANSMISSION LINES

The proposed 230-kV electric transmission line will connect the DEC to the existing PG&E substation at the Pittsburg Power Plant 3.3 miles to the west of the proposed DEC site. The transmission line exits the DEC site as an overhead line and will follow the BN&SF Railroad utility easement west to Columbia Street. Existing land uses adjacent to this above ground segment of the transmission line include industrial uses such as Dow Chemical and USS-POSCO, and undeveloped land. At a point east of the northern end of Columbia Street, the transmission line will convert to an underground line.

To “transition” the line below ground, an overhead/underground transition station will be constructed near the CEMCO industrial building on USS-POSCO property. The underground line will then travel through vacant land between East Santa Fe Avenue and the BN&SF railroad tracks. The Central Addition residential neighborhood is to the south of East Santa Fe, and industrial zoned land is to the north. The line will continue westward and underground within the median of 8th Street (the former Sacramento Northern Railroad right-of-way). Residential housing is the predominant land use adjacent to 8th Street. Zoning designations in this highly developed area are Duplex Residential (R-2), Multiple Family Residential (R-3), Residential / Semi-Commercial (R-4) and Central Commercial (C-2). The line will continue west along the abandoned railroad right-of-way and enter unincorporated Contra Costa County at a point just west of Beacon Street. Immediately west of the Delta Diablo Sanitation District pumping station, the transmission line will turn north to follow a utility easement into the Pittsburg Power Plant substation. The area traversed by the line in the County is zoned Heavy Industrial (H-I).

The project will also include a 0.8-mile 13.8 kV underground transmission line to Dow Chemical, which will provide up to 20 megawatts (MW) of power to Dow. The line will exit out of the DEC site in a northerly direction for about 1,000 feet. The line will then turn west, north of the industrial waste ponds, for approximately 1,500 feet before turning north again for about 1,500 feet and connecting to Dow Chemical. Adjacent land use is heavy industry and vacant land.

NATURAL GAS PIPELINE

Natural gas will be delivered to the DEC through a 5.2 mile pipeline. The underground pipeline primarily travels within the BN&SF Railroad right-of-way to interconnect with an existing PG&E natural gas supply line (Line 400) east of the DEC site. The gas pipeline will utilize an existing easement within the BN&SF right-of-way that Dow Chemical owns for an abandoned 4-in. caustic line. Since it may not be possible for DEC to utilize the Dow easement in all areas along the right-of-way, Calpine/Bechtel has applied to the railroad for a 75-foot pipeline corridor along the BN&SF right-of-way. This will give the DEC the flexibility to locate the pipeline on either side of the railroad tracks.

In the Application for Certification (AFC), Calpine/Bechtel proposed interconnecting with Line 400 at the PG&E Antioch Terminal east of Highway 160 on Bridgehead Road immediately north of the BN&SF railroad right-of-way. On June 11, 1999 Calpine/Bechtel filed an amendment to the AFC modifying the interconnection point with PG&E's Line 400 (DEC 1999d). The new interconnection point will reduce the length of the route by about 700 feet. The pipeline route is primarily within the City of Antioch, and will travel through land predominantly zoned for industry. It will also traverse unincorporated Contra Costa County in two locations. The proposed route is divided into segments for discussion purposes. The segment numbers begin at the DEC site and change where there are road crossings or due to the use of specific construction practices such as horizontal directional drilling.

SEGMENT 1

This 1.1-mile long segment begins at the DEC site and extends east toward the Antioch Marina. The majority of Segment 1 (4,400 feet) will be horizontally directionally drilled in order to avoid the Dow Wetland Preserve. The remainder of Segment 1 will be within the BN&SF right-of-way on the north side of the tracks. There is some industrial development along the south side of the route. There are no residents adjacent to this segment.

SEGMENT 2

This segment extends from west of the Antioch Marina to H Street (0.46 mile) and will be entirely within the BN&SF right-of-way. Existing land uses along Segment 2 include the Antioch Marina, Amtrak Station and Prospects High School/Antioch Adult School, located about 300 feet from the proposed pipeline route. The pipeline will be located along the north side of the railroad tracks in order to avoid recently installed landscaping at the Amtrak Station. There are no residents adjacent to Segment 2.

SEGMENT 3

This 0.31-mile segment begins near the Antioch Public Fishing Pier and is entirely within the BN&SF right-of-way. Commercial development abuts Segment 3 on the south side. There are no residents adjacent to this segment of the pipeline route.

SEGMENT 4

Near D Street the railroad tracks are carried on a rail bridge to make a water crossing. In order to avoid this crossing, this 0.41-mile segment of the pipeline route will deviate approximately 200 feet to the south of the BN&SF right-of-way. The pipeline will traverse vacant land between coastal marsh habitat to the north and residential housing about 150 feet to the south and at a higher elevation. The pipeline will travel through this vacant land for approximately 1,000 feet before rejoining the railroad right-of-way.

SEGMENT 5

This 0.25-mile long segment extends from McElheny Road to Fulton Shipyard Road. It is entirely within the BN&SF right-of-way and will travel along the north

side of the tracks. Segment 5 is surrounded by heavy industrial uses. No residents are adjacent to this segment of the pipeline route.

SEGMENT 6

This segment extends from Fulton Shipyard Road to the new interconnection with Line 400. Segment 6 will travel within the BN&SF right-of-way on the south side of the tracks. It will then cross under the tracks and from the right-of-way parallel Line 400 until reaching the interconnection point about 600 feet north of the railroad right-of-way and 50 feet south of Wilbur Avenue on PG&E property. Existing land uses adjacent to this segment include the Antioch Dunes National Wildlife Refuge and heavy and light industrial uses such as Georgia Pacific Gypsum and Victory Packaging. At a point west of the intersection of Viera and Santa Fe Avenue, the pipeline enters unincorporated Contra Costa County. For about 900 feet, the pipeline runs behind a row of houses that border on the BN&SF right-of-way. The railroad right-of-way within the County's jurisdiction is subject to a Railroad Corridor Combining District overlay zone. At the eastern edge of the residential area, the pipeline crosses back into the City of Antioch. Along this portion of the route, the pipeline runs along about 2,100 feet of grape vineyards. The pipeline once again enters Contra Costa County when it exits the BN&SF right-of-way to travel north across vacant PG&E property (zoned Heavy Industrial (HI) by the County) to the interconnection point.

At the interconnection with Line 400, there will be an above ground metering set, which will consist of a section of pipe with metering equipment and isolation valves. The metering set yard is 85' by 35" and will be fenced. The fencing will consist of non-reflective chain link with wood slat inserts. The area is industrial with a GWF power plant immediately to the east, and the Contra Costa Power Plant to the north and across Wilbur Avenue.

WATER PIPELINES

Water supply (for cooling) and discharge lines will run from the site for about 500 feet east to connect into the Delta Diablo Sanitation District Wastewater Treatment Plant. The existing land use is vacant land; zoning is IG. Potable water will be supplied by the Contra Costa Water District through an existing pipeline owned by Dow. The plant will be connected to this line, which runs down Arcy Lane, via a new 500-foot pipeline.

STEAM LINE

An 8-in. steam line will supply steam to Dow Chemical. The 0.7-mile line will run parallel to the electrical transmission line servicing Dow. Adjacent land use is heavy industry and vacant land.

PROJECT DESCRIPTION Figure 1
Regional Setting - - SEE MAP LOCATED ON OUR WEB SITE

PROJECT DESCRIPTION Figure 2
Local Setting - - SEE MAP LOCATED ELSEWHERE ON WEB SITE

PROJECT DESCRIPTION Figure 3 - NOT AVAILABLE IN PDF VERSION
Artist Rendering of the Delta Energy Center

PROJECT DESCRIPTION Figure 4 - NOT AVAILABLE IN PDF VERSION
Proposed Transmission Tower

NEED CONFORMANCE

Constance Leni

INTRODUCTION

Under state law, the Energy Commission cannot certify a proposed electric generating facility unless it finds that the project conforms with the Integrated Assessment of Need contained in the Energy Commission's most recent *Electricity Report*. This analysis examines whether the Delta Energy Center (Delta) conforms to the Energy Commission's Integrated Assessment of Need.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

STATE

CALIFORNIA CODE OF REGULATIONS

California Code of Regulations states "The presiding member's proposed decision shall contain the presiding member's recommendation on whether the application shall be approved, and proposed findings and conclusions on each of the following: (a) Whether and the circumstances under which the proposed facilities are in conformance with the 12-year forecast for statewide and service area electric power demands adopted pursuant to Section 25309(b) of the Public Resources Code." (Cal. Code Regs., tit. 20, § 1752(a).)

PUBLIC RESOURCES CODE

The Energy Commission's Final Decision must include, among other things, "Findings regarding the conformity of the proposed facility with the integrated assessment of need for new resource additions determined pursuant to subdivision (a) to (f), inclusive, of Section 25305 and adopted pursuant to Section 25308 or, where applicable, findings pursuant to Section 25523.5 regarding the conformity of a competitive solicitation for new resource additions determined pursuant to subdivisions (a) to (f), inclusive, of Section 25305 and adopted pursuant to Section 25308 that was in effect at the time that the solicitation was developed." (Pub. Resources Code, § 25523(f).)

NEED CONFORMANCE CRITERION

In order to obtain a license from the Energy Commission, a proposed power plant must be found to be in conformance with the Integrated Assessment of Need. The criterion governing this determination is contained in the *1996 Electricity Report (ER 96)*, and is most succinctly described on page 72 of that document:

"In sum, the ***ER 96*** need criterion is this: during the period when ***ER 96*** is applicable, proposed power plants shall be found in conformance with the Integrated Assessment of Need (IAN) as long as the total number of

Megawatts permitted does not exceed 6,737.”

CONCLUSIONS AND RECOMMENDATIONS

The Commission adopted **ER 96** on November 5, 1997. Delta was found data adequate on July 29, 1998. **ER 96** is the most recently adopted *Electricity Report* and because it was adopted prior to the Delta Application for Certification being found data adequate, the need conformance criterion of **ER 96** applies to the Delta project. Staff therefore evaluated the project based on the **ER 96** Need Conformance Criterion.

The Delta Energy Center shall be in conformance with the **ER 96** integrated assessment of need as long as the total number of megawatts permitted under **ER 96**, including this project's capacity, if approved, does not exceed 6,737 at the time of project approval.

AIR QUALITY

Magdy Badr

INTRODUCTION

This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the Delta Energy Center project. Criteria air pollutants are those for which a state or federal standard has been established. They include nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), ozone (O₃) and its precursors (nitrogen oxides (NO_x) and volatile organic compounds (VOC)), and particulate matter less than 10 and 2.5 microns in diameter (PM₁₀ and PM_{2.5}) and their precursors: NO_x, VOC, and SO_x.

In carrying out its analysis, the California Energy Commission staff evaluates the following points:

- whether the Delta Energy Center project is likely to conform with applicable Federal, State, and Bay Area Air Quality Management District (BAAQMD) air quality laws, regulations and standards, as required by Title 20, California Code of Regulations, sections 1744(b) and 1744.5 (b),
-
- whether the Delta Energy Center is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, sections 1742(b) and 1742.5 (b) , and
-
- whether the mitigation proposed for the Delta Energy Center is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, section 1742(b), and 1742.5(a).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

The federal Clean Air Act requires any new major stationary sources of air pollution and any major modifications to major stationary sources to obtain an air pollution permit before commencing construction. This process is known as New Source Review (NSR). Its requirements differ depending on the attainment status of the area where the major facility is to be located. Prevention of Significant Deterioration (PSD) requirements apply in areas that are in attainment of the national ambient air quality standards. The Non-attainment area NSR requirements apply to areas that have not been able to demonstrate compliance with national ambient air quality standards. The entire program, including both PSD and Non-attainment NSR permit reviews, is referred to as the federal NSR program.

Title V of the federal Clean Air Act requires states to implement and administer an operating permit program to ensure that large sources operate in compliance with

the requirements included in the Code of Federal Regulations 40, part 70. A Title V permit contains all of the requirements specified in different air quality regulations which affect an individual project.

The U.S. Environmental Protection Agency (EPA) has reviewed and approved the Bay Area Air Quality Management District's (BAAQMD) regulations and has delegated to the BAAQMD the implementation of the federal PSD, Non-attainment NSR, and Title V programs. The BAAQMD implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations.

STATE

The California State 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, response, health, or safety of any such person or the public, or which causes, or have a natural tendency to cause, injury or damage to business or property."

The state's Air Resources Board (ARB) promulgates state-level ambient air quality standards, which are, in general, more stringent than the national ambient air quality standards. Table 5.2-2 in the Application for Certification (AFC) presents a summary of the current national and state ambient air quality standards.

LOCAL

The proposed facility is subject to various BAAQMD rules and regulations. Regulation 2, Rule 2 is the more relevant local air quality rule for this project. This rule, entitled "New Source Review," applies to all new and modified stationary sources. It defines requirements related to Best Available Control Technology (BACT), offsets, emission calculation procedures to estimate bankable emission reduction credits (ERCs), and requirements for the federal acid rain program.

A more complete discussion of the applicable rules and regulations can be found in section 8.1 Regulatory Setting of the AFC and data responses. An in-depth discussion how the PDEF will comply with all applicable rules and regulations will be provided in the BAAQMD's Preliminary Determination of Compliance (PDOC).

SETTING

METEOROLOGY AND CLIMATE

A good presentation of the meteorological and climatological characteristics of the region can be found in section 8.1 of the AFC. In addition, the BAAQMD has published an excellent discussion on this subject, entitled "Climate, Physiography, and Air Pollution Potential - Bay Area and its Subregions" (BAAQMD, 1999).

The Delta Energy Center would be located in a climatological subregion of the Bay Area known as the Carquinez Strait region. This region covers the areas surrounding the Carquinez Strait, including cities such as Martinez, Pittsburg, Antioch, Fairfield, and Suisun City.

The project area is characterized by prevailing strong winds from the west, particularly during the spring, summer and fall. However, sometimes a weak westerly flow (flow from the east) develops, causing elevated pollutant levels in the Bay Area. During these periods the Bay Area, in general, is affected by low wind speeds and shallow mixing depths, thereby allowing the build up of pollution levels.

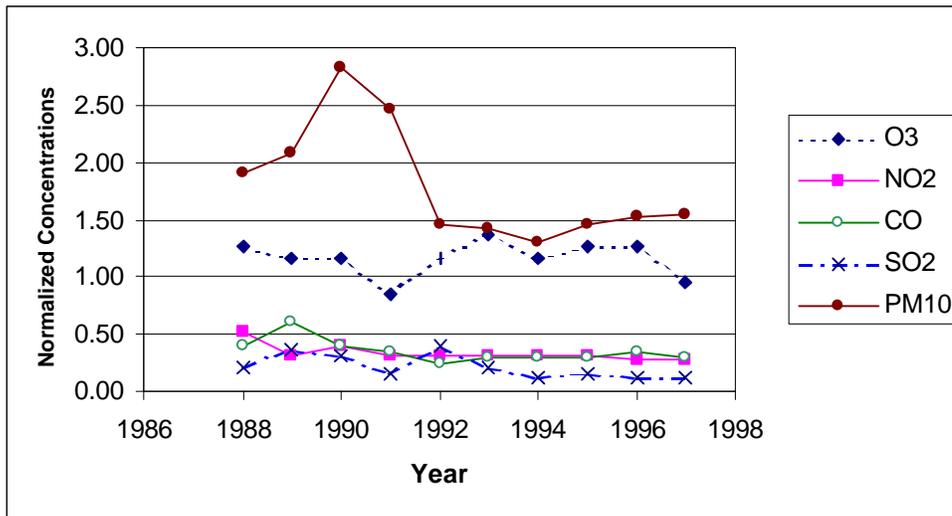
Pacific Gas and Electric (PG&E) collects meteorological data in Pittsburg. The data collected or subsequently estimated by PG&E includes wind direction, wind speed, temperature, and atmospheric stability class. The data collection monitor is located approximately four miles northwest (upwind) from the proposed project. The BAAQMD has deemed the data collected by this monitor as representative of the area's meteorology, and that it is appropriate to use for air dispersion modeling analyses for this project.

EXISTING AMBIENT AIR QUALITY

A very good summary of the existing ambient air quality conditions in the Project area can be found in the Delta Energy Center's AFC section 8.1. **AIR QUALITY Figure 1** summarizes the historical air quality data for project location for particulate matter less than 10 microns (PM10), CO, SO₂, O₃, and NO₂. In **AIR QUALITY Figure 1** normalized concentrations are presented, which represent the ratio of the highest measured concentrations in a given year to the most stringent applicable national or state ambient air quality standard. Therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the most stringent ambient air quality standard. The particulate matter data correspond to the data collected at Bethel Island, which has traditionally been higher than the concentrations measured at other sites in Contra Costa County.

Following is a more in-depth discussion of ambient air quality conditions in the Pittsburg area for O₃, CO, NO₂, and PM.

AIR QUALITY Figure 1
Normalized Maximum Short-Term Historical Air Pollutant
Concentrations:1988-1997. Pittsburg Area



A Normalized Concentration is the ratio of the measured concentration to the applicable most stringent air quality standard. For example, in 1997 the highest 24-hour average PM10 concentration measured in Bethel Island was $77 \mu\text{g}/\text{m}^3$. Since the most stringent ambient air quality standard is $50 \mu\text{g}/\text{m}^3$, the 1997 normalized concentration is $77/50 = 1.54$.

Source: ARB, 1998a as reported in Delta Energy Center, 1998.

OZONE

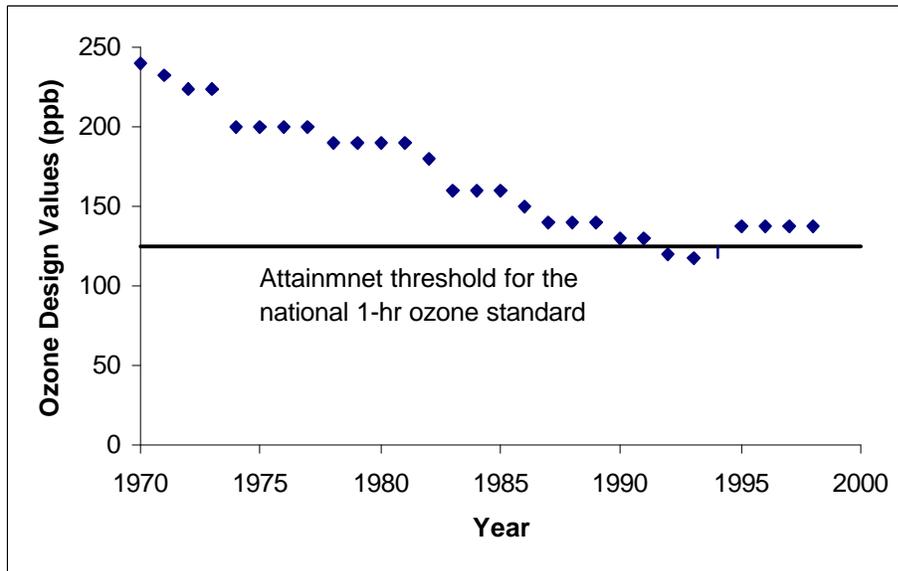
The Pittsburg area has experienced, in general, an average of four or five days with violations of the 1-hour state ambient air quality standard for ozone in a year and it may be in violation of the new 8-hour national ambient air quality standard for ozone. This new national standard, adopted in 1997, is more stringent than the previous 1-hour national ambient air quality standard but less restrictive than the state standard. The EPA still applies the 1-hour national ozone standard to areas that have been unable to attain the previous national ozone ambient air quality standard. The San Francisco Bay Area is one of the areas in this situation.

Ozone formation is influenced significantly by year-to-year changes in atmospheric conditions. For this reason, a long-term trend in ambient ozone levels is needed to understand if a region is experiencing reductions in its ambient ozone concentrations or not. As shown in **AIR QUALITY Figure 2**, the long-term statistics of ozone levels in the San Francisco Bay Area region shows that this region has made significant strides toward attainment of the previous federal ozone 1-hour standard.

The reasons for the recent violations of the federal ozone standard shown in the **AIR QUALITY Figure 2** are not known. However, one important characteristic of the last few years is that more exceedences have been observed during weekends, when NO_x emissions are expected to go down by 30 percent, and VOC emissions would only be reduced by 10 percent from the emission levels expected during weekdays (SCAQMD 1997). The “weekend effect”, modeling analyses, and other

corroborative analyses suggest that the air basin may be VOC limited. This means that any reductions in NO_x emissions may be counterproductive unless accompanied by reductions in VOC emissions. The BAAQMD is developing its 1999 State Implementation Plan (SIP) to identify a strategy to bring the air basin back to attainment of the national 1-hour standard (BAAQMD 1998). Additional studies will be conducted in the future to better understand the ozone problem in the Bay Area air basin and surrounding air basins. The study results will be used to develop equitable and more effective air quality management strategies to reach attainment of federal air quality standards.

AIR QUALITY Figure 2
District Ozone Design Value 1970-1998



Each design value represents the fourth highest concentration recorded in the air basin during the previous three years. Design values are used to determine attainment status.

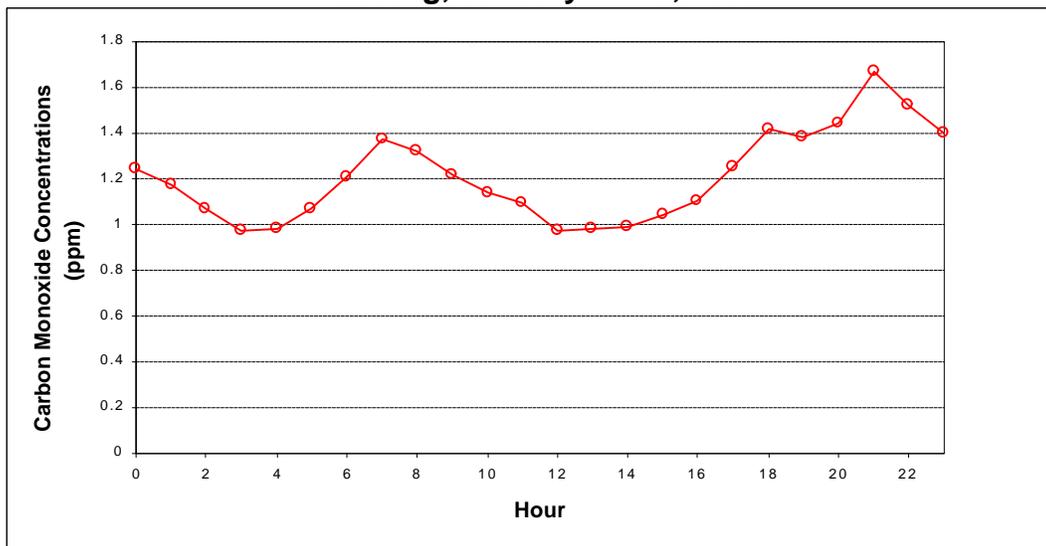
Source: BAAQMD, 1998

While high maximum hourly ozone concentrations are important, they do not reflect the geographical and temporal extent of ozone levels. The population weighted ozone exposure level is a better measure of public exposure and a more meaningful measure of public health concerns. This parameter has had a downward trend in Contra Costa County. For example, the most recent estimated per capita ozone exposure levels above the state standard in the 1994-1996 period are 16 percent lower than the values measured in the 1986-88 period (BAAQMD 1997a). Pittsburg does not experience, in general, violations of the less stringent national ozone 1-hour average ambient ozone air quality standard. As indicated above, the U.S. EPA adopted in 1997 a more stringent ozone standard that is set at a level of 80 parts per billion (ppb), averaged over an 8 hour period. Attainment designations with regard to this new standard will occur in the year 2000 and air quality management plans which will identify attainment strategies, if needed, are due in 2003. It is likely that the Bay Area air basin will be in non-compliance with the new ozone standard and, therefore, reductions of ozone precursor (NO_x and VOC) emissions will continue to be required in the foreseeable future.

CARBON MONOXIDE (CO)

The highest CO concentration levels measured in Pittsburg are at least one-half lower than the most stringent California ambient air quality standards (see **AIR QUALITY Figure 1**). The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. Since the mobile sector (cars, trucks, busses) is the main source of CO, we expect ambient concentrations of CO to be highly dependent on emissions from the mobile sector. In fact, the peak CO concentrations occur during the rush hour traffic in the morning and afternoon. In Pittsburg CO concentrations may also peak late in the evening, as shown in **AIR QUALITY Figure 3**. This is probably the result of CO emissions from wood burning in residential fireplaces in Pittsburg and/or adjacent areas.

AIR QUALITY Figure 3
Average Diurnal CO Profile
Pittsburg, January 1 - 15, 1996



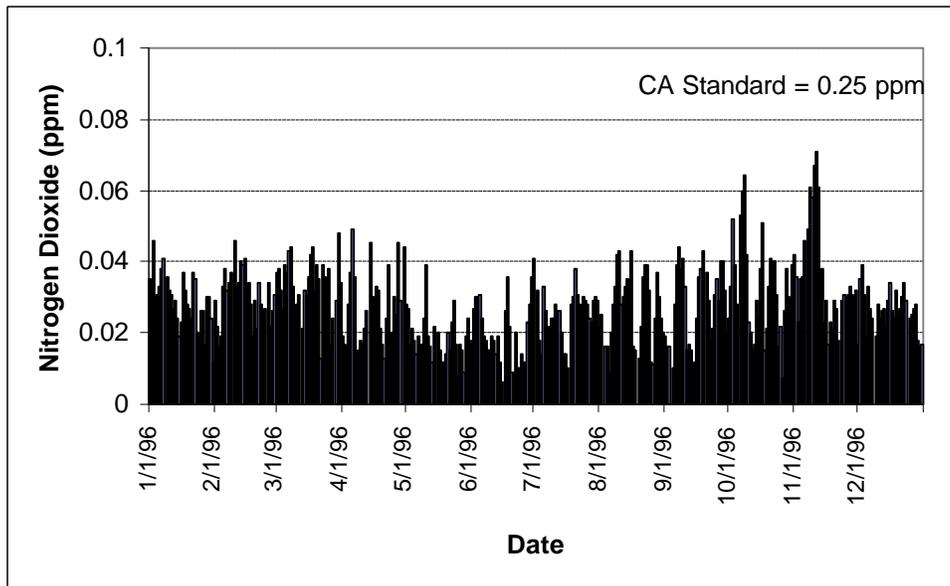
Source: ARB, 1998a

Carbon monoxide concentrations in Pittsburg and the rest of the state have declined significantly due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phases I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to the decline in CO levels in the state. Today all the counties in California, with the sole exception of Los Angeles County, are in compliance with the CO ambient air quality standards. Recently the California Air Resources Board rescinded the requirements for a minimum level of oxygen in the wintertime fuel when allowed by federal law (ARB 1998b). Even with this action, county-wide and state-wide forecasted CO inventories show a decline (ARB, 1998b). Therefore, compliance with the CO standards are expected to continue in the future.

NITROGEN DIOXIDE (NO₂)

NO₂ levels in Pittsburg are no more than one-half of the most stringent NO₂ ambient air quality standards, as shown in **AIR QUALITY Figure 1**. Approximately 90 percent of the NO_x emitted from combustion sources is NO, while the balance is NO₂. NO is oxidized in the atmosphere to NO₂ but some level of photochemical activity is needed for this conversion. This is why the highest concentrations of NO₂ occur during the fall (see **AIR QUALITY Figure 4**) and not in the winter when atmospheric conditions favor the trapping of ground level releases but lack significant photochemical activity (less sun light). In the summer the conversion rates of NO to NO₂ are high but the relatively high temperatures and windy conditions (atmospheric unstable conditions) disperse pollutants, preventing the accumulation of NO₂ to levels approaching the 1-hour ambient air quality standard.

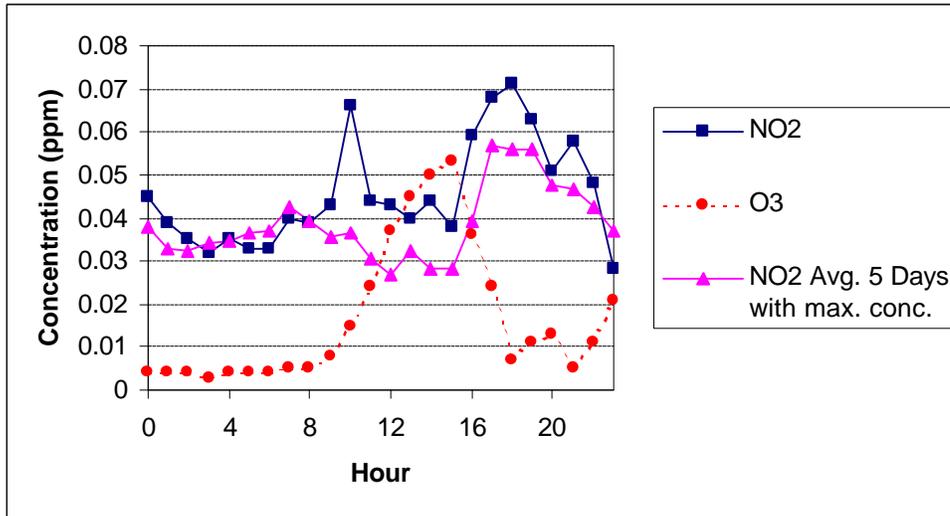
AIR QUALITY Figure 4
Maximum Daily 1-hour average NO₂ Concentrations measured in 1996:
Pittsburg Station



Source: ARB,1998a

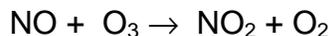
AIR QUALITY Figure 5 presents the diurnal profile of NO₂ and O₃ concentrations observed on November 11, 1996 (Monday) when the highest ambient 1-hour NO₂ concentration was recorded in 1996. This figure also shows the average diurnal NO₂ profile for the five days with the highest measured concentrations in 1996, all occurring in the fall.

AIR QUALITY Figure 5
Diurnal Profile for NO₂ and O₃
Pittsburg Station: 11/11/96 and five day with the maximum concentrations



Source: ARB, 1998a.

One important thing to notice from **AIR QUALITY Figure 5** is that the maximum NO₂ concentrations that occur late in the afternoon are possibly linked to the rapid reaction of NO emissions from ground level sources with the ground level ozone, as shown in the following equation:



As indicated before, fresh NO_x (NO plus NO₂) emissions from combustion sources are mainly NO emissions. The above reaction explains why, in urban areas, ozone concentrations at ground level drop substantially at night, while aloft and in rural areas (without sources of fresh NO_x emissions) ozone concentrations can remain relatively high.

PARTICULATE MATTER (PM)

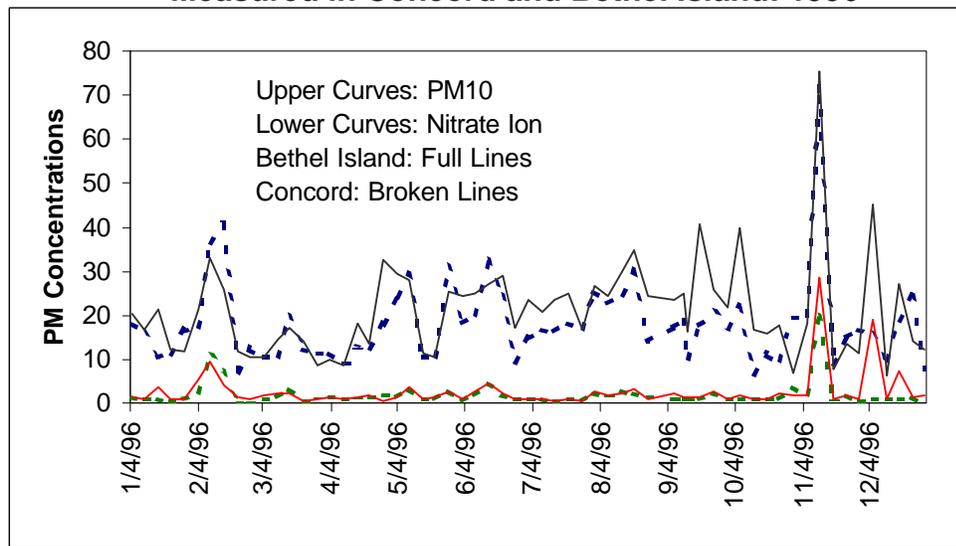
As shown in **AIR QUALITY Figure 1**, PM concentrations measured at the Bethel Island monitoring station declined in the last few years. The same trend has been observed at other sites at Contra Costa County, including the City of Concord.

One issue that has been raised by the public is the lack of a PM monitoring station in Pittsburg. The concern is that PM concentrations in Pittsburg may be higher than the PM concentrations in Concord. To address this issue, we will use in our analysis the PM concentrations measured at Bethel Island, which have been traditionally the highest measured concentrations in the county. In addition, as shown in **Air Quality Figure 6**, PM concentrations in both Concord and Bethel Island track each other reasonably well, suggesting that Pittsburg should also have a similar PM profile. This is confirmed by the measurements taken in Crockett a few years ago, which show that PM concentrations there were not significantly

different from concentrations measured at other Contra Costa County sites and were lower than measurements taken at Bethel Island.

PM 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. **AIR QUALITY Figure 6** also shows that the nitrate ion concentrations during the winter time are a significant portion of the total PM10 and should be even a higher contributor to particulate matter of less than 2.5 microns ($\text{PM}_{2.5}$). The nitrate ion is only a portion of the PM nitrate, which can be in the form of ammonium nitrate (ammonium plus nitrate ions) and some as sodium nitrate. If we consider the ammonium and the sodium associated with the nitrate ion, we can estimate much higher PM nitrate contributions to the total PM than can be inferred by just looking at **AIR QUALITY Figure 6**.

AIR QUALITY Figure 6
Total PM10 and PM Nitrate Ion
Measured in Concord and Bethel Island: 1996



Source: ARB, 1998a

In 1997, the U.S. EPA established a new ambient air quality standard for $\text{PM}_{2.5}$. The air agencies in California are now deploying $\text{PM}_{2.5}$ ambient air quality monitors throughout the state. Attainment designations are expected in 2003 based on measurements to be taken a few years before 2003. $\text{PM}_{2.5}$ ambient air quality attainment plans, if needed, are due to the U.S. EPA by 2005. As with PM_{10} , information from existing $\text{PM}_{2.5}$ research monitors in California indicates that there have been significant reductions in ambient $\text{PM}_{2.5}$ concentrations in the state (Watson 1998) and that the San Francisco Bay Area air basin may be in attainment of the new $\text{PM}_{2.5}$ standards.

The highest PM concentrations are measured in the winter. During wintertime high PM episodes, the contribution of ground level releases to ambient PM concentrations are disproportionately high. For example, wood smoke contributes approximately 47 percent of the PM_{10} mass in San Jose, while the contribution at

Pittsburg may be on the order of 30 percent (Chow et al. 1995). The contribution of woodsmoke particles to the PM_{2.5} concentrations may be even higher, considering that most of the woodsmoke particles are smaller than 2.5 microns.

OTHER AIR POLLUTANTS

There are also ambient air quality standards for sulfates and lead. A full description of the measured ambient air concentrations in Pittsburg is contained in section 8.1.3 of the AFC (Delta Energy Center, 1998). The ambient concentrations of these pollutants are well below their respective standards.

DELTA ENERGY CENTER ESTIMATED EMISSIONS

CONSTRUCTION PHASE

The construction phase includes the power plant and ancillary facilities (i.e., steam line, transmission lines, and pipelines for reclaimed water, natural gas, fire and potable water). The construction of the proposed power plant will result in temporary emissions for approximately 14 months.

All construction scheduling is based on a 40-hour work week. The worst-daily fugitive dust emissions are expected to occur during the first two to three months of construction. Tables 8.1E-1 through 8.1E-3 in the AFC present detailed construction emission estimates for PM₁₀, NO_x, CO, SO_x, and VOC emissions from vehicle and equipment combustion and from site grading activities. It is important to understand that construction estimated emissions are highly speculative since detailed activity data can not be forecast accurately and the emission factors used in these estimations are known to be conservative estimates. For example, the Air Resources Board has recently measured PM emissions from actual construction sites and has revised its estimated PM₁₀ construction related emissions downward by 67 percent (ARB 1997).

COMMISSIONING AND OPERATIONAL PHASES

The proposed Delta Energy Center is a combined cycle power plant with three new power trains. Each power train consists of a gas turbine rated at 200 MW, a duct burner and a heat recovery steam generator (GT/HRSG). The steam from the heat recovery the steam generators will be fed to a steam turbine rated at 300 MW and part of steam will be delivered to the Dow Chemical Company Complex. The actual operation of turbines will range between 70 percent to 100 percent of their maximum rated output. Supplemental firing will be provided by the duct burners up to 200 MMBtu/hr to maintain required electricity and steam production rates. The facility will also include two 200,000 lb/hr auxiliary boilers, a 14-cell mechanical cooling tower, emergency generator, and a fire pump engine.

The existing facility consists of three Pratt and Whitney FT4 natural gas fired gas turbines with fired HRSGs. These turbines are used to provide electricity and steam

to Dow Chemical Company Complex and will continue to operate in conjunction with the new turbines.

The Delta Energy Center will burn only natural gas with no provisions for an alternative backup fuel. The exclusive use of an inherently clean fuel, natural gas, will limit the formation of VOC, PM10, and SO_x. The combustion turbine will be equipped with low-NO_x combustors to minimize NO_x formation. After combustion, the flue gases will be treated by Selective Catalytic Reduction (SCR) systems to further reduce NO_x emissions. Calpine/Bechtel is not proposing an oxidizing catalyst at this time to further control CO and VOC emissions.

“Commissioning” is the technical term used to describe, in general, all the operations of the power plant once it has been physically installed but is not yet in commercial operation. Commissioning starts with the first firing of fuel in the GT/HRSG or in the auxiliary boilers. During commissioning the control systems are tested, the burners are tuned up, the inside and outside of tubes are cleaned up, and the control systems are installed after determining that there are no contaminants in the GT/HRSG that may damage the surfaces of the catalysts. It is important to emphasize that for a short period of time, during the commissioning period which can last for several months, the power plant will operate without emission controls. Commissioning ends with the start of commercial operation, which is usually signaled by the issuance of the Permit to Operate (PTO) from the local air district.

AIR QUALITY Table 1 presents the estimated maximum emission concentration for NO₂ over the one hour averaging times. The table also shows that during the commissioning of the project using a start-up hourly average emissions, and giving the background, the maximum concentration per turbine does not violate the State one hour ambient air quality standard of 470 (µg/m³).

CO and NO_x emissions are relatively easy to measure, even during commissioning, because calibrated continuous emission monitors for both pollutants will be installed before commissioning begins. The amount of fuel burned and the sulfur content of the fuel will limit SO_x emissions. There is no additional control on CO emissions since no CO catalyst is proposed at this time. Therefore, CO and VOC emissions will be at the same levels during the commissioning and normal operation of the Delta Energy Center.

Finally, PM10 emissions during commissioning are not expected to exceed the daily emissions established for normal operation because natural gas combustion does not produce high PM emissions and the amount of fuel consumed during this period is expected to be lower than during normal operations.

AIR QUALITY Table 1
Maximum NO_x Emission Impact During Commissioning per Gas Turbine

Pollutant/Averaging Time	Maximum Impact (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)
NO ₂ 1-hour	219	153	372

Source: Calpine/Bechtel response to data request AQ-10 dated April 20,1999.

The maximum facility emission levels presented in **AIR QUALITY Table 2** are calculated based on the following assumptions:

Delta Energy Center Hourly Emission Assumptions:

- One turbine is in hot start-up mode with no duct burner, while the other two turbines operate at full load with duct burners;
- One auxiliary boiler operating at full load, and the other operating at 10% load;
- Cooling tower is in operation;
- Emergency generator or fire pump is in operation.

Delta Energy Center Maximum Daily Emission Assumptions:

- Each turbine has one cold start-up (three hours) and one hot start-up (one hour);
- Each turbine operates at full load for the remaining hours;
- Duct burners operate for 16 hours each;
- One auxiliary boiler operates at full load, and the other operates at 10% load;
- Emergency generator or fire pump is in operation;
- Cooling tower operates 24 hours.

Delta Energy Center Maximum Annual Emission Assumptions:

- Each turbine has 52 cold start-up (156 hours) and 260 hot start-up (260 hours);
- Each turbine operates at full load for the remaining 8,344 hours;
- Duct burners operate for 1500 hours;
- One auxiliary boiler operates for 540 hours at full load, and the other operates at 40 hours per year at full load. The remaining time, both boilers are operating at minimum load;
- The fire pump operates 200 hours per year;
- Emergency generator operates 200 hours per year;
- Cooling tower operates 8760 hours per year.

These assumptions are for the new equipment only. However, Calpine/Bechtel is in the process of figuring out how the three existing turbines will operate with the new turbines on daily and annual bases.

AIR QUALITY Table 3 delineates the maximum heat rate assumptions underlying the emission calculations for the new equipment for the Delta Energy Center.

AIR QUALITY Table 2
Maximum Hourly, Daily, and Annual Emissions

	NO _x			CO			VOC			PM10			SO _x		
	lb/hr	lb/day	Tons/yr	lb/hr	Lb/day	tons/yr	lb/hr	lb/day	tons/yr	lb/hr	lb/day	tons/yr	lb/hr	lb/day	tons/yr
GT1	18.1	1068.6	235.7	44.1	10512.6	1000.6	8.0	240.0	92.1	10.0	180.0	108.9	1.2	21.6	13.1
GT2	18.1			44.1			8.0			10.0			1.2		
DT3	18.1			44.1			8.0			10.0			1.2		
GT1 w/DB	19.2	921.6	43.2	113.5	5448.0	255.4	12.0	576.0	27.0	12.0	576.0	27.0	1.3	60.9	2.9
GT2 w/DB	19.2			113.5			12.0			12.0			1.3		
GT3 w/ DB	19.2			113.5			12.0			12.0			1.3		
Boiler1 @ 100%	2.82	67.6	2.2	9.3	223.9	6.4	0.53	12.7	0.6	2.0	48.0	2.6	0.26	6.2	0.2
Boiler1 @ 10%	0.34			1.0			0.11			0.5			0.026		
Boiler 2 @ 100%	2.82	67.7	1.5	9.3	223.9	4.3	0.53	12.7	0.5	2.0	48.0	2.2	0.26	6.2	0.1
Boiler2 @ 10%	0.34			1.0			0.11			0.5			0.026		
Cooling Tower	-	-	-	-	-	-	-	-	-	3.2	77.2	14.1	-	-	-
GT-S	80	-	-	838	-	-	16.0	-	-	-	-	-	-	-	-
EG	4.9	4.9	0.5	13.3	13.3	1.3	6.3	6.3	0.6	1.1	1.1	0.1	0.014	-	-
FPE	3.9	-	-	3.6	-	-	0.48	-	-	0.2	-	-	0.106	-	-
Total Facility	-	2,130.5	283.5	-	16,421.7	1,268.1	-	847.7	120.8	-	930.3	154.9	-	95.0	16.2
GT1 = the first gas turbine. GT1 w/ DB = the first gas turbine and Duct Burner. GT-S = Start-up emissions from either GT. EG = Emergency Generator FPE = Fire Pump Engine															

Source: Calpine/Bechtel AFC Appendix 8.11

AIR QUALITY Table 3
Maximum Hourly, Daily, and Annual Fuel Consumption

	Hourly	Daily	Annual
	(MMBtu/hr)	(MMBtu/day)	(MMBtu/yr)
GT1 w/ DB	2125	50,024	17,727,252
GT2 w/ DB	2125	50,024	17,727,252
GT3 w/ DB	2125	50,024	17,727,252
Boiler 1	256	6,144	351,960
Boiler 2	256	6,144	351,960
Total Facility	6,887	162,358	53,770,676

Source: AFC Table 8.1-15

PROJECT IMPACTS

MODELING APPROACH

Calpine/Bechtel used the SCREEN model to select the worst case turbine configuration that would produce the highest impacts. The SCREEN model is an approved U.S. model designed to provide conservative estimation of impacts. Based on the results of the SCREEN model, Calpine/Bechtel modeled the Westinghouse gas turbine and HRSG configuration using a more refined modeling analysis. This more refined modeling analysis was done with the Industrial Source Complex (ISC) model, using near-by meteorological data collected at the PG&E Pittsburg power plant between 1994 and 1997.

CONSTRUCTION IMPACTS

Calpine/Bechtel estimated the impacts of construction-related emissions using the ISC model. **AIR QUALITY Table 4** provides a summary of the maximum estimated impacts. The modeling results indicate that the construction-related emissions would cause violations of the one hour NO₂ standard and 24 hour and annual PM10 standards. The impact estimates are very conservative because of a potential overestimation of emission levels, the lack of consideration of rapid deposition of PM fugitive (dust) emissions, and potential overestimation of impacts from ground-level releases using the ISC model. It is important to note that these are temporary impacts that would only occur during the construction phase of the project. Also they do not reflect the implementation of construction related mitigation measures included in conditions proposed by Energy Commission staff to minimize emissions.

AIR QUALITY Table 4
Maximum Estimated Construction-Related Incremental Impacts

Pollutant	Averaging Time	Incremental Impacts ($\mu\text{g}/\text{m}^3$)	Maximum Background ($\mu\text{g}/\text{m}^3$)	Maximum Total Impacts ($\mu\text{g}/\text{m}^3$)	State Limiting Standard ($\mu\text{g}/\text{m}^3$)	Federal Limiting Standard ($\mu\text{g}/\text{m}^3$)	Percent of the Standard (%)
NO ₂ ²	1-hour	460 ¹	153	613	470	-	130.4
	Annual	10.1	33	43.1	-	100	43.1
PM10	24-hour	117 ¹	77	194	50	150	388
	Annual	9.8	23.3	33.1	30	-	110.3

CO	1-hour	592.8 ¹	8149	8741.8	23000	40000	38.0
	8-hour	288.3 ¹	3725	4013.3	10000	10000	40.1
SO ₂	1-hour	55.0	106	161	650	-	24.8
	24-hour	11.9 ¹	32	43.9	109	365	40.3
	Annual	0.37	5.3	5.7	-	80	7.12

¹ Based on maximum daily emissions during the construction period.

² Ozone limiting method applied to the 1-hour average using the maximum background levels in the last three years.

Sources: AFC Table 8.1E-4 from AFC.

In addition, we should add that the maximum fugitive dust PM10 emission levels and impacts would not occur during the winter time when the highest measured PM concentrations are historically measured in the San Francisco air basin. This is due to the fact that the ground tends to be wet during the winter because of the rains, and the relative humidity is high.

PROJECT NORMAL OPERATIONAL IMPACTS

Calpine/Bechtel has assessed the impact of the operation of the facility using EPA-approved air quality dispersion models. The AFC presents the SCREEN and the ISC modeling analyses in Appendix 8.1B. The impact analyses were used to determine the worst case ground level impacts of the facility. The results show that the facility, by itself, does not violate the State or Federal ambient air quality standards. However, the PM10 impact from the facility when added to the existing background exceeds the 24 hour State Standard. Staff finds the Calpine/Bechtel analysis of the operational impact to be acceptable. **AIR QUALITY Table 5** presents a summary of the ISC modeling results for the proposed Delta Energy Center.

**AIR QUALITY Table 5
ISC Modeling Results**

Pollutant	Averaging Time	Facility Maximum Impact (µg/m ³)	Maximum Background (µg/m ³)	Maximum Total Impacts (µg/m ³)	State Limiting Standard (µg/m ³)	Federal Limiting Standard (µg/m ³)	Percent of Standard (%)
NO ₂	1-hour	267	153	420	470		84.7
	Annual	1	33	34	-	100	34
CO	1-hour	725	8149	8874	23000	40000	38.6
	8-hour	244	3725	3969	10000	10000	39.7
PM10	24-hour	4.95	77	82	50	150	164
	Annual	0.3	23.3	24	30	-	80
SO ₂	1-hour	33	106	139	650	-	21.4
	24-hour	0.5	32	32.5	109	365	29.8
	Annual	0.03	5.3	5.3	-	80	6.6

Source: AFC Table 8.1-28, Appendix 8.1 B and Table 1 in letter dated June 28, 1999.

CUMULATIVE IMPACT ANALYSES

The Energy Commission staff has conducted a cumulative impact analysis for the Pittsburg project using the emissions from the new gas turbines proposed as part of the Delta Energy Center. Emission from the existing Dow Chemical Company turbines were not included. Due to the proximity of the existing and proposed

turbines, staff has asked DEC to evaluate the combined impacts of the existing and new turbines. Staff intends to include this information in a revised cumulative impact analysis in the FSA.

MITIGATION

APPLICANT'S PROPOSED MITIGATIONS

The Calpine/Bechtel is proposing to mitigate potential air quality impacts using a state of the art combustion technology, installing post-combustion control devices, and providing offsets, as required by the BAAQMD's regulations.

The Calpine/Bechtel is proposing to install a gas turbine equipped with Low NO_x combustors that can achieve low NO_x concentrations without the need for steam or water injection. In addition, the GT/HRSG will be equipped with SCR to control NO_x. The auxiliary boiler will comply with the Best Available Control Technology (BACT) limitations determined by the BAAQMD. However, Calpine/Bechtel is not proposing a CO catalyst at this time.

The Calpine/Bechtel has submitted confidential information regarding the offsets that they plan to provide for this project. The applicant is still in negotiations with the sellers of the offsets. However, one potential problem is the fact that all sources of offsets are required to go through the regulatory "banking" process of certifying the emission reductions that have occurred or will occur to obtain valid ERCs before the Final Determination Of Compliance is issued by the BAAQMD.

ADEQUACY OF PROPOSED MITIGATION

The BACT (state definition) levels, which are applicable to individual projects, are typically determined by the local air district with input from the Air Resources Board (ARB) and EPA. Recently, in both the High Desert and Sutter Power Plant AFC cases, the EPA has clearly stated their position regarding what they consider to be BACT (federal definition) and Lowest Achievable Emission Rates (LAER).

For NO_x, Calpine/Bechtel has agreed in their letter to the BAAQMD dated June 8, 1999, to a permit limit of 2.5 ppm averaged over one hour, which is consistent with EPA recommendations. For VOC, the BAAQMD did not propose, on the Pittsburg Project, limitations in terms of concentrations, e.g. ppm, but has specified limitations in terms of mass emissions (lb/hr, lb/day, and tons per year). Staff expects a similar strategy from the BAAQMD on this project.

With respect to CO, Calpine/Bechtel is not proposing to install a CO catalyst. They propose to meet a limit of 10 ppm over a three hour averaging time. Calpine/Bechtel is claiming that the CO catalyst would increase the PM10 emissions by approximately 2 lb/hour. Calpine/Bechtel submitted analysis to support their argument on May 7, 1999. Staff reviewed this issue and believes that the analysis does not justify Calpine/Bechtel's position (see Appendix A which addresses this issue in more detail). Furthermore, Calpine/Bechtel submitted to this Commission another AFC, "Metcalf Energy Center", with a similar turbine

configuration to Delta Energy Center, in which they stated that they can not meet the 10 ppm limitation for CO at all times. Staff discussed this issue with the BAAQMD staff who are continuing to investigate this issue.

ERCs are generated from reduction of emissions from existing sources beyond what is required by rules and regulations or by required control measures included in district Air Quality Management Plans (AQMPs) for future adoption. Offsets, in the form of ERCs, are required for the Delta Energy Center for NO_x, VOC, and PM10 in order to assure future attainment of ozone and PM10 standards. ERCs are banked and can be used to offset the emission increases for future projects. In past siting cases some intervenors have argued that the ERCs are not actual mitigation since the emission reductions have already occurred and, therefore, ambient air quality can only deteriorate with the new source of emissions. However, the BAAQMD, in its AQMP, includes banked ERCs in its planning emissions inventories for future years as actual ongoing emissions (BAAQMD, 1997b). Therefore, the future effects of new sources due to emission increases are already taken into account in the AQMP, including the use of ERCs as a source of mitigation or offsets. The new source will not detract from the BAAQMD's attainment strategy. Consequently, we believe that banked offsets in this case constitute real mitigation of potential impacts from the proposed project in the context of the BAAQMD's overall attainment strategy.

COMPLIANCE WITH LORS

FEDERAL

The U.S. EPA has delegated its Prevention of Significant Deterioration (PSD) and Non-attainment New Source Review (NSR) requirements to the BAAQMD. This delegation is only done for air districts that are able to demonstrate to the satisfaction of U.S. EPA that their regulatory programs are at least as stringent as the federal PSD and Non-attainment NSR programs. The BAAQMD will issue an Authority to Construct (ATC) only after this project secures a license from the California Energy Commission which will be based, in part, on the BAAQMD's Final Determination of Compliance (FDOC). The ATC will be equivalent to a federal PSD and federal Non-attainment NSR permit. In addition, the U.S. EPA has also delegated to the BAAQMD the authority to implement the federal Clean Air Act Title V operating permit program. This operating permit is issued only after a facility is in operation and will be included in the BAAQMD's Permit to Operate. Therefore, compliance with the BAAQMD's rules and regulations should result in compliance with federal requirements.

STATE

The project, assuming full compliance with the BAAQMD's rules and regulations, should comply with Section 41700 of the California State Health and Safety Code.

LOCAL

The regulatory offsets required for this project have not yet been secured. Part of the offsets that Calpine/Bechtel would like to use have also not been banked yet. Since these offsets have not been banked, they do not yet constitute valid ERCs. For this reason, the project does not yet comply with the offset requirements of Sections 2-2-302 and 2-2-303 of Rule 2, Regulation 2. Furthermore, Calpine/Bechtel is proposing the use of the existing facility as a source of offsets. It is not clear yet to the staff if these offsets are surplus, permanent and enforceable. This issue will be addressed by the District in the PDOC.

At the time of the preparation of this analysis, the BAAQMD had not yet submitted its PDOC. Therefore, a finding of compliance with the BAAQMD's rules and regulations cannot yet be made. The BAAQMD intends to issue the PDOC soon. The PDOC will be subject to a 30-day public review period before the BAAQMD prepares its DOC.

FACILITY CLOSURE

Eventually the Delta Energy Center will close, either as a result of the end of its useful life, or through some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, then all sources of air emissions would cease and thus all impacts associated with those emissions would no longer occur.

The Permit to Operate, issued by the BAAQMD, is required for operation of the facility and is usually renewed on a five year schedule. However, during those five years, the applicant must still pay permit fees annually. If the applicant chooses to close the facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the project could not restart and operate unless the applicant pays the fees to renew the Permit to Operate.

If Delta Energy Center were to decide to dismantle the project, there would likely be fugitive dust emissions associated with this dismantling effort. The Facility Closure Plan to be submitted to the Energy Commission Compliance Project Manager should indicate that the applicant will comply with the applicable construction related permit conditions included in the Conditions of Certification.

CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented in this analysis, we cannot recommend approval of the proposed project at this time. The following must be done before staff can complete its analysis and present its recommendations on the project:

1. Calpine/Bechtel must provide an adequate offset package which must be approved by the BAAQMD.
2. Calpine/Bechtel and the BAAQMD need to resolve whether a CO catalyst is required for the project.

3. The BAAQmd must issue the FDOC.
4. A revised cumulative impact analysis of the Delta Energy Center's operation should be conducted.
5. The BAAQMD must determine whether Calpine/Bechtel's proposed use of the existing Dow Chemical facility turbines as a source of offsets is acceptable to mitigate a portion of the proposed project's emission increases.

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes conditions of certification for construction activities, at this time. Conditions of Certification for the operation of the facility will be included in staff's final testimony, following the issuance of the FDOC.

For the purposes of these conditions, the following definitions apply:

(1) ACTIVE OPERATIONS shall mean any activity capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, or heavy- and light-duty vehicular movement.

(2) CHEMICAL STABILIZERS mean any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation; and should meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(3) CONSTRUCTION/DEMOLITION ACTIVITIES are any on-site mechanical activities preparatory to or related to the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities; grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(4) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust.

(5) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(6) EARTH-MOVING ACTIVITIES shall include, but not be limited to, grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, or soil mulching.

(7) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man.

(8) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of ten consecutive days.

(9) STABILIZED SURFACE means:

(A) any disturbed surface area or open storage pile which is resistant to wind-driven fugitive dust;

(B) any unpaved road surface in which any fugitive dust plume emanating from vehicular traffic does not exceed 20 percent opacity.

(10) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

AQ-1 The project owner shall implement a CEC CPM approved fugitive Dust Control Plan.

Protocol: The plan shall include the following:

1. A description of each of the active operation(s) which may result in the generation of fugitive dust;
2. an identification of all sources of fugitive dust (e.g., earth-moving, storage piles, vehicular traffic, etc).
3. A description of the Best Available Fugitive Dust Control Measures (see Table 1 attached) to be applied to each of the sources of dust emissions identified above (including those required in AQ-2 below). The description must be sufficiently detailed to demonstrate that the applicable best available control measure(s) will be utilized and/or installed during all periods of active operations;
4. In the event that there are special technical (e.g., non-economic) circumstances, including safety, which prevent the use of at least one of the required control measures for any of the sources identified, a justification statement must be provided to explain the reason(s) why the required control measures cannot be implemented.

Verification: Not later than sixty (60) days prior to the commencement of construction, the project owner shall submit the plan to the CEC CPM for review and approval. The project owner shall maintain daily records to document the

specific actions taken pursuant to the plan. A summary of the monthly activities shall be submitted to the CPM via the Monthly Compliance Report.

AQ-2 During the construction phase of the project, the project owner shall:

1. Prevent or remove within one hour the track-out of bulk material onto public paved roadways as a result of their operations, or take at least one of the actions listed in Table 2 (attached) to prevent the track-out of bulk material onto public paved roadways as a result of their operations and remove such material at anytime track-out extends for a cumulative distance of greater than 50 feet on to any paved public road during active operations;
2. Install and use a track-out control device to prevent the track-out of bulk material from areas containing soils requiring corrective action (as currently identified in drawing no. 5-1 of the addendum dated February 12, 1999 to the Corrective Measures Study performed by the Mark Group for USS-POSCO Industries) to other areas within the project construction site and lay-down area;
3. Minimize fugitive particulate emissions from vehicular traffic on paved roads and paved parking lots on the construction site by vacuum mechanical sweeping or water flushing of the road surface to remove buildup of loose material. The project owner shall inspect on a daily basis the conditions of the paved roads and parking lots to determine the need for mechanical sweeping or water flushing.

Verification: The project owner shall maintain a daily log during the construction phase of the project indicating: 1) the manner in which compliance with AQ-2 is achieved and 2) the date and time when the inspection of paved roads and parking lots occurs and the date and time(s) when the cleaning operation occurs. The logs shall be made available to the CEC CPM upon request.

AQ-3 At any time when fugitive dust from PDEF project construction is visible in the atmosphere beyond the property line, the project owner will identify the source of the fugitive dust and implement one or more of the appropriate control measures specified in Table 3 (attached)

Verification: The project owner will maintain a daily log recording the dates and times that measures in Table 3 (attached) have been implemented and make them available to the CEC CPM upon request.

**TABLE 1
BEST AVAILABLE FUGITIVE DUST CONTROL MEASURES**

<u>FUGITIVE DUST SOURCE CATEGORY</u>	<u>CONTROL ACTIONS</u>
Earth-moving (except construction cutting and filling areas, and mining operations)	<p>Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the CEC CPM. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR</p>
	<p>For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.</p>
Earth-moving: Construction fill areas:	<p>Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the CEC CPM. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the CEC CPM, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.</p>

TABLE 1 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS
Earth-moving: Construction cut areas and mining operations:	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	Apply chemical stabilizers within five working days of grading completion; OR
	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

TABLE 1 (Continued)

<u>FUGITIVE DUST SOURCE CATEGORY</u>	<u>CONTROL ACTIONS</u>
Unpaved Roads	Water all roads used for any vehicular traffic at least once per every two hours of active operations; OR
	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	Apply chemical stabilizers; OR
	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	Install temporary coverings; OR
	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile.
<u>All Categories</u>	Any other control measures approved by the CEC CPM as equivalent to the methods specified in Table 1 may be used.

**TABLE 2
TRACK-OUT CONTROL OPTIONS**

(1)	Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface, and extending for a centerline distance of at least 100 feet and a width of at least 20 feet.
(2)	Pave from the point of intersection with the public paved road surface, and extending for a centerline distance of at least 25 feet and a width of at least 20 feet, and install a track-out control device immediately adjacent to the paved surface such that exiting vehicles do not travel on any unpaved road surface after passing through the track-out control device.
(3)	Any other control measures approved by the CEC CPM as equivalent to the methods specified in Table 2 may be used.

**TABLE 3
CONTROL MEASURES FOR WIND CONDITIONS EXCEEDING 25 MPH**

FUGITIVE DUST SOURCE CATEGORY	<u>CONTROL MEASURES</u>
Earth-moving	Cease all active operations; OR
	Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR
	Apply chemical stabilizers prior to wind event; OR
	Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR
	Take the actions specified in Table 1, Item (3c); OR
	Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	Apply chemical stabilizers prior to wind event; OR
	Apply water twice [once] per hour during active operation; OR
	Stop all vehicular traffic.
Open storage piles	Apply water twice [once] per hour; OR
	Install temporary coverings.
Paved road track-out	Cover all haul vehicles; OR
	Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

REFERENCES

- DEC (Delta Energy Center). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.
- CEC (California Energy Commission). 1999b. CEC second set of data requests, data requests #62-86.
- DEC (Delta Energy Center). 1998d. Confidential filing—Air Quality. Submitted to the California Energy Commission, December 18, 1998.
- DEC (Delta Energy Center). 1999a. PG&E Detailed Facilities Study for DEC, submitted to the California Energy Commission on March 25, 1999.
- DEC (Delta Energy Center). 1999f. Response to CEC data requests #62-75 submitted to the California Energy Commission on April 20, 1999.
- DEC (Delta Energy Center). 1999h. Response to data requests made at the workshops and submitted to the California Energy Commission on May 7, 1999.
- DEC (Delta Energy Center). 1999i. Response to CEC data requests made at the workshops and submitted to the California Energy Commission on May 14, 1999.
- DEC (Delta Energy Center). 1999d. Supplemental filing--reduction in length of the gas pipeline and inclusion of an additional outfall for wastewater discharge, dated June 11, 1999 and docketed June 16, 1999.

APPENDIX A - not available in PDF version

ENGELHARD ANALYSIS OF THE CO CATALYST

PUBLIC HEALTH

Michael Ringer

INTRODUCTION

Normal operation of the proposed Delta Energy Center will result in the release of potentially harmful substances to the environment. The purpose of staff's public health analysis is to determine if emissions of toxic contaminants will have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potential significant health impacts are identified, staff will evaluate mitigation measures that may be used to reduce such impacts to insignificant levels.

Staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section. We examine potential impacts on public and worker health from accidental releases of hazardous materials in the **Hazardous Materials Management** and **Worker Safety and Fire Protection** sections, respectively. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project via wastewater streams to surface water bodies or the public sewer system are discussed in the **Soils and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

METHOD OF ANALYSIS

Public health staff is concerned about toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people could come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Toxic air contaminants are called noncriteria pollutants because no ambient (outdoor) air quality standards have been set for them. Ambient standards are outdoor air pollution levels that are considered safe for everyone. Since noncriteria pollutants do not have such standards, staff uses a process known as health risk assessment to make sure that people will not be exposed to them at unhealthy levels. The risk assessment procedure consists of the following steps:

- Identify hazardous substances that the DEC project could emit to the environment and their emission rates;
- Estimate ambient concentrations of project emissions using dispersion modeling (how the substance travels in the environment);
- Estimate exposure levels to affected populations through applicable exposure routes such as inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, a simplified assessment is designed that will not underestimate 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 which are estimated by the assessment. This is accomplished by examining conditions that would lead to the highest, or worst-case, risks and then using those in the study. Such conditions include:

- Using the highest expected level of pollutants emitted from the plant;
- Assuming weather conditions that would result in the highest ambient concentration of pollutants;
- Using the type of air quality computer model which results in the highest impacts;
- Calculating health risks to a person at the location where the pollutant concentrations are calculated to be the highest;
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- Assuming that an individual's exposure to cancer-causing agents occurs for 70 years.

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 which could present a health hazard from noninhalation pathways of exposure (CAPCOA 1993, Table III-5). 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 (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (1-hour) exposure to relatively high concentrations of pollutants. Such effects include irritation of the eyes, skin, and respiratory tract. Chronic health effects, such as emphysema or heart disease, may result from long-term exposure to lower concentrations of pollutants.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels (CAPCOA 1993, p. III-36). Reference exposure levels are amounts of toxic substances to which

people can be exposed and suffer no adverse health effects. 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 which makes them more sensitive to the effects of toxic substance exposure. Reference exposure levels 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, including an adequate margin of safety, is achieved if the estimated worst-case exposure is below the relevant reference exposure level.

If someone is exposed at the same time to multiple toxic substances, an adverse health effect could result, even if each individual substance is not present at harmful levels. Therefore, the assumption is made that the combined effects of the toxic substances are additive. In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact (CAPCOA 1993, p. III-37).

For carcinogenic substances, the health assessment considers the risk of developing cancer during exposure over a 70-year lifetime. Cancer risk is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called potency factors, these are published in the California Air Pollution Control Officers Association (CAPCOA) Risk Assessment Guidelines), 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 are likely to be lower or even considerably lower than those estimated.

If a proposed project passes the initial screening analysis, staff will conclude that the project does not pose a significant health risk to the exposed population. Failure to pass the initial screening analysis does not automatically indicate that the project would pose a significant risk to public health, but that a more detailed assessment, using more realistic project-specific assumptions, is necessary to more accurately determine 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 are 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. 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 indices for all project-related toxic substances are 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 total reference exposure levels. Under these conditions, health protection 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 presumes that a project-related lifetime cancer risk of less than one chance in one million (1×10^{-6}) is not significant for purposes of requiring additional health-related mitigation measures. Staff believes that this level constitutes a de minimis risk, or one that is so small as to be effectively “no risk”. The Federal Food and Drug Administration has made such a finding in the context of cancer risks from food additives (FDA 1985, p. 51557). They emphasized that the risk level did not mean that one in every one million people would contract cancer, but that the level represented an additional one in one million chance over a person’s normal risk of developing cancer in his or her lifetime. The agency noted that “as far as can be determined, in all probability no one will contract cancer” (Id.). A survey of 132 regulatory decisions found that, with the exception of one decision, no action was taken to reduce risks below one in a million (Travis et al., 1987).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following state and local LORS generally apply to the protection of public health. These provisions have established the basis for Energy Commission staff’s determination regarding the significance and acceptability of project-related impacts on public health.

STATE

California Health and Safety Code section 41700 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.”

LOCAL

Bay Area Air Quality Management District Rule 2-1-316 requires a risk assessment or risk screening analysis to be performed for new or modified facilities that emit one or more toxic air contaminants that exceed specified amounts.

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 prior to exposure. 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 conditions and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The topography at the site is flat, with an elevation about 17 feet above sea level. New York Slough and the Sacramento-San Joaquin delta lie about one-half mile to the north. The terrain north, west, and east of the site is flat and at about sea level for several miles. To the south, the terrain slopes steadily upward toward Mt. Diablo, which lies about ten miles distant.

The project site is located in a heavy industrial area. The area immediately west of the site is comprised of commercial and industrial properties. West-northwest and northwest of the site are the USS-POSCO steel plant and a Dow Chemical facility. For more detailed information, please refer to the **Land Use** section.

As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts. The nearest residence is approximately 2200 feet south of the site. The nearest residences to the east and west are located, respectively, in Antioch at a distance of 5000 feet and Pittsburg at about 6500 feet. There are no residences north of the site. AFC Figures 8.12.1a,b, and c show the location of sensitive receptors, including schools, hospitals, emergency response facilities, long-term care facilities and day care facilities within a three-mile radius of the DEC site.

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 climate at the project site is dominated by the influence of the Pacific Ocean and the Pacific high-pressure system, which is a semi-permanent, subtropical high-pressure system located off the coast. The size and strength of the Pacific high is at a maximum during the summer, which results in solar heating over California's interior, forming a thermal trough of low pressure which intensifies the prevailing flow over the area. The Pacific high's influence weakens during the fall and winter so that sky cover, temperature, and humidity are more variable.

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the heights above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during the more stable mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), which includes Contra Costa County as well as eight other Bay Area counties. BAAQMD conducts ambient monitoring of thirteen gaseous toxic air contaminants at 17 locations throughout the District (collecting data for toxics at the Pittsburg monitoring station was suspended in 1993). By combining average toxic concentration levels from all monitoring sites 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. In 1997, BAAQMD calculated the cancer risk in the area to be 194 in one million (BAAQMD 1998, p. 3). Two of the monitored pollutants, benzene and 1,3-butadiene, together account for over one-half of the total risk, and are emitted primarily from mobile sources. Because of the use of reformulated gasoline beginning in the second quarter of 1996, as well as other toxics reduction measures, ambient levels of these two pollutants have been decreasing, leading to a reduction in overall risk during the past few years. For example, the risk was 342 in one million based on 1992 data, 315 in one million based on 1994 data, and 303 in one million based on 1995 data.

As noted above, toxics data is no longer collected at the Pittsburg monitoring station, so site specific data is not available. The closest stations collecting data are in Concord and Antioch. Based on comparisons of selected toxic compounds which are significant contributors to total risk from ambient air, it appears that the Antioch area may have slightly higher overall risk from inhalation, while the risk in Concord may be slightly lower.

As part of implementing the Air Toxics "Hot Spots" Information and Assessment Act of 1987, BAAQMD examines toxic emissions from facilities having operating permits. Certain facilities, based on the amount of pollutants emitted and the proximity of people who may live or work nearby, undergo further analysis by means of a comprehensive health risk assessment. Based on such a health risk assessment, the Dow Chemical Company was calculated to have a maximum lifetime cancer risk of 14 in one million. Because of the conservative nature of the health risk assessment, the actual risk from the facility is likely to be lower.

SITE CONTAMINATION

Significant site disturbances may 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.

In order to determine if any contamination exists on the proposed site, DEC commissioned a Phase I Environmental Site Assessment (ESA) performed in accordance with American Society for Testing and Materials practice E 1527-97 (ERM 1998). The assessment revealed no evidence of “recognized environmental conditions” at the site, meaning that there is no presence or likely presence of any hazardous substances or petroleum products under conditions that indicate a release, or threat of a release, into the ground, groundwater, or surface waters of the property.

In addition to the Phase I ESA, DEC also commissioned a database search for hazardous substance release sites which may be near the proposed routes for the electric transmission and natural gas supply lines (CH2M Hill 1999, Response to CEC Staff Waste Management Data Request WM-1, p. 59). The search of 19 databases identified 58 sites within 1000 feet of the proposed linear routes. Three of the sites appear to be relatively close to the electric transmission line route, and are listed due to the existence of underground storage tanks, although there is also a solid waste landfill at one site. There are also three sites listed in close proximity to the gas supply line, each containing underground storage tanks. It is currently unknown whether any of the sites contains contaminated soil in areas requiring excavation for DEC linear facilities. Staff is proposing a condition of certification in the Waste Management section (WASTE-4) which would require the project owner to suspend excavation and assess the nature and extent of any contamination, if found, during construction.

IMPACTS

PROJECT SPECIFIC IMPACTS

Potential risks to public health may occur during both project construction and operation.

CONSTRUCTION IMPACTS

Potential risks to public health during construction may be associated with toxic substances disturbed during site preparation and remediation, as well as from heavy equipment operation. Potential impacts from emissions of criteria pollutants from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

As described in the Phase I ESA, no evidence of site contamination has been found. Therefore, no significant toxics-related public health impacts are anticipated from earth moving due to project construction.

OPERATION IMPACTS

The proposed project includes three combustion turbines, three heat recovery steam generators equipped with duct burners, a condensing steam turbine, two auxiliary boilers, and a 14-cell cooling tower. During operation, potential public health risks are related to natural gas combustion emissions from the gas turbines (with their duct burners) and auxiliary boilers, as well as noncombustion emissions from the cooling tower.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. AFC Table 8.1-19 lists noncriteria pollutants that may be emitted from project turbines and auxiliary boilers as combustion byproducts, along with their anticipated amounts (emission factors). Emission factors are from data compiled by the Ventura County Air Pollution Control District and from the California Air Toxics Emission Factors (CATEF) database. AFC Table 8.6-2 lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include reference exposure levels, 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 CAPCOA Guidelines (CAPCOA 1993). PUBLIC HEALTH Table 1 lists combustion-related toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that acetaldehyde is not of concern due to oral exposure, but if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

Noncriteria emissions from the cooling tower originate from contaminants in the cooling source water that become entrained in liquid water droplets emitted as cooling tower drift. DEC will use recycled wastewater from the Delta Diablo Sanitation District (DDSD) for cooling water. AFC Table 8.14-3 lists constituents found in DDSD wastewater which could be emitted as part of the drift. AFC Appendix 8.1, Table 8.1A-3 lists the amounts of each pollutant released to the atmosphere in the cooling tower drift based on the pollutant levels in the circulating cooling water. PUBLIC HEALTH Table 2 lists these substances and shows how each contributes to the health risk analysis.

In addition to the substances identified in PUBLIC HEALTH Table 2, wastewater contains various levels of pathogenic organisms, such as viruses and bacteria. If the wastewater is not treated to reduce the numbers of these organisms, they could be entrained in the cooling tower drift at levels that could affect public health. The California Department of Health Services (DHS) is currently promulgating

PUBLIC HEALTH Table 1

Types of Health Impacts and Exposure Routes Attributed to Combustion-Related Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Inhalation Noncancer (Chronic)	Inhalation Noncancer (Acute)
Acetaldehyde			X	X	
Acrolein				X	X
Ammonia				X	X
Benzene			X	X	
1,3-Butadiene			X		
Formaldehyde			X	X	X
Napthalene		X		X	
PAHs	X		X		
Propylene oxide			X	X	X
Toluene				X	
Xylene				X	X

Source: AFC Table 8.1-19 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993

PUBLIC HEALTH Table 2

Types of Health Impacts and Exposure Routes Attributed to Cooling Tower Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Chronic Inhalation Noncancer	Acute Inhalation Noncancer
Ammonia				X	X
Arsenic	X	X	X	X	
Cadmium		X	X	X	
Copper				X	
Lead		X	X	X	
Mercury		X			X
Nickel			X	X	X
Zinc				X	

Source: AFC Table 8.1-19 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993

regulations under Title 22 of the California Code of Regulations that require recycled water used in systems with cooling towers to be disinfected tertiary recycled water (DTRW). The regulations also list criteria that specify the degree of disinfection required, as well as the final allowable concentrations of pathogens (e.g., 99.999 percent reduction of virus) (DHS 1992, p. 5). It is of interest to note that such water is also allowed by the proposed regulations to be used for irrigating food crops, parks and playgrounds, school yards, and residential landscaping.

Calpine/Bechtel plans to install a treatment system at DEC to produce tertiary treated water which will meet the proposed Title 22 requirements (CH2M Hill 1999a, Public Health p. 1). Recycled water from DDS D will be filtered and treated with sodium hypochlorite to provide specified disinfection levels. A constant chlorine residual level will be maintained to ensure satisfactory disinfection. The treated water will be sampled once daily for total coliform bacteria by an on-site water testing laboratory. Additionally, information from a continuous on-line turbidity monitor will provide plant operators with real-time monitoring data and provide alarm enunciation should the specified turbidity level be exceeded.

In developing the proposed regulations for DTRW, DHS assumed that a negligible risk to health would be that the highest conceivable annual probability of intestinal infection with virus would not exceed one in ten thousand (DHS 1992, p. 8). In order to assure that such a minimal risk level is achievable with the proposed treatment standards, DHS considered various factors, including the amount of drift emitted from cooling towers of varying efficiencies; the number of viruses swallowed which would be necessary to cause a one in 10,000 probability of infection; the seasonal concentration of viruses in DTRW that can infect cells; the volume of air throughout which particulate aerosols must be dispersed prior to entry into a breathing zone; and the fraction of the mass of particulate aerosols which will be deposited in the upper respiratory tract and then swallowed.

DHS combined the above factors with various assumptions, such as an average adult's daily air intake and the particle size distribution in filtered effluent. This allowed DHS to specify a method of calculating the volume of air (including cooling tower exhaust air) through which cooling tower drift would have to disperse in order to result in the one in ten thousand annual risk level. The final calculation method is ultimately dependent on the cooling tower drift rate, the retention time of the circulating water, the fraction of time a breathing zone is downwind from the tower, and a monthly virus concentration factor.

The DEC project will use high efficiency drift eliminators which limit the amount of drift loss to approximately 0.0006 percent of the circulating water rate, resulting in a drift rate of about 1.2 gallons per minute (DEC 1998a, AFC Appendix 8.1, Table 8.1A-5). Due to the high efficiency of the drift eliminator (superior by about two orders of magnitude to the ones considered by DHS), staff expects the actual risk of illness to be much lower than the one in ten thousand benchmark.

The drift eliminators must be properly installed and maintained in order to achieve efficient operation over the life of the facility. Following installation, proper maintenance includes periodic inspection and repair or replacement of any components found to be broken or missing. Calpine/Bechtel has proposed language for a Condition of Certification for the inspection and maintenance of the drift eliminators. Staff has incorporated this language in proposed Condition of Certification PUBLIC HEALTH -1.

Although the cooling water is initially treated to reduce pathogens, additional routine water treatment is required during use to minimize bacterial growth, corrosion, and formation of mineral scale. DEC will employ an automated chemical feed system to supply conditioning chemicals (sulfuric acid, organic phosphate, and sodium hypochlorite) to the cooling water. The system will continuously monitor several water parameters and provide real time data to the plant operators, as well as alarm enunciation if specified levels are exceeded. Such routine water treatment also serves to minimize conditions which are conducive to the growth of pathogenic organisms such as *Legionella* bacteria. These include the presence of other microorganisms which contribute nutritional factors, stagnant water or low flow conditions, the presence of corrosion, scale, and accumulations of sludge and sediment.

The amount of water lost as liquid from the cooling towers (1.2 gallons per minute, as noted above) is in sharp contrast with the amount of water lost as steam from the cooling towers, which is estimated to be about 3700 gallons per minute (Id.). However, steam emitted from the cooling towers is distilled water, and will not contain contaminants.

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis based on maximum hourly and annual fuel use. Annual emissions are required to calculate cancer and chronic (long-term) noncancer health effects. AFC Table 8.1-15 shows maximum annual fuel use for the gas turbines, duct burners, and auxiliary boilers. The annual maximum fuel use is combined with the emission factor for each toxic air contaminant to estimate maximum annual emissions (DEC 1998a, AFC Appendix 8.1A, Table 8.1A-3). Emission factors are estimates of the amounts of toxic substances released per unit of fuel burned and were taken from data compiled by the Ventura County Air Pollution Control District and the California Air Toxic Emission Factors database maintained by the California Air Resources Board (DEC 1998a, AFC page 8.1-26).

Hourly emissions are required to calculate acute (short-term) noncancer health effects. As above, maximum hourly fuel use for the turbines, duct burners, and auxiliary boilers are combined with emission factors to arrive at maximum hourly emissions (DEC 1998a, AFC Appendix 8.1A, Table 8.1A-3).

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 screening analysis was performed using the U.S. EPA approved ISCST3 dispersion modeling program (please see staff's **Air Quality** section for a detailed discussion of the modeling methodology). Finally, ambient concentrations were used in conjunction with the reference exposure levels and unit risk factors presented in AFC Table 8.6-2 to estimate health effects which might occur due to 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 method of assessing health effects is consistent with those presented in the CAPCOA Air Toxics "Hot Spot" Program Revised 1992 Risk Assessment Guidelines (October 1993) referred to earlier, and result in the following health risk estimates.

NONCANCER HAZARD

The acute hazard index at the point of maximum impact from exposure to contaminants which could cause short-term health effects is 0.058 (PUBLIC HEALTH Table 3). The location of the maximum acute hazard is about 2.5 miles southwest of the proposed site (DEC 1998a, AFC Appendix 8.1C, Figure 8.1C-1). As described earlier, a total hazard index of less than 1.0 indicates that facility emissions are not expected to result in any short-term adverse health effects, even in sensitive members of the population.

The chronic hazard index at the point of maximum impact for substances which could cause long-term health effects is 0.035 (PUBLIC HEALTH Table 3). The location of the maximum chronic hazard is slightly over four miles southeast of the proposed site (DEC 1998a, AFC Appendix 8.1C, Figure 8.1C-1). The chronic hazard index is well under the safe level of 1.0, indicating that no long-term adverse health effects are expected.

PUBLIC HEALTH Table 3
Facility Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance (Safe) Level
Acute Noncancer	0.058	1.0
Chronic Noncancer	0.035	1.0
Individual Cancer	0.38×10^{-6}	1.0×10^{-6}

Source: DEC 1998a, AFC p. 8.6-6 and CH2M Hill 1999, Response to CEC Staff Public Health Data Request PH-1, p. 32.

CANCER RISK

As shown in PUBLIC HEALTH Table 3, total worst-case individual cancer risk is estimated to be 0.38 in one million. As explained earlier, this is the worst-case risk at the location where pollutant concentrations are calculated to be the highest. The location of this risk for the DEC facility is slightly over four miles southeast of the proposed site (DEC 1998a, AFC Appendix 8.1C, Figure 8.1C-1).

CUMULATIVE IMPACTS

This section examines the public health impacts of DEC emissions combined with those from other selected facilities. These include the proposed Pittsburg District Energy Facility (PDEF) and the existing Dow Chemical Plant. The potential impacts identified are represented by the risks associated with exposure to average ambient toxics concentrations from all sources (atmospheric background levels).

The maximum calculated cancer risk for the PDEF facility is 0.5 in one million, which, like the DEC facility, is less than the level of one in one million which staff considers de minimus. The location of the PDEF maximum cancer risk is about five miles northeast of that project site, at the southern base of the Montezuma Hills (PDEF 1998k, Fig. 5.16-2). The maximum modeled cancer risk for the DEC facility is located approximately 5.5 miles south of the maximum impact location for PDEF, or just southeast of the intersection of Highway 4 and Hillcrest Road (DEC 1998a, AFC Fig. 8.1C-1). The maximum cancer risk and impact location for the Dow Chemical facility have been estimated as part of the Bay Area Air Quality Management District's Air Toxics "Hot Spots" Program. A maximum cancer risk of 14 in one million for Dow has been estimated at a location just north of Sixth Street Park in the northwest section of Antioch, about four miles southwest of the maximum impact location for PDEF (BAAQMD 1998 and Bateman 1999). Thus, modeling for the three facilities shows that none of the maximum impact locations coincide. Since the maximum cancer risk for the DEC facility is less than the de minimus level of one in one million additional lifetime cancer risk, staff would not expect any significant change in the risk to any individual person, even if the maximum impact location were to coincide exactly with that from another facility.

The BAAQMD estimated the lifetime cancer risk for inhalation of ambient air to be 194 in one million based on 1997 average toxic concentration data (BAAQMD 1998, p. 3). The DEC risk increase of 0.38 in one million represents a maximum risk based on conservative assumptions. The average increase in risk from the DEC facility is less than 0.5 in one million, and does not represent a significant contribution to the ambient risk of 194 in one million. Therefore, staff does not consider the incremental impact of the additional risk posed by the DEC project to be cumulatively considerable.

As explained earlier, the risk and hazards discussed above are worst-case estimates which are applicable to the specific locations determined by air quality modeling to have the highest impacts (maximum impact locations). (see PDEF 1998k, Figure 5.16-2 and DEC 1998a, AFC Figure 8.1C-1). Facility-related risks are lower at all other locations, and actual risks are expected to be much lower, since worst-case impacts are based on conservative assumptions, and overstate the true magnitude of the risk expected.

BAAQMD staff examined the issue of cumulative impacts from facilities affecting the same neighborhood (BAAQMD 1993). They concluded that elevated concentrations of toxic air contaminants from stationary sources tend to be quite localized, and that cumulative risks are likely to occur only when multiple facilities with substantial low-level emissions are immediately adjacent to, or very close to, one another.

The conservative estimate of additional lifetime cancer risk due to emissions from the DEC facility is less than one chance in one million (the de minimis risk level) at the point of maximum exposure. As shown above in Public Health Table 3, estimates for acute and chronic health hazards at their locations of maximum impacts are substantially lower than their significance levels. Even in the unlikely event that emissions from an existing facility were to coincide both geographically and temporally with DEC emissions at the location of maximum impact, overall risk would not change significantly. Thus, for both cancer and noncancer health effects, the DEC project will not meaningfully change the existing overall level of hazard or risk and will not result in significant cumulative health-related impacts.

FACILITY CLOSURE

As noted in the introduction to this section, the scope of staff's public health analysis is limited to routine releases of harmful substances to the environment. During either temporary or permanent facility closure, the major concern would be from accidental or nonroutine releases from either hazardous materials or wastes which may be onsite. These are discussed in the sections on **Hazardous Materials** and **Waste Management**, respectively. During temporary closure (periods greater than those required for normal maintenance), it is unlikely that there would be any routine releases of harmful substances to the environment, since the facility would not be operating. For permanent closure, the only routine emissions would be related to facility demolition or dismantling, such as exhaust from heavy equipment or fugitive dust emissions. These would be subject to closure conditions adopted by the Energy Commission once a closure plan is received from the project owner.

MITIGATION

Excavation at the site or at linear facilities could disturb contaminated soil that may require mitigation measures to prevent potential public health impacts. Staff has proposed adoption of a condition of certification in the **Waste Management** section which requires the project owner to have an environmental professional on site to inspect locations where potentially contaminated soil is found, determine the need for future action, and potentially contact appropriate agencies for possible oversight.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the DEC project will be in compliance with all applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed potential public health risks associated with construction and operation of the DEC project. With implementation of the conditions of certification included herein, as noted, staff does not expect there to be any significant adverse cancer, or short- or long-term noncancer health effects from any project emissions.

CONDITION OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall perform a visual inspection of the cooling tower drift eliminators once per calendar year, and repair or replace any drift eliminator components which are broken or missing. Prior to initial operation of the project, the project owner shall have the cooling tower vendor's field representative inspect the cooling tower drift eliminator and certify that the installation was performed in a satisfactory manner. The CPM may, in years 5 and 15 of project operation, require the project owner to perform a source test of the PM₁₀ emissions rate from the cooling tower to verify continued compliance with the vendor guaranteed drift rate.

Verification: The project owner shall include the results of the annual inspection of the cooling tower drift eliminators and a description of any repairs performed in the next required compliance report. The initial compliance report will include a copy of the cooling tower vendor's field representative's inspection report of the drift eliminator installation. If the CPM requires a source test as specified in Public Health-1, the project owner shall submit to the CPM for approval a detailed source test procedure 60 days prior to the test. The project owner shall incorporate the CPM's comments, conduct testing, and submit test results to the CPM within 60 days following the tests.

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WORKER SAFETY AND FIRE PROTECTION

Ellen Townsend-Smith

INTRODUCTION

Industrial workers use process equipment and hazardous materials on a daily basis. Accidents involving relatively small amounts of material, and fires or explosions can result in serious injuries to workers. Worker protection measures can include special training, protective equipment and procedural controls. The employer must also comply with applicable laws, ordinances, regulations, and standards (LORS) to protect workers. This Worker Safety and Fire Protection analysis assesses the completeness and adequacy of the measures proposed by Calpine/Bechtel to comply with applicable health and safety standards and other reasonable requirements (Cal. Code Regs., tit. 20, § 1743), and to draw conclusions about the compliance of the proposed project with applicable LORS (Cal. Code Regs., tit. 20, § 1744). The applicable LORS are designed to protect the health and safety of workers during construction and operation of the facility, and to establish adequate fire protection and emergency response procedures.

Staff has reviewed the DEC Project Application for Certification (AFC) and AFC supplement to determine whether DEC has proposed adequate measures to:

- comply with applicable safety laws, ordinances, regulations and standards (LORS);
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

Staff has determined that the features of the project comply with applicable LORS and do not present unusual industrial safety or fire protection problems. Issues relating to the project's impacts to local fire protection service capabilities and appropriate mitigation have not yet been resolved and will be addressed in the Final Staff Assessment.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

- 29 U.S.C. § 651 et seq. (Occupational Safety and Health Act of 1970)
- 29 C.F.R. §§ 1910.1 - 1910.1450 (Occupational Safety and Health Administration Safety and Health regulations)

- 29 C.F.R. §§ 1952.170 - 1952.175 (Approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in §§ 1910.1 - 1910.1500)

STATE

- Title 8, California Code of Regulations, § 450 et seq. (Applicable requirements of the Division of Industrial Safety, including Unfired Pressure Vessel Safety Orders, Construction Safety Orders, Electrical Safety Orders, and General Industry Safety Orders)

LOCAL

- 1998 Edition of California Fire Code (CFC) and all applicable (National Fire Protection Association (NFPA) standards. The fire code contains provisions necessary for fire prevention and information about fire safety, special occupancy uses, special processes, and explosive, flammable, combustible and hazardous materials.
- Uniform Fire Code (UFC) Standards. This is a companion publication to the CFC and contains standards of the American Society for Testing and Materials and of the National Fire Protection Association.
- California Building Code. (Cal. Code Regs., tit. 24) The California Building Code is designed to provide minimum standards to safeguard human life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, etc. of buildings and structures.

SETTING

DEC is located in an industrial area. The Contra Costa County Fire Protection District (District) provides fire protection. There are four fire stations located close to the facility, as illustrated in **WORKER SAFETY Figure 1. WORKER SAFETY Table 1** provides an outline of the equipment and personnel at each station. Each station has some or all of the following items: an engine, a truck, a power wagon, and a water tender. The engine is a primary response unit. It has a 500 gallon water tank, a 1,500 gallon per minute (gpm) pump, 2,000 feet of hose and a medical response unit. The trucks are also primary response units, and have a 200-gallon water tank, a 1,250-gpm pump, 1,000 feet of hose and an aerial ladder with a water tower. Power wagons are primarily used for fighting wild fires, such as grass fires. Each consists of a 300-gallon water tank, 130-gpm-water pump, and comes with four-wheel drive. The water tender has a 2,000-gallon water supply, a 500-gpm pump, and an auxiliary 2,000-gallon folding tank.

The local fire stations have first responder HAZMAT capabilities (Warren 1999). "First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property or the environment from the

**WORKER SAFETY AND FIRE PROTECTION Figure 1 - NOT AVAILABLE IN PDF VERSION
Delta Energy Center – Fire Station Locations**

effects of the release (Code of Federal Regulations 1910.120).” When there is a hazardous materials incident, the fire stations request assistance from the Contra Costa County HAZMAT Team (Warren 1999).

**WORKER SAFETY AND FIRE PROTECTION Table 1
Fire Station/Fire Protection Capabilities**

Station	Response time	Equipment	Number of Firefighters
Station 81 315 W. 10 th Street Antioch, CA	5 minutes	1 Type 1 engine 1 Type 6 engine 1 Foam engine Type	3
Station 83 2717 Gentrytown Drive Antioch, CA	Approximately 5 minutes	1 Type 1 engine 1 Type 4 engine 1 Primary Response Truck Type 1	3
Station 82 2900 Lone Tree Way Antioch, CA	Approximately 5 minutes	1 Type 1 engine 1 Type 4 engine	3
Station 84 200 E. 6 th Street Pittsburg, CA	Approximately 5 minutes	1 Type 1 engine 1 power wagon	6

IMPACTS

PROJECT SPECIFIC IMPACTS

FIRE PROTECTION

Staff reviewed the information provided in the AFC regarding available fire protection services and equipment (DEC 1998 Sections 2.3.2, Alarm Center 1999), to determine if the project would adequately protect workers and if it would impact the fire protection services in the area. The applicant will have a dedicated water supply that will provide the facility with two hours of fire protection. Fire protection systems will be dedicated to the transformers, turbine lubrication oil equipment and cooling tower. There will be fire alarms, detection systems, portable fire extinguishers and hose stations throughout the plant. The information in the AFC indicates that the project intends to meet the minimum fire protection requirements and therefore will not adversely impact local fire protection services. The applicant will be required to provide final diagrams and plans to staff and to the District, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures. Please refer to conditions of certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

The District has identified in a letter to the California Energy Commission dated June 11, 1999, that the project will cause impacts to their service capabilities (Ryan

and Ryan(a) 1999). Staff will meet with the District to discuss their concerns and present further analysis in the Final Staff Assessment.

WORKER SAFETY

Industrial environments are potentially dangerous. Workers are exposed to chemical spills, hazardous waste, fires, moving equipment, and confined space entry and egress problems. It is important for DEC to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers.

MITIGATION

A Safety and Health Program will 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 DEC will take to ensure compliance with applicable LORS during the construction and operation phases of the project.

CONSTRUCTION SAFETY AND HEALTH PROGRAM

The Construction Safety Orders found in Title 8 of the California Code of Regulations contain health and safety requirements promulgated by Cal/OSHA that are applicable to the construction phase of the project (Cal Code Regs., tit. 8, § 1502 et seq.). The various plans required by the regulations are incorporated in the project Construction Safety and Health Program, the major elements of which include:

- Construction Injury and Illness Prevention Program (IIPP) (Cal. Code Regs., tit. 8, § 1509);
- Construction Fire Protection and Prevention Plan (Cal. Code Regs., tit. 8, § 1920);
- Personal Protective Equipment Program (Cal. Code Regs., tit. 8, §§ 1514 - 1522.

In addition, the requirements of the Electrical Safety Orders (Cal. Code Regs., tit. 8, §§ 2300 - 2974) and Unfired Pressure Vessel Safety Orders (Cal. Code Regs., tit. 8, §§ 450 - 544) will be applicable to the project.

DEC provided adequate outlines in the AFC and AFC supplement for each of the above programs and plans, and prior to construction of the facility, will provide detailed programs and plans in accordance with condition of certification **WORKER SAFETY-1**.

OPERATION SAFETY AND HEALTH PROGRAM

During the operation phase of the project, many Electrical Safety Orders (Cal. Code Regs., tit. 8, §§ 2300 - 2974) and Unfired Pressure Vessel Safety Orders (Cal. Code Regs., tit. 8, §§ 450 - 544) will be applicable. In addition, the Division of Industrial

Safety has promulgated regulations applicable solely to operations. These are contained in the General Industry Safety Orders (Cal. Code Regs., tit. 8, § 3200 et seq.). DEC will incorporate these requirements into its Operation Safety and Health Program, the major elements of which include:

- Injury and Illness Prevention Program (Cal. Code Regs., tit. 8, § 3203)
-
- Emergency Action Plan (Cal. Code Regs., tit. 8, § 3220)
- Fire Prevention Plan (Cal. Code Regs., tit. 8, § 3221)
- Personal Protective Equipment Program (Cal. Code Regs., tit. 8, §§ 3401 - 3411)

DEC provided adequate outlines for each of the programs and plans in the AFC and will provide detailed programs and plans in accordance with condition of certification **WORKER SAFETY-2**.

SAFETY AND HEALTH PROGRAM ELEMENTS

DEC has provided proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program (DEC 1998). 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)

DEC will submit an expanded Construction and Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to both construction and operation of the project.

Cal/OSHA will review and provide comments on the IIPP as the result of an onsite consultation at the request of DEC, during which a Cal/OSHA representative will complete a physical survey of the site, analyze the work practices, and point out those practices that are likely to result in illness or injury. The on-site consultation will give Cal/OSHA an opportunity to evaluate DEC's IIPP and apply it directly to activities taking place on-site (De Rosa 1999).

EMERGENCY ACTION PLAN

California Code of Regulations, tit. 8, Section 3220 requires an Emergency Action Plan. The AFC contains a satisfactory outline for an emergency action plan (DEC 1998). The outline lists the following features; fire and emergency reporting procedures, evacuation procedures, and a Spill Prevention/Control and Countermeasures Plan. Staff proposes condition of certification **WORKER SAFETY-2**, which requires DEC to submit a final Operation's Emergency Action Plan to Cal/OSHA, for review and comment, after an on-site consultation.

FIRE PROTECTION PLAN

California Code of Regulations, tit. 8, Section 3221 requires an Operation Fire Prevention Plan. The AFC contains a draft proposed fire prevention plan which is acceptable to staff. The plan discusses the following topics:

- On-site Fire Protection Systems, including carbon dioxide extinguishing systems, preaction sprinkler systems, a dry pipe deluge system, hand-held fire extinguishers, and fire detection and alarm systems;
- Local Fire Protection Services.

Staff proposes that DEC submit a final Fire Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) and the District for review and approval to satisfy proposed conditions of certification **WORKER SAFETY 1** and **2**.

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

The purpose of the Personal Protective Equipment Program is to ensure that employers comply with applicable requirements for the provision and use of Personal Protective Equipment (PPE), and to provide employees with the information and training necessary to carry out the program. DEC has provided a satisfactory outline that identifies minimum requirements of a proposed PPE program.

Under California Code Regulations, tit. 8, Sections 3380 - 3400, personal protective equipment and first aid supplies will be required whenever hazards are encountered which, due to process, environment, chemicals, or mechanical irritants, can cause injury or impairment of body function as a result of absorption, inhalation, or physical contact. The project's operational environment will create potential situations where personal protective equipment is required.

DEC's PPE Program will include a written policy on the use of protective equipment and methods of communicating the information to the employees, selection of the proper type of equipment, training of employees on the correct use and maintenance of the equipment, and enforcement of personal protective equipment use.

DEC's PPE program will include the use of devices that provide respiratory protection, hearing conservation, eye protection, and head protection. Staff believes that if DEC develops and carries out a PPE Program similar to the format and elements listed above, the program will meet applicable regulations and will significantly reduce the potential for adverse impacts to workers.

GENERAL SAFETY

Besides the specific plans listed above, there are other requirements, some of which are called "safe work practices," imposed by various worker safety LORS applicable to this project. For the sake of clarity, staff has grouped these requirements as follows:

Lighting

American National Standards Practice for Industrial Lighting, ANSI/IES-RP-7 contains requirements to protect workers from inadequate lighting. Insufficient light leads to errors and sometimes accidents. An error may result from not seeing a situation that is dangerous and being able to react quickly enough. The **Visual Resources Section** will provide further detail concerning off-site consequences and performance requirements for exterior lighting.

Hazardous Materials Releases

Staff's analysis considered the system design and administrative procedures proposed to reduce the likelihood of an accidental release of acutely hazardous materials that could affect workers. See the **Hazardous Materials Section** for more detail.

Smoking

DEC will not allow smoking in areas designated in the National Electrical Code (NEC) as Class I, Divisions 1 and 2. These locations are areas where ignitable concentrations of flammable gases or vapors exist or where volatile flammable liquids or flammable gases are handled, processed, or used. Signs restricting smoking in these areas of the project site will be posted to protect the facility and workers.

Lock-out/Tag-out

California Code of Regulations, title 8, Sections 2320.4, 2320.5, 2320.6, 2530.43, 2530.86, 3314, 3340 and 3341 identify required lock-out and tag-out safety practices and programs which reduce employee exposure to moving equipment, electrical shock, and hazardous and toxic materials. Lockout is the placement of a padlock, blank flange, or similar device on equipment to ensure that it will not be operated until the lockout device is removed. Tag-out is the use of warning signs that caution personnel that equipment cannot be energized until the lockout device is removed. Warning signs can also be used to alert employees about the presence of hazardous and toxic materials. DEC's lock-out/tag-out program will include steps for applying locks and tags, steps for removing locks and tags, and employee training on lock-out/tag-out procedures.

Confined Spaces Entry

California Code of Regulations, title 8, Sections 5156 - 5158 identifies the minimal standards for preventing employee exposure to dangerous air contaminants and/or oxygen deficiency in confined spaces. A confined space is any space that limits the means of egress, is subject to toxic or flammable contaminants, or has an oxygen-deficient atmosphere. Examples of confined spaces are silos, tanks, vats, vessels, boilers, compartments, ducts, sewers, pipelines, vaults, bins and pits. DEC will take the following steps to ensure worker safety during work in confined spaces. Before entering a confined space, site personnel will evacuate or purge the space and will disconnect lines that provide access for substances into the space. The air in the vessels will be tested for oxygen deficiency, and the presence of both toxic and explosive gases and vapors will be evaluated before entry into the confined

space is allowed. Lifelines or safety harnesses will be worn by anyone entering the confined space, and a person will be stationed outside in a position to handle the line and to summon assistance in case of emergency. Appropriate respirators will be available whenever hazardous conditions may occur.

Hot Work

Hot work is any type of work that causes a spark and can ignite a fuel source. Examples include welding, cutting and brazing. Before proceeding with hot work, workers will need to get a work authorization from the project's assigned Safety Officer. The control operator, together with the shift supervisor, will decide whether hot work is required on a job and if a work authorization will be required. Before hot work is undertaken, the area will be inspected, the job will be posted and, depending on what is located in the area, additional safeguards may be implemented.

CUMULATIVE IMPACTS

The construction and operation of the DEC and Pittsburg District Energy Facility projects could result in a significant adverse impact on the fire and emergency service capabilities of the District. Staff has received two letters from the District detailing the fire protection equipment and services required for the facilities. Staff will hold meetings with District representatives to discuss their concerns and provide an analysis of their mitigation requirements in the Final Staff Assessment.

FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time.

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

If DEC provides a Construction Safety and Health Plan, and an Operation Safety and Health Plan, as required by conditions of certification **WORKER SAFETY 1 and 2**, staff believes that the project will incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. Issues relating to the project's impacts to local fire protection service capabilities and appropriate mitigation have not yet been resolved and will be addressed in the Final Staff Assessment.

RECOMMENDATIONS

If the Commission certifies the project, staff recommends that the Commission adopt the following proposed conditions of certification. The proposed conditions of certification provide assurance that the Project Construction and Operation Safety and Health Programs proposed by DEC 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 LORS.

PROPOSED CONDITIONS OF CERTIFICATION

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

- a construction Injury and Illness Prevention Program
- a construction Fire Protection and Prevention Plan
- a personal Protective Equipment Program

Protocol: The Construction Injury and Illness Prevention Program and the Personal Protective Equipment Program shall be submitted to the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders.

The Construction Fire Protection and Prevention Plan shall be submitted to the Contra Costa County Fire Protection District for review and acceptance.

Verification: At least 30 days prior to the start of construction, or a date agreed to by the CPM, the project owner shall submit to the CPM a copy of the Project Construction Safety and Health Program and the Personal Protective Equipment Program, incorporating Cal/OSHA's Consultation Service comments. The project owner shall provide a letter from the Contra Costa County Fire Protection District stating that they have reviewed and accepted the Construction Fire Protection and Prevention Plan.

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

- an operation Injury and Illness Prevention Plan
- an emergency Action Plan
- an operation Fire Protection Plan
- a personal Protective Equipment Program

Protocol: The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) Consultation Service, for review and

comment concerning compliance of the program with all applicable Safety Orders.

The Operation Fire Protection Plan and the Emergency Action Plan shall be submitted to the Contra Costa County Fire Protection District for review and acceptance.

Verification: At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the final version of the Project Operation Safety & Health Program. It shall incorporate Cal/OSHA's Consultation Service comments, stating that they have reviewed and accepted the specified elements of the proposed Operation Safety and Health Plan.

The project owner shall notify the CPM that the Project Operation Safety and Health Program (Injury and Illness Prevention Plan, Fire Protection Plan, the Emergency Action Plan, and Personal Protective Equipment requirements), including all records and files on accidents and incidents, is present on-site and available for inspection.

WORKER SAFETY-3 The project owner shall design and install all exterior lighting to meet the requirements contained in the Visual Resources conditions of certification and in accordance with the American National Standards Practice for Industrial Lighting, ANSI/IES-RP-7.

Verification: Within 60 days after construction is completed, the project owner shall submit a statement to the CPM that the illuminance levels contained in ANSI/IES RP-7 were used as a basis for the design and installation of the exterior lighting.

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TRANSMISSION LINE SAFETY AND NUISANCE

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INTRODUCTION

The purpose of staff's analysis is to assess the proposed transmission line design for appropriate measures necessary to prevent possible health and safety hazards, as described by the applicant (DEC 1998a, AFC pages 6-37 through 6-40). Such hazard prevention is accomplished through compliance with laws, ordinances, regulations and standards (LORS) identified by the applicant as applicable to the proposed project (DEC 1998a, AFC pages 6-40 through 6-44). Staff will also consider design revisions if needed to further mitigate the health and safety hazards involved. The assessment will evaluate the following issues, which relate primarily to the physical presence of the line, or secondarily to the physical interactions of line electric and magnetic fields, as will be discussed later.

- Aviation safety
- Interference with radio-frequency communication
- Audible noise
- Fire hazards
- Hazardous shocks
- Nuisance shocks
- Electric and magnetic field (EMF) exposure

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Discussed below by subject area are design-related LORS applicable to the physical impacts of transmission lines as proposed for the power facility.

FEDERAL

AVIATION SAFETY

Any hazard to area aircraft relates to the potential for collision with the line in the navigable air space. The applicable LORS are intended to ensure the distance and visibility necessary to avoid such collision.

- Title 14, Part 77 of the Federal Code of Regulations (CFR), "Objects Affecting the Navigation Space". Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a "Notice of Proposed Construction or Alteration" is required for potential obstruction hazards. 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. Such notification allows the FAA to ensure that the structure is located to avoid any significant hazards to area aviation.

- FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that may Affect the Navigation Space". This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, "Obstruction Marking and Lighting". This circular 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

Transmission line-related radio-frequency interference is one of the indirect effects of line operation as produced by the physical interactions of line electric fields. The level of such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts could be assessed from field strength estimates obtained for the line. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. 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 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 FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff usually recommends specific conditions of certification to ensure compliance with this FCC requirement. Since electric fields cannot penetrate the soil and other objects, underground lines do not produce the radio noise associated with overhead lines.

Several design and maintenance options are available for minimizing these electric field-related impacts. When incorporated in the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

STATE

- General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced by the electric field induced by the line in the antenna of a radio signal receiver.
- GO-128 “Rules for Construction of Underground Electric Supply and Communications Systems”. Provisions of this order establish requirements and minimum standards for the safe construction of underground AC power and communications circuits.

AUDIBLE NOISE

As with radio noise, any audible noise from a transmission line 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. Since (as with communications interference), the noise level depends on the strength of the line electric field, the potential for occurrence can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during wet weather and from lines of 345 kV or higher. It therefore, is generally not expected at significant levels from lines of less than 345 kV. 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 100-ft right-of-way. There are no design-specific regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design and maintenance standards established from industry research and experience as effective without significant impacts on line safety, efficiency maintainability and reliability. All high-voltage lines are designed to assure compliance.

FIRE HAZARDS

The fire hazards addressed through the following regulations 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.

- General Order 95 (GO-95), CPUC, “Rules for Overhead Electric Line Construction”. This order specifies tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 Section 1250 of the California Code of Regulations, “Fire Prevention Standards for Electric Utilities”. This code specifies utility-related measures for fire prevention.

HAZARDOUS SHOCKS

The hazardous shocks that are addressed by the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line. 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.

- GO-95, CPUC. “Rules for Overhead Line Construction”. These rules specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements usually ensures the safety of the general public and line workers.
- Title 8, CCR, Section 2700 et seq., “High Voltage Electric Safety Orders”. These safety orders establish essential requirements and minimum standards for safely installing, operating, and maintaining electrical installations and equipment.
- National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. Provisions in this part of the code specify the national safe operating clearances applicable in areas where the line might be accessible to the public. Such requirements are intended to minimize the potential for direct or indirect contact with the energized line.

LOCAL

There are no local laws or regulations specifically aimed at the physical structure or dimensions of electric power lines to limit their obstruction or hazardous shock hazards, or eliminate the interactive effects of their electric or magnetic fields. All the noted LORS are implemented industry wide to ensure that lines are uniformly constructed to reflect existing health and safety information while ensuring efficiency and reliability.

SETTING

According to information from the applicant (DEC 1998a, AFC pages 6-1 through 6-8), the proposed transmission line will be located in an area with existing 230 kV, 115 kV, and 60 kV transmission lines and related facilities owned by PG&E. Fields from the new line will therefore contribute to any cumulative exposures and other field-related environmental impacts. The line will traverse industrial areas, open spaces and residential and commercial areas with varying population densities. Since the line will be connected with the PG&E transmission system, it will, as noted by the applicant, (DEC 1998a, AFC pages 6-32 through 6-37) be designed according to PG&E’s field-reducing design guidelines.

Individuals from the project area could be exposed to line-related fields for varying periods of time. Short-term exposure among the general public could occur while individuals are in transit or during the short-term recreational use of the area. Short-term worker exposures would occur among utility and nonutility workers in the course of their duties around the line. Such short-term exposures are well understood and, as noted by the applicant, (DEC 1999d) are significantly lower than exposures from the use of common household appliances, such as hair dryers,

toaster ovens, microwave ovens and electric shavers. Such exposures are not known to have caused any significant health impacts in the past.

Long-term exposures, by contrast, would occur during prolonged presence in the area, as most commonly happens to individuals living in houses near the line. As will be more fully discussed later, the present concern about the presence of power lines stems mostly from reports of possible health effects from such long-term residential exposure. Since residences around transmission lines are normally located beyond the edge of their rights-of-way, the magnitude of any such long-term exposure can be assessed from estimates of field strengths obtained for areas beyond the edge of the right-of-way. The continuing challenge is to meaningfully interpret such exposures in light of present uncertainty about possible health significance at any given level.

PROJECT DESCRIPTION

Project Description Figure 1 shows the route proposed for the transmission line. The line will consist of the components listed below.

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- A double circuit 230 kV overhead line extending 1.5 miles from the proposed power plant site to a transition station.
- An underground line extending 1.7 miles between the transition station and the Pittsburg Substation.
- A 0.8-mile 13 kV underground line from the proposed power plant site to the adjacent Dow Chemical facility.
- A new 230 kV switchyard at the site of the proposed power plant.
- A modified Pittsburg Substation.

According to the applicant, (DEC 1998a, AFC pages 6-2, and 6-9) the route for the 230 kV line was chosen to parallel existing line corridors. This is in keeping with state policy (specified in Senate Bill 2431 of 1988) encouraging the use of existing rights-of way. The line will be located underground in residential and commercial areas in keeping with the General Plan of the City of Pittsburg. Details of the routing and support structures for the individual segments are provided in the applicant's submittals (DEC 1998a, AFC pages 6-9 through 6-18). The above-ground segment will be constructed using single pole structures as shown in Project Description Figure 4. This pole structure was chosen in keeping with the goals of the City's general plan. The underground section of the 230 kV line will consist of fluid-filled cables. The right-of way will generally be 150 ft wide, with the line located along the centerline (DEC 1998a, AFC page 6-36). The 0.8-mile underground 13.8 kV line to the adjacent Dow Chemical facility is not of significant concern to staff in terms of the impacts at issue in this assessment.

IMPACTS

As noted in the LORS section, GO-95, GO- 128 and Title 8, CCR provide the minimum regulatory requirements necessary to avoid the direct or indirect contact previously discussed in connection with hazardous shocks and aviation hazards. Of secondary concern in project evaluation are the field-related impacts manifesting as

nuisance shocks, electric and magnetic field exposure and radio noise and communications interference, as also discussed above. These impacts are reduced through specific field-reducing design guidelines developed for each utility service area in the state. As will be more fully discussed later, these guidelines were established to ensure uniformity in EMF reducing approach, in light of present knowledge on field effects and the potential impacts of field control measures on line operations. The extent of such measures, together with the related field strengths, will vary according to environmental and other local conditions bearing on line safety, efficiency, reliability and maintainability. When the ground-level strengths of such fields are calculated, they can be used to assess each line for appropriate implementation of the applicable field-reducing measures. The impacts of most concern in terms of indirect effects are nuisance shocks and electric and magnetic field exposure. These secondary impacts are assessed for every project in addition to the primary issues of aviation safety, and hazardous shocks.

NUISANCE SHOCKS

Nuisance shocks around transmission lines are non-hazardous but unpleasant experiences caused by current flow at levels generally incapable of causing significant physiological harm. Such shocks mostly result from direct contact with metal objects in which electric charges are induced by fields from the energized line. For modern high-voltage lines, shocks of this type are effectively minimized through grounding procedures specified in the National Electrical Safety Code and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). As with lines of the types proposed, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. Staff will recommend specific conditions of certification to ensure that such grounding is made within the right-of-way by both the applicant and property owners.

ELECTRIC AND MAGNETIC FIELD EXPOSURE

The possibility of health effects of electric fields and magnetic fields has increased public fear in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure. As noted by the applicant (DEC 1998a, AFC page 6-39, DEC 1999d), the available evidence as evaluated by CPUC and other regulatory agencies, has not established that such fields pose a significant health hazard to exposed humans. However, 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 reduce such fields to some degree, where feasible, until the issue is better understood. The challenge has been to establish when, and how far to reduce them.

While there is considerable uncertainty about the EMF/health effects issue, 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 relate to 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.

In light of the present health uncertainty, some state regulatory agencies have opted for regulations ensuring that fields from new lines are similar to those from existing lines. Some states (Minnesota, Florida, New York, Montana New Jersey) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. All regulatory agencies believe, as does staff, 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.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component, whose effects can manifest as the previously noted radio noise, audible noise and nuisance shocks. The present focus is on the magnetic field because only it can penetrate building materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible transmission and other high-voltage power lines, staff considers it important for perspective, to again consider the previously noted fact that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). 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 the power line environment.

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) 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 required the previously noted EMF-reducing design guidelines of all utilities under its jurisdiction. 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. Utilities not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements.

In keeping with this CPUC policy, staff requires a showing that each proposed line will 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 issues bearing on safety, reliability efficiency and maintainability. It, therefore, is up to each applicant to ensure that such measures are applied in ways, and to an extent, without significant impacts on line operation. The extent of such applications will be reflected by the ground-level field strengths as measured during operation. When estimated or measured for the line, such field strengths can be used by staff and other regulatory agencies for comparison with fields of lines of similar voltage and current-carrying capacity. Such 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 structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since the overhead and underground sections of the proposed line will be designed according to PG&E's EMF-reducing guidelines, their fields are required under existing CPUC policies to be similar to fields from similar lines in the PG&E service area. A condition of certification (**TLSN-3**) is proposed by staff to ensure implementation of the reduction measures necessary.

PROJECT SPECIFIC IMPACTS

AVIATION SAFETY

As noted by the applicant (DEC 1998a, AFC page 6-40) there are no major airports in the vicinity of the proposed facility. The nearest airfield is the Heliport in Concord approximately 5.9 miles west of the city of Pittsburg. The next closest airport, Buchanan Field Airport in Concord, is located about 8.5 miles west-southwest of Pittsburg. Other area airports are much farther away. An FAA "Notice of Construction or Alteration" will not be required for the proposed power line, according to existing regulatory criteria. From its consideration of all issues related to distance from the line and FAA safety requirements, staff is in agreement with the applicant that the proposed line will not pose a significant hazard to area aviation.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Experience has shown that spark gap discharges are mostly responsible for any radio interference around the type of transmission line proposed. Such interference is generally avoided through appropriate maintenance, which minimizes occurrence of the structural gaps involved. The applicant intends to institute such a maintenance program in accordance with accepted industry practices (DEC 1998a, AFC page 6-40). The previously noted provisions of the related FCC regulations are important in requiring each project owner to ensure mitigation of any such interference to the satisfaction of the affected individual. The applicant intends to mitigate any such complaints on a case-specific basis (DEC 1998a, AFC page 6-40). The applicant has further noted that the line's corona-reducing design would be

adequate to prevent any radio noise-related complaints. This is as staff expects for a line of the voltage proposed. Staff has proposed a condition of certification (**TLSN-2**) to ensure mitigation of any interference-related complaints on a case-specific basis, as required by the FCC. **TLSN-1** is also proposed by staff to ensure compliance with GO-52, also intended to prevent radio interference.

AUDIBLE NOISE

According to information from the applicant (DEC 1998a, AFC pages 6-38 and 6-39) the low-corona design for the line could produce some corona-related effects, but only during foul weather. This means that no audible noise will be likely in fair weather. The calculated foul weather noise level is between 34 dB and 42 dB at the edge of the right-of-way. This is insignificant as it is much less than the 59 dB or more associated with complaints, for example, in the service area of the Bonneville Power Authority (BPA). DEC, therefore, does not expect the noise from the proposed line design to add significantly to the existing background levels. This will be in keeping with requirements in the Noise Element of the General Plan of the City of Pittsburg. Staff is in agreement with the applicant's conclusions regarding the noise level expected for the line voltage and the conductor configuration proposed. For an assessment of the noise from all phases of the proposed power plant and related facilities, please refer to staff's analysis in the **Noise** section.

FIRE HAZARDS

The overhead section of the proposed line will be routed through grassland, shrub-covered and urban areas of relatively few trees, where adequate fire prevention and suppression measures will be implemented, as required by related regulations and industry practices (DEC 1998, AFC page 6-40). Compliance with GO-90 requirements will ensure the clearance necessary to prevent fires possible from direct contact between the transmission line, trees and other objects. Such fires are not expected for the underground section as proposed. Compliance with condition of certification **TLSN-4**, as staff proposes, will prevent accumulation of combustible materials that would contribute to such fires.

HAZARDOUS SHOCKS

The applicant has stated their intention to comply with the requirements of GO-95 as intended to prevent hazardous shocks from direct or indirect human contact with the overhead energized line. Therefore, they do not expect the proposed line to pose any such hazards to humans (DEC 1998, AFC page 6-29). Staff does not expect such a hazard from the line as proposed and proposes a condition of certification (**TLSN-1**) to ensure implementation of the GO-95-related measures necessary. Compliance with GO-128 requirements, as also required by this condition, will ensure the safe operation of the underground sections of the line.

NUISANCE SHOCKS AND ELECTRIC AND MAGNETIC FIELDS

Because of the cancellation effects of fields from nearby conductors, the ground-level strength of the magnetic fields from the closely spaced underground portion of power lines would be much less than those from the more widely spaced overhead section of the same current-carrying capacity. This means that the fields produced

by the overhead section of the proposed line would be weaker than fields from the underground section of the same line. The intensity of these fields diminishes rapidly with distance from the line. However, because of the shorter distance to the underground conductors, exposure to an individual directly over such a line would be higher than if the line were overhead. Since electric fields are unable to penetrate the soil or other materials, they will not be encountered on the ground above the line. The underground section of both the 230 kV and the underground 13.8 kV line to the Dow Chemical facility, will be constructed according to the requirements in GO-128.

The applicant calculated the maximum electric and magnetic field strengths across the 150-ft right-of-way. These calculations were made to reflect the interactive effects of fields from the nearby PG&E 115 kV line. The magnetic field strength for the overhead section was calculated as 142 mG directly underneath the line and 17 mG at the edge of the right-of-way. For the underground section, a magnetic field strength of 3.0 mG was calculated for the area directly above the line; 1.0 mG was calculated for the edge of the right-of-way. These values as noted by the applicant, are similar to magnetic fields from similar lines and significantly below the levels (150 mG to 250 mG) established by states with regulatory limits on such fields.

An electric field strength of 2.62 kV/m was calculated for the area directly under the overhead section of the line. This is similar to fields from lines of similar voltage and design. Experience has shown nuisance shocks to be mostly associated with field strengths significantly greater than 1.6 kV/m in the transmission line environment. The electric field strength of 0.06 kV/m was calculated for the edge of the right-of-way. These field strengths are characteristic of lines constructed using the field-reducing design proposed and are not associated with nuisance shocks when all potential sources of such shocks are properly grounded as the applicant proposes (DEC 1998, AFC pages 6-37 and 6-38). Since electric fields from underground lines are not encountered on the ground above the line, the previously noted electric field effects would be absent in the area around the underground sections of the proposed line. Staff has verified the accuracy of the applicant's calculations with regard to parameters and assumptions bearing on field strengths and dissipation, as well as exposure assessment.

Condition of certification **TLSN-3** is proposed by staff to verify that the fields are reduced to the extent proposed by DEC. Conditions of certification **TLSN-5** and **TLSN-6** are proposed to ensure the preventive measures necessary for mitigation in the case of property owners along the route. These field strengths are similar to those of transmission lines within the PG&E service area.

CUMULATIVE IMPACTS

The strengths of electric and magnetic fields from the proposed line were calculated to factor the interactive effects of fields from nearby lines. These calculated field strength values, therefore, reflect the cumulative exposure of an individual to fields from all lines within the impact area of the proposed line.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for lines such as those proposed for this project, the public health significance of any project-related field exposure cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern will likely occur in the area beyond the edge of the right-of-way. Project-related exposures estimates for such areas are significantly below levels associated with lines of the same voltage and current-carrying capacity. They also are significantly lower than levels established by states with specific regulatory limits for such fields. Any nuisance shocks from such lines will be minimized through grounding and other measures to be implemented by SPCP Compliance with GO-90, GO-128 and Title 8, Section 2700 et seq. of the California Code of Regulations, will ensure the safety of humans around the line. Since the line will be located away from all area airports, any hazard to area aviation will be small. The use of an electric field-reducing conductor configuration together with an appropriate line maintenance program will minimize the potential for interference with radio-frequency communication.

RECOMMENDATIONS

Since the proposed 230 kV transmission line design will prevent the health and safety hazards of general concern, staff, recommends approval of the line as proposed for the route identified. If such approval is granted, staff recommends that the Commission adopt the following conditions of certification to ensure implementation of the measures necessary to achieve the field levels assumed for the line by the applicant.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission line according to the requirements of GO-95, GO 128, GO-52 and Title 8, Section 2700 et seq. of the California Code of Regulations.

Verification: Thirty days before start of transmission line construction, the project owner shall submit to the Commission's Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the transmission line will be constructed according the requirements of GO-95, GO-128 and Title 8, Section 2700 et seq. of the California Code of Regulations.

TLSN-2 The project owner shall make every reasonable effort to identify and correct, on a case-specific basis, all complaints of interference with radio or television signals from operation of the line and related facilities. In addition to any transmission repairs, the relevant corrective actions should include, but shall not be limited to, adjusting or modifying receivers, repairing, replacing or adding antennas, signal amplifiers, filters, or lead-in cables.

The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to operation together with the corrective action taken in response to each complaint. All complaints shall be recorded to include notations on the corrective action taken. Complaints not leading to a specific action, or for which there was no resolution should be noted and explained. The record shall be signed by the project owner and also the complainant, if possible, to indicate concurrence with the corrective action or agreement, with the justification for a lack of action.

Verification: All reports of line-related complaints shall be summarized and included in the Annual Compliance Report to the CPM.

TLSN-3 The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields before and after the 230 kV line is energized. Measurements should be made at appropriate points along the route to allow verification of design assumptions relative to field strengths. The areas to be measured should include the facility switchyard and any residences near the right-of-way.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 30 days after energization.

TLSN-4 The project owner shall ensure that the transmission line right-of-way is kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and Section 1250 of Title 14 of the California Code of Regulations.

Verification: The project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way, in the annual compliance report.

TLSN-5 The project owner shall send a letter to all owners of property within or adjacent to the right-of-way at least 60 days prior to first transmission of electricity.

Protocol: Protocol: The letter shall consist of the following:

- A discussion of the nature and operation of a transmission line.
- A discussion of the project owner's responsibility for grounding existing fences, gates and other large permanent chargeable objects within the right-of-way regardless of ownership.
- A discussion of the property owner's responsibility to notify the project whenever the property owner adds or installs a metallic object which would require a statement recommending against fueling motor vehicles or other mechanical equipment underneath the line.

Verification: The project owner shall submit the proposed letter to the CPM for review and approval 30 days prior to mailing to the property owners and shall maintain a record of correspondence (notification and response) related to this requirement, in a compliance file at the plant site. The project owner shall notify the CPM in the first Monthly Compliance Report that letters have been mailed and that copies are on file.

TLN-6 The project owner shall ensure the grounding of any ungrounded permanent metallic objects within the right-of-way, regardless of ownership. Such objects shall include fences, gates, and other large objects. These objects shall be grounded according to procedures specified in the National Electrical Safety Code.

Protocol: In the event of a refusal by the property owner to permit such grounding, the project owner shall so notify the CPM. Such notification shall include, when possible, the owner's written objection. Upon receipt of such notice, the CPM may waive the requirement for grounding the object involved.

Verification: At least 10 days before the line is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

- Delta Energy Center (DEC). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.
- Delta Energy Center 1999d. May 14, 1999 Response to Informal Staff Data Requests.
- Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above
- Energy Commission Staff 1992. High Voltage Transmission Lines: Summary of Health Effects Studies. California Energy Commission Publication, P700-92-002
- 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.

HAZARDOUS MATERIAL MANAGEMENT

Rick Tyler

INTRODUCTION

The purpose of this analysis is to determine if the proposed Delta Energy Center (DEC) (DEC 1998a) will result in the potential for significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts are identified, Energy Commission staff must also evaluate the potential for facility design alternatives or additional mitigation measures to reduce impacts to the extent feasible, as required pursuant to Title 20, California Code of Regulations, section 1748.5.

Hazardous materials to be used at the facility (see Appendix B below) in quantities which exceed the reportable amounts defined in the California Health and Safety Code, Section 25532(a) (P), include the following:

- Anhydrous ammonia
- Sulfuric Acid

Other hazardous materials stored in smaller quantities such as scale inhibitors, biological growth control agents, oxygen scavengers, and caustics for pH control will be present at the proposed facility. However, these materials pose minimal potential for off-site impacts as a result of the quantities on site, their relative toxicity, or their environmental mobility. Although no natural gas is stored, the project will also involve the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses risk of both fire and explosion. However, design of the natural gas pipeline to comply with modern design standards combined with implementation of proposed safety management practices will reduce the risk of an accidental release to insignificant levels. Design of the natural gas pipeline is addressed in staff's **Facility Design** analysis.

The DEC facility will also require the transportation of anhydrous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed in staff's **Traffic and Transportation** analysis.

The use of anhydrous ammonia poses the principal risk of off-site impacts in the event of a major accidental release associated with the project. Anhydrous ammonia is a liquefied gas stored at elevated pressure, which has a high internal energy. The 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, where it can be transported in the atmosphere and result in high down-wind concentrations.

LAWS, ORDINANCES, REGULATIONS, STANDARDS AND POLICIES

The following federal, state, and local laws and policies generally apply to the protection of public health and hazardous materials management. Their provisions have established the basis for staff's determination regarding the significance and acceptability of project-related impacts on public health due to accidental releases of hazardous materials.

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III and Clean Air Act of 1990 established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The Acts (codified in 40 C.F.R., section 68.115, part F) require 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 these Acts are reflected in the California Health and Safety Code, section 25531 et seq.

STATE

The California Health and Safety Code, section 25534 directs facility owners, storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

The California Code of Regulations, Title 8, 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.

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 Government Code, section 65850.2 restricts the issuance of a certificate of occupancy permit to any new facility involving the handling of acutely hazardous

materials until the facility has submitted an RMP to the administering agency with jurisdiction over the facility.

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials. These provisions are contained in Articles 79 and 80. Article 80 was extensively revised in the latest (1994) edition. These articles contain requirements that are generally similar to those contained in the Health and Safety Code. The UFC does, however, contain unique requirements for secondary containment, monitoring, and treatment of toxic gases emitted through emergency venting. These unique requirements are generally restricted to extremely hazardous materials.

The California Building Code contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit. A further discussion of these requirements is provided in the **Facility Design** portion of this document.

SETTING

SITE AND VICINITY DESCRIPTION

Several factors associated with the area in which a project is to be located affect its potential to cause public health impacts from an accidental release of a hazardous material. These include:

- the local meteorology,
- terrain characteristics, and
- the location of population centers and sensitive receptors relative to the project.

Staff considered these factors, as discussed below, in assessing the potential public health impacts of 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 level of public exposure to such materials and the associated health risks. When wind speeds are low and 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 of the AFC (DEC 1998a, AFC Chapter 8.1). This data indicates that wind speeds below 3 knots and temperatures exceeding 100°F are not uncommon for the project area. Therefore, staff suggested that the applicant use F stability

(stagnated air, very little mixing), one meter/second wind speed and an ambient temperature of 100° F in its modeling analysis of an accidental release to reflect worst case atmospheric conditions. These conditions were reflected in the modeling used to estimate the potential worst case impacts associated with an accidental ammonia release. Additional modeling of more likely accident scenarios and more realistic meteorological conditions were also evaluated.

TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) 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 principal risk of accidental release at this facility is associated with anhydrous ammonia. Accidental releases of anhydrous ammonia typically result in denser than air plumes. Thus, elevated terrain has no important effect on modeled results.

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 (Calabrese 1978). Also, the location of the population in the area surrounding a project site may have a large bearing on health risk. Figures 8.1-1A, 8.1-1B and 8.1-1C of the application are diagrams showing the locations of both populated areas and sensitive receptors in the project vicinity.

IMPACTS

The Commission staff has determined that the handling of anhydrous ammonia, sulfuric acid and natural gas are the only hazardous materials to be handled that pose a risk of off-site impacts. The following is a project specific analysis of the potential impacts associated with the handling of each of these materials.

SITE SPECIFIC IMPACTS

ANHYDROUS AMMONIA

Anhydrous ammonia will be used in controlling the emission of oxides of nitrogen (NOx) from the combustion of natural gas in the facility. The accidental release of anhydrous ammonia can result in hazardous down-wind concentrations of ammonia gas.

To assess the potential impacts associated with an accidental release of ammonia, staff typically evaluates where four "bench mark" exposure levels of ammonia gas occur off-site. These include: 1) the lowest concentration posing a risk of lethality, 2,000 ppm; 2) the Immediately Dangerous to Life and Health level (IDLH) of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) 2 level of 200 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 one time exposure of 75 ppm (A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in Appendix A of this analysis.) If the exposure associated with a potential release would exceed 75 ppm at any public receptor, staff will presume that the potential release poses a risk of significant impact. However, staff may also assess the probability of occurrence of the release and/or the nature of the potentially exposed population. Staff may, based on such analysis, determine that the likelihood and extent of potential exposure are not sufficient to support a finding of potentially significant impact.

Calpine/Bechtel's responses to staff's Data Request (CEC 1999a, Data Request number 26) provided the results of modeling of a worst case accidental release of anhydrous ammonia. This data response also provides an analysis of an alternative accidental release during the transfer of ammonia from a delivery vehicle to the storage tank. In conducting this worst case analysis it was assumed that winds of one meter per second and category F stability would exist at the time of the accidental release. This screening analysis was designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport. Figure 1 in the response shows the results of the worst case scenario. Figure 2 shows the results of the alternative scenario. The results of the worst case scenario indicate potential for serious impacts on the nearest residents at the Casa Medanos apartments about 250 meters south east of the proposed facility. Results of the worst case scenario also suggest the possibility of exposure between 200 and 75 PPM at other more distant residences and at a few sensitive receptor locations. However, the probability of this scenario occurring is very low. Additional analysis of more probable scenarios was provided in response to discussions in workshops (DEC 1999h). These analyses provided modeling of several loading accidents assuming more prevalent meteorological conditions.

Staff evaluated the probability of occurrence for the worst case scenario using data on spontaneous tank failure from the Canvey Study (Lees, 1992). This study suggested a spontaneous failure rate of between 1 in 100,000 per year and 1 in 10,000 per year. However, this data was based on tank failures occurring prior to 1978 when the study was conducted. This population of tanks is not representative of the tank proposed for the DEC facility. Stress corrosion cracking was the primary cause of the spontaneous pressure vessel failures reflected in the results of the Canvey study. The proposed tank will be designed to a newer standard of construction better addressing the causes of past stress corrosion failures, will be double walled construction and will be designed to California's seismic 4 standard. The double walled construction and design to of the tank to California seismic standard will result in increased tank wall thickness, which will significantly reduce the probability of failure from corrosion cracking. In addition the exterior tank would preclude a release in the event that the primary tank fails. Staff, therefore, estimates the maximum spontaneous failure rate for the proposed tank is less than 1 in 100,000 per year. The worst case scenario also reflects the concurrent occurrence of F stability and 1 meter per second wind speeds and assumes winds directly toward a specific receptor. From data presented in the Air Quality section of the AFC (DEC 1998a, Section 8.1), staff concludes that the probability of such concurrent conditions is less than 1%. Thus, the maximum risk of a worst case

impact is significantly lower than 1 in 10,000,000 per year and less than 3 in 1,000,000 over the life of the project. This estimate ignores the effect of double walled construction or design to California seismic code 4 as there is not sufficient data on failure rates of such designs. Staff, therefore, concludes that the worst case impact is not plausible. The results of the alternative scenario and the other more realistic scenarios suggest the potential for exposures of 200 PPM at the Casa Medanos apartments. However, such exposure would require both an accidental release and winds directly toward the Casa Medanos apartments. Both the probability of occurrence and magnitude of potential impact are low for these scenarios. While the probability of occurrence can not be considered negligible the relative magnitude of potential impacts is low. Staff does not believe that the potential for impact is of sufficient magnitude to recommend further mitigation.

In addition to spontaneous tank failure, accidental release of ammonia can also result from human error and external events. The primary human errors associated with release from fixed storage facilities occur during transfer operations. Staff believes that the potential for accidental releases will be reduced to insignificant levels by the implementation of safety management practices included in the RMP and PSM for the facility. These plans will be reviewed by Cal OSHA, the local Administering Agency, EPA, and Energy Commission staff prior to the handling of anhydrous ammonia at the facility. The external hazards potentially affecting the ammonia storage tank at this facility include; earthquakes, fires, explosions and turbine overspeed failure. Staff concludes that the earthquake damage is sufficiently addressed by seismic code requirements. Staff has also determined that no fire, explosion, or overspeed hazards threaten storage tank at its current location. It should be noted that the proposed site for the storage facility has been changed from the site proposed in the AFC (DEC 1998a, AFC Chapter 8.12) to the location described in a letter from Susan Strachan dated June 22, 1999 (DEC 1999i). This move was proposed to reduce the risk of the tank being affected by a turbine overspeed failure.

SULFURIC ACID

While sulfuric acid is a listed hazardous material, the form proposed for use (DEC 1998a, AFC § 8.12.2.2) has such low vapor pressure that insignificant amounts of sulfuric acid would be evolved in the event of an accidental release.

NATURAL GAS

Natural gas, which will be used as a fuel by the project, poses a fire and/or explosion risk as a result of its flammability. While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion from natural gas can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) Code 85A requires: 1) the use of double block and bleed valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems. These measures will significantly reduce the likelihood of an explosion in combustion equipment. Additionally, start-up procedures will require air purging of the gas turbines and

combustion equipment prior to start-up to preclude the presence of an explosive mixture.

This facility will also require the installation of a natural gas pipeline that could result in accidental release of natural gas. It is staff's belief that compliance with modern design codes and accepted safety management practices will reduce the potential of accidental release of natural gas from the pipeline to insignificant levels. Design analysis of the natural gas pipeline is provided in staff's Facility Design analysis.

CUMULATIVE IMPACTS

With the mitigation proposed, the facility will cause a very small risk of any off-site impacts. This risk will be cumulative to the existing risk posed by the nearby Dow Chemical Facility. Since the level of risk added by the project is insignificant, staff does not believe that the additional risk associated with the proposed facility will significantly increase the risks already affecting surrounding populations.

FACILITY CLOSURE

The requirements for handling of hazardous materials remain in effect until such materials are removed from the site regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner which poses a risk to surrounding populations, staff will coordinate with the California Office of Emergency services, Contra Costa County, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such necessary emergency action can be obtained through DTSC's RAPID Program until the cost can be recovered from the responsible parties.

MITIGATION

The typical methods used for mitigating accidental releases of hazardous materials are as follows:

- use of non-hazardous or less hazardous materials,
- use of engineered controls,
- use of administrative controls, and
- emergency response planning.

With the exception of using anhydrous ammonia instead of aqueous ammonia, the proposed project reflects the use of all these methods to reduce to the extent feasible the potential for impacts associated with hazardous materials use and handling. It is staff's conclusion that the proposed mitigation will be effective in reducing the potential for impacts associated with an accidental release of hazardous materials to insignificant levels. The only potentially significant risk associated with the proposed project is associated with the use of anhydrous ammonia. While the use of anhydrous ammonia does pose some very small risk of

impact, staff does not believe that the risk is sufficient to require further mitigation. However if this risk is determined to be unacceptable, use of aqueous ammonia is a feasible mitigation that could be imposed.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

Staff's evaluation of hazardous materials handling and use for the proposed project indicates that they pose minimal potential for significant impacts on the public. 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 submit a RMP. The EPA, Contra Costa County and staff will evaluate the RMP, including the hazardous materials storage and handling systems and the risk assessment provided by the applicant, and indicate whether they are satisfied with the proposed facilities. To insure adequacy of the RMP, staff has required that the plan be submitted for concurrent staff review and that confirmation of Contra Costa County's approval also be submitted prior to delivery of any hazardous materials to the facility.

With adoption of staff's proposed conditions, the project will comply with Health and Safety Code, section 41700, as it will not pose any potential for significant impacts to the public from hazardous materials releases.

RECOMMENDATION

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.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material in reportable quantities, as specified in Title 40, Code Of Federal Regulations, Part 355, Subpart J, section 355.50, that is not listed in Appendix B, unless approved in advance by the CPM.

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

HAZ-2 The project owner shall provide a Risk Management Plan and Process Safety Management Plan to Contra Costa County and the CPM for review and approval at the time the plans are first submitted to the U.S. Environmental Protection Agency (EPA) and the California Occupational Safety and Health Administration (Cal OSHA). The project owner shall

reflect all recommendations of Contra Costa County and the CPM in the final document. A copy of the final plans, reflecting all comments, shall be provided to Contra Costa County and the CPM once approved by EPA and Cal OSHA.

Verification: At least sixty (60) days prior to the delivery of any hazardous materials to the facility, the project owner shall provide the final approved plans listed above to the CPM.

REFERENCES

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HAZARDOUS MATERIAL MANAGEMENT Appendix A

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a criterion of 75 ppm to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this criterion is not consistent with the 200 ppm criterion 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 CEQA analysis. 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 are implemented and actions are taken 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. 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 changes to the proposed project.

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limits (STPELs) to determine the potential for significant impact. These limits are designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at these levels should not result in "serious sequelae" 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 of the general public 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 MATERIAL MANAGEMENT

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 protect 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)	200 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

- EPA, 1987, U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.
- NRC, 1985, National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), Short-Term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) Documents, NRC, Washington, D.C.
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- AIHA, 1989, American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.
- NIOSH, 1994, National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication number 94-116.
- WHO, 1986, World health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

ABBREVIATIONS

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidelines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Safety and Health
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

**Appendix B - NOT AVAILABLE IN PDF VERSION
Hazardous Material Inventory**

WASTE MANAGEMENT

Michael Ringer

INTRODUCTION

This analysis presents an assessment of issues associated with managing wastes generated from constructing and operating the Delta Energy Center (DEC) project. It evaluates 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. The technical scope of this analysis encompasses wastes generated during facility construction and operation, except wastewaters discharged to navigable waters. Such wastewaters are discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's primary concerns in its waste management analysis are to ensure that:

- Wastes generated during constructing and operating the proposed project will be managed in an environmentally safe manner;
-
- Disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities;
-
- The management of the wastes will be in compliance with all applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

RESOURCE CONSERVATION AND RECOVERY ACT (42 U.S.C. SECTION 6922)

The Resource Conservation and Recovery Act 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:

- 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 EPA or authorized state.

TITLE 40, CODE OF FEDERAL REGULATIONS, PART 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity, and specific types of wastes are listed.

STATE

CALIFORNIA HEALTH AND SAFETY CODE SECTION 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 under the California Environmental Protection Agency, or 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.

TITLE 14, CALIFORNIA CODE OF REGULATIONS, SECTION 17200 ET SEQ. (MINIMUM STANDARDS FOR SOLID WASTE HANDLING AND DISPOSAL)

These regulations specify minimum standards for solid waste handling and disposal, guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.

TITLE 22, CALIFORNIA CODE OF REGULATIONS, SECTION 66262.10 ET SEQ. (GENERATOR STANDARDS)

These sections establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.

LOCAL

There are no additional local LORS to be considered.

SETTING

PROJECT AND SITE DESCRIPTION

The DEC consists of a nominal 880 megawatt natural gas-fired combined cycle cogeneration facility designed to generate electricity for sale and supply process steam to the adjacent Dow Chemical Plant. Appurtenant facilities include a

switching station and transmission line, natural gas pipeline, underground electrical transmission line, pipelines to supply process steam to Dow and return condensate to the power plant, and water supply and wastewater discharge lines to the Delta Diablo water treatment plant.

The proposed site consists of approximately 20 acres to be leased to DEC by Dow within a 139-acre parcel owned by Dow. To determine the existence of on-site contamination, DEC commissioned a Phase I Environmental Site Assessment (ESA) which was performed in accordance with American Society for Testing and Materials practice E 1527-97 (ERM 1998). The ESA revealed no evidence of recognized environmental conditions (defined as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property) at the site.

IMPACTS

PROJECT SPECIFIC IMPACTS

CONSTRUCTION

Project construction will generate both hazardous and nonhazardous wastes.

The applicant estimates that the following nonhazardous solid wastes will be generated from construction of the generating plant, electric transmission line, natural gas supply line, water supply and wastewater discharge lines, and the electric and steam lines to Dow (DEC 1998a, AFC p. 8.13-2):

- Paper, wood, glass, and plastics - DEC estimates that about 120 tons of these wastes from packing materials, waste lumber, insulation, and empty chemical containers will be generated during project construction. The wastes will be placed in dumpsters onsite and where practical, will be recycled. Waste which cannot be recycled will be disposed of weekly in a Class III (nonhazardous) landfill.
-
- Concrete - About 75 tons of excess concrete will be generated and will be disposed of weekly in a Class III landfill or clean fill site.
-
- Metal - metal wastes include steel from welding and cutting operations, packing materials, empty nonhazardous chemical containers, and aluminum from packing materials and electrical wiring. About 30 tons of metal waste is anticipated to be generated during construction, and will be recycled where practical. Nonrecyclable waste will be taken to a Class III landfill.
-
- Drilling Mud - nontoxic drilling mud, comprised of bentonite clay, is used in underground drilling of pipelines to lubricate and cool. About 1500 barrels of drilling mud will be used and will require disposal at a Class III landfill.

Hazardous wastes generated during construction include waste oil and grease, paint, spent solvent, welding materials, and cleanup materials from spills of hazardous substances. Such wastes are not usually generated in large amounts during construction.

The majority of hazardous waste to be generated during construction consists of liquid chemical cleaning waste, such as flushing and cleaning fluids used for initial cleaning of steam generators and piping. The volume expected to be generated is from one to two times the internal volume of the equipment to be cleaned. These wastes will be temporarily stored onsite in portable tanks and disposed of offsite in accordance with applicable regulatory requirements.

During the construction period, the construction contractor is the generator and is responsible for proper waste handling. Wastes will be collected in hazardous waste accumulation containers near the point of generation, and moved daily to the hazardous waste storage area located at the site construction laydown area. Within 90 days, the waste will be delivered to an authorized hazardous waste management facility (DEC 1998a, AFC p. 8.13-3).

OPERATION

Under normal operating conditions, the proposed facility will generate both nonhazardous and hazardous wastes.

Nonhazardous wastes generated during plant operation include trash, office wastes, empty containers, broken or used parts, used packing material, used filters, and spent demineralizer resin. DEC estimates that there will be about 80 cubic yards of such wastes generated annually, with large metal parts to be recycled.

Hazardous wastes generated during routine project operation include spent air pollution control catalysts, used lubricating oil and filters, chemical cleaning wastes, cooling tower sludge, and spill clean-up materials. The selective catalytic reduction catalyst, used for NO_x emissions control, must be replaced as it becomes contaminated, typically after several years' service. Classified as hazardous due to heavy metals content, catalysts will be returned to the supplier for reclamation or disposal, if feasible. Waste lubricating oil will be recycled by a waste-oil recycling contractor. Chemical cleaning wastes consist of acid solutions used for cleaning the heat recovery steam generator, as well as turbine wash and fireside wash waters. These wastes, which typically contain high concentrations of metals, will be temporarily stored onsite in portable tanks and treated or disposed of offsite. AFC Table 8.13-1 summarizes hazardous wastes which may be generated at DEC.

Chemical feed area drains consisting of spillage, tank overflows, maintenance operations, and area washdowns will be routed to a neutralization facility for pH adjustment along with demineralizer regeneration wastes. Such elementary neutralization is considered to be hazardous waste treatment under California regulations (Cal. Code Regs., tit. 22, sec. 67450.1 et seq.) and requires a permit from the Department of Toxic Substances Control.

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

AFC Table 8.13-2 lists solid waste disposal facilities which may be used for recycling and disposal of nonhazardous waste generated during construction and operation of the DEC facility. The Potrero Hills landfill is currently operating at somewhat less than one-half its permitted capacity and has about 20 years of capacity remaining. Other landfills in the area, such as Altamont Pass, are also available to accept nonhazardous waste from the project. Even discounting the effects of recycling on the total amount of non-hazardous wastes destined for landfilling, staff concludes that the amount of nonhazardous wastes generated during project construction and operation are insignificant relative to existing disposal capacity, and would not meaningfully impact any of the nearby landfills' capacity or operating life.

Three Class I landfills in California are permitted to accept hazardous waste: Chemical Waste Management's Kettleman Hills facility and Safety-Kleen Environmental Service's landfills in Buttonwillow in Kern County and Westmoreland in Imperial County. In total, there is in excess of twenty million cubic yards of remaining hazardous waste disposal capacity in California with remaining lifetimes as long as 90 years.

Much of the hazardous waste generated during facility construction and operation will be recycled, such as used oil and spent catalysts. Even without recycling, the generation of hazardous waste from this type of facility is minor and thus would not significantly impact the capacity of any of the above Class I landfills.

CUMULATIVE IMPACTS

Due to the minor amounts of wastes generated during project construction and operation, the insignificant impacts on individual disposal facilities, and the availability of additional regional landfills, cumulative impacts will be insignificant for both hazardous and nonhazardous wastes.

FACILITY CLOSURE

During any type of facility closure (see staff's **General Conditions** section which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any potentially significant problem to the public, workers, or the environment. Staff believes that conditions of certification in the General Conditions section will adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste accumulation time to 90 days and requiring proper containment) would likely be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure require preparation of an on-site contingency plan which shall provide for removal of hazardous wastes and draining of all chemicals from storage tanks and other equipment for temporary closures exceeding 90 days.

An approved on-site contingency plan is also required to protect public health and safety in the case of unexpected permanent closure. As above, the plan must provide for the removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

For planned permanent closure, DEC is required to develop a facility closure plan at least twelve months prior to commencement of closure and is committed to complying with LORS which are applicable at the time of closure (DEC 1998a, AFC p. 4-2).

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Energy Commission staff concludes that DEC will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during project construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the San Francisco Bay Regional Water Quality Control Board or the CAL EPA - Department of Toxic Substances Control. Because hazardous wastes will be produced during project construction and operation, the project owner must acquire and maintain an EPA identification number as a hazardous waste generator. Accordingly, DEC will be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, and keep detailed records. Pursuant to California Code of Regulations, title 22, section 67100.1 et seq., a hazardous waste source reduction and management review may be required, depending on the amounts of hazardous waste ultimately generated.

MITIGATION

DEC intends to implement the following mitigation measures during construction and operation of the proposed DEC project (DEC 1998a, AFC p. 8.13-10):

- Hazardous wastes will not be stored on-site for periods longer than 90 days and will be stored in segregated hazardous waste storage areas surrounded by containment structures to control leaks and spills.
- Hazardous wastes will be collected by licensed hazardous waste haulers using manifests and managed only at authorized facilities.
-
- Employees will be trained in hazardous waste procedures, spill contingencies, and waste minimization.
-
- Procedures to minimize hazardous waste generation will be established. Nonhazardous materials will be used instead of hazardous materials and wastes will be recycled whenever possible.

Energy Commission staff has examined the mitigation measures proposed by DEC and concluded that the measures together with applicable LORS will adequately assure that no significant environmental impacts will result from the management and disposal of project-related waste.

CONCLUSIONS AND RECOMMENDATIONS

Energy Commission staff concludes that management of the wastes generated during construction and operation of the DEC project will not result in any significant adverse impacts if the project owners implement the mitigation measures proposed in the Application for Certification (98-AFC-3), the additional measure proposed by staff below, and the proposed conditions of certification.

Staff recommends that if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, or other signs, the project owners have an environmental professional (as defined by American Society for Testing and Materials practice E 1527-97 Standard Practice for Phase I Environmental Site Assessments) determine the need for sampling to confirm the nature and extent of contamination. If significant remediation may be required, the project owners should also contact representatives of the Contra Costa County Health Services Department and Region 2 of the California Department of Toxic Substances Control for possible oversight.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste.

Verification: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the monthly compliance report of its receipt.

WASTE-2 The project owner shall notify the CPM of any waste management-related enforcement action taken or proposed to be taken against it, or against any waste hauler or disposal facility or treatment operator that the owner contracts with.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action.

WASTE-3 Prior to the start of both construction and operation, the project owner shall prepare and submit to the CPM a waste management plan, including revisions based on the CPM's comments, for all wastes generated during construction and operation of the facility, respectively. 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: No less than 60 days prior to the start of construction, the project owner shall submit the construction waste management plan to the CPM for review. The operation waste management plan shall be submitted no less than 60 days prior to the start of project operation. The project owner shall submit any required revisions within 30 days of notification by the CPM (or mutually agreed upon date). In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to planned management methods.

WASTE-4 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, or other signs, prior to any further construction activity at that location,

an environmental professional (as defined by American Society for Testing and Materials practice E 1527-97 Standard Practice for Phase I Environmental Site Assessments) shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner stating the recommended course of action. If, in the opinion of the environmental professional, significant remediation may be required, the project owner shall contact representatives of the Contra Costa County Health Services Department and Region 2 of the California Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall notify the CPM in writing within 5 days of any reports filed by the environmental professional, and indicate if any substantive issues have been raised.

REFERENCES

- ERM (Environmental Resources Management). 1998. Phase I Report Dow Corporation 20-Acre Property Pittsburg, California. Prepared for Calpine Corporation. May 29.
- DEC (Delta Energy Center). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.

LAND USE

Eric Knight

INTRODUCTION

The land use analysis of the Delta Energy Center (DEC) focuses on two main issues: the project's consistency with local land use plans, ordinances and policies; and the project's compatibility with existing and planned land uses. In general, an electric generation project and its related facilities can be incompatible with existing and planned land uses when it creates unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or when it unduly restricts existing or planned future uses.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

STATE

DELTA PROTECTION ACT OF 1992 (PUBLIC RESOURCES CODE § 29700 ET SEQ.)

This Act created the Delta Protection Commission with a mandate to develop a long-term resource management plan for the Delta Primary Zone. The goals of the plan are to "protect, maintain and, where possible, enhance and restore the overall quality of the delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities." All local general plans for areas within the Primary Zone are required to be consistent with the regional plan. The Secondary Zone consists of areas within the statutory Delta (as defined in Section 12220 of the California Water Code) but not part of the Primary Zone. Local general plans for land use within the Secondary Zone are not required to conform to the regional plan.

LOCAL

The proposed DEC will be located in the City of Pittsburg. Portions of the project's linear facilities (e.g., electrical transmission line, natural gas pipeline) will be located in the City of Antioch and unincorporated areas of Contra Costa County. Staff reviewed the land use planning documents listed below for goals, policies and regulations relevant to the proposed project. A discussion of the project's conformity with applicable goals, policies, standards and regulations from each of these planning documents can be found in the **COMPLIANCE WITH LORS** section of this report.

PITTSBURG GENERAL PLAN

The City of Pittsburg General Plan, last updated in 1988, consists of the seven mandatory elements (land use, circulation, housing, open space, safety, conservation and noise) and two optional elements (Parks and Recreation and Public Facilities, Institutions, and Utilities). The Pittsburg General Plan has three

functions: 1) to enable the Planning Commission and City Council to establish long-range development policies; 2) to provide a basis for judging whether specific private development proposals and public projects are in harmony with the policies; and 3) to guide other public agencies and private developers in designing projects that are consistent with city policies.

DOWNTOWN SPECIFIC PLAN

The Downtown Specific Plan (1986) was adopted out of the necessity for more specific land use and design review controls for upgrading the downtown area and to help achieve goals for downtown revitalization. The Downtown Specific Plan has been divided into four separate geographical areas, each with its own set of development standards. The proposed 230-kilovolt (kV) transmission line (interconnecting the Delta Energy Center to an existing PG&E substation at the Pittsburg Power Plant) would travel through Area II of the Specific Plan. Area II of the Specific Plan includes residential zoned and developed lands in the downtown area, generally located north of the Santa Fe Railroad, east and west of the commercial area along Railroad Avenue.

PITTSBURG ZONING ORDINANCE

The City of Pittsburg Zoning Ordinance (Title 18 of the Municipal Code) was adopted on March 19, 1990. The purpose of the zoning ordinance is to protect the public health, safety, and general welfare, and to implement the policies of the City General Plan. It contains regulations that establish zoning districts, govern the use of land and the placement of buildings and improvements within districts, and establish performance standards.

ANTIOCH GENERAL PLAN

The current City of Antioch General Plan (1988 - 2000) consists of the seven mandatory elements and several optional elements such as public infrastructure, growth management, social services, economic development and community image. The open space, conservation and noise elements have been combined within a broader category of Resources Management.

ANTIOCH ZONING ORDINANCE

The current City of Antioch Zoning Ordinance was adopted on November 8, 1994. The broad purposes of the Zoning Ordinance are to protect and promote the public health, safety, and general welfare, and to implement the policies of the City of Antioch General Plan.

CONTRA COSTA COUNTY GENERAL PLAN

The Contra Costa County General Plan (1995 – 2010) was adopted on July 1996. The purpose of the County General Plan is to express the broad goals and policies, and specific implementation measures, which will guide decisions on future growth, development and the conservation of resources through the year 2010. In addition to the seven mandatory elements, the Contra Costa County General Plan includes a Growth Management Element and a Public Facilities/Services Element.

CONTRA COSTA COUNTY ZONING ORDINANCE

The Contra Costa County zoning ordinance establishes classes of zoning districts governing the use of land and the placement of buildings and improvements within districts.

SETTING

The DEC site is located within the Northeast River planning subarea, a major industrial sector of the City of Pittsburg. With the exception of the PG&E Power Plant west of downtown, all of Pittsburg's heavy industrial uses are in Northeast River (Pittsburg 1998). Other industrial uses in the immediate vicinity of the site include Dow Chemical, Delta Diablo Wastewater Treatment Plant, and USS-POSCO (see **LAND USE Figure 1**).

SITE AND VICINITY DESCRIPTION

The DEC will occupy approximately 20 acres of a 129.53-acre parcel of land (Assessor Parcel No. 073-230-042-1) owned by Dow Chemical. The site is currently undeveloped and designated General Industry (IG) on the City of Pittsburg General Plan Land Use Map. According to the General Plan, the IG land-use classification is defined to include "large areas of major industrial manufacturing uses, including the existing operations such as USS-POSCO (formerly U.S. Steel) and Dow Chemical." The site is zoned General Industrial (IG) (see **LAND USE Figure 2**). The Pittsburg Zoning Ordinance states that the purpose of the IG District is:

To provide sites for the full range of manufacturing, industrial processing, general service, and distribution uses deemed suitable for location in Pittsburg; and to protect Pittsburg's general industrial areas, to the extent feasible, from disruption and competition for space from unrelated retail and commercial uses that could more appropriately be located elsewhere in the city. Performance standards will minimize potential environmental impacts.

The site is located within the city limits of Pittsburg at the border of the City of Antioch. Land use and zoning in the vicinity of the DEC site is as follows:

North – Immediately north of the site and across the Burlington Northern and Santa Fe (BN&SF) Railroad tracks is Dow Chemical. Zoning is IG.

West – Immediately west of the site is undeveloped property zoned IG.

South / Southwest – Immediately south of the site is undeveloped property zoned IG. Across the Pittsburg-Antioch Highway are Service Commercial (CS) land uses. The Pittsburg Zoning Ordinance states that the purpose of the CS District is "to

LAND USE Figure 1 - NOT AVAILABLE IN PDF VERSION

LAND USE Figure 2 - NOT AVAILABLE IN PDF VERSION

provide opportunities for retail and service businesses on transitional sites between commercial and industrial areas, including businesses not allowed in other commercial districts because they have industrial characteristics, require heavy vehicle or truck traffic, or have certain other adverse impacts.” The Casa Medanos apartments, a former motel converted into a 14-unit residential complex, are the nearest residences to the DEC site, located about 2,300 feet to the southwest and across the Pittsburg-Antioch Highway within the area zoned Service Commercial. Other nearby residences in Pittsburg are south of Highway 4, approximately 4,000 feet from the site (DEC 1998a, AFC page 8.4-6).

East / Southeast – Immediately southeast of the site is the Delta Diablo Sanitation District (DDSD) Administration Building. East of the site is vacant property zoned IG, and, across Arcy Lane, the DDSD Wastewater Treatment Plant. The water treatment plant is in the City of Antioch. Zoning is Planned Industrial District (M-1). The closest residence in Antioch, at Hazel’s Restaurant, is about 1 mile south-southeast of the site, near the intersection of Somersville Road and the Pittsburg-Antioch Highway. Other residences are east of Somersville Road (DEC 1998a, AFC page 8.4-6).

ELECTRIC TRANSMISSION LINES

The proposed 230-kV electric transmission line will connect the DEC to the existing PG&E substation at the Pittsburg Power Plant 3.3 miles to the west of the proposed DEC site. The transmission line exits the DEC site as an overhead line and will follow the BN&SF Railroad utility easement west to Columbia Street. Existing land uses adjacent to this above ground segment of the transmission line include industrial uses such as Dow Chemical and USS-POSCO, and undeveloped land. These properties are zoned IG. At a point east of the northern end of Columbia Street, the transmission line will convert to an underground line. To “transition” the line below ground, an overhead/underground transition station will be constructed near the CEMCO industrial building on USS-POSCO property. The underground line will then travel through vacant land between East Santa Fe Avenue and the BN&SF railroad tracks. The Central Addition residential neighborhood is to the south of East Santa Fe, and industrial zoned land is to the north. The line will continue westward and underground within the median of 8th Street (the former Sacramento Northern Railroad right-of-way). Residential housing is the predominant land use adjacent to 8th Street. Zoning designations in this highly developed area are Duplex Residential (R-2), Multiple Family Residential (R-3), Residential / Semi-Commercial (R-4) and Central Commercial (C-2). The line will continue west along the abandoned railroad right-of-way and enter unincorporated Contra Costa County at a point just west of Beacon Street. Immediately west of the Delta Diablo Sanitation District pumping station, the transmission line will turn north to follow a utility easement into the Pittsburg Power Plant substation. The area traversed by the line in the County is zoned Heavy Industrial (H-I). The railroad right-of-way is subject to a Railroad Corridor Combining District overlay zone.

The project will also include a 0.8-mile 13.8 kV underground transmission line to Dow Chemical, which will provide up to 20 megawatts (MW) of power to Dow. The line will exit out of the DEC site in a northerly direction for about 1,000 feet. The line

will then turn west, north of the industrial waste ponds, for approximately 1,500 feet before turning north again for about 1,500 feet and connecting to Dow Chemical. Adjacent land use is heavy industry and vacant land. Zoning is IG.

NATURAL GAS PIPELINE

Natural gas will be delivered to the DEC through about 5 miles of new pipeline. The underground pipeline primarily travels within the BN&SF Railroad right-of-way to interconnect with an existing PG&E natural gas supply line (Line 400) east of the DEC site. The gas pipeline will utilize an existing easement within the BN&SF right-of-way that Dow Chemical owns for an abandoned 4-in. caustic line. Since it may not be possible for DEC to utilize the Dow easement in all areas along the right-of-way, Calpine/Bechtel has applied to the railroad for a 75-foot pipeline corridor along the BN&SF right-of-way. This will give the DEC the flexibility to locate the pipeline on either side of the railroad tracks.

In the Application for Certification (AFC), Calpine/Bechtel proposed interconnecting with Line 400 at the PG&E Antioch Terminal east of Highway 160 on Bridgehead Road immediately north of the BN&SF railroad right-of-way. On June 11, 1999 Calpine/Bechtel filed an amendment to the AFC modifying the interconnection point with PG&E's Line 400 (DEC 1999d). As described in the supplement, because there are a significant number of gas pipelines and other product lines at or near the Antioch Terminal, PG&E proposed and Calpine/Bechtel agreed that a better point for the DEC gas pipeline to interconnect with Line 400 is within an undeveloped PG&E-owned parcel west of Highway 160. The new interconnection point will reduce the length of the route by about 700 feet. The pipeline route is primarily within the City of Antioch, and will travel through land predominantly zoned Planned Industrial District (M-1) or Industrial District (M-2). It will also traverse unincorporated Contra Costa County land in two locations. Existing land use along the pipeline route is discussed below. The proposed route is divided into segments for discussion purposes. The segment numbers begin at the DEC site and change where there are road crossings or due to the use of specific construction practices such as horizontal directional drilling.

SEGMENT 1

This 1.1-mile long segment begins at the DEC site and extends east toward the Antioch Marina. The majority of Segment 1 (4,400 feet) will be horizontally directionally drilled in order to avoid the Dow Wetland Preserve, the predominant land use along this segment. The remainder of Segment 1 will be within the BN&SF right-of-way on the north side of the tracks. There is some industrial development along the south side of the route. There are no residents adjacent to this segment.

SEGMENT 2

This segment extends from west of the Antioch Marina to H Street (0.46 mile) and will be entirely within the BN&SF right-of-way. Existing land uses along Segment 2 include the Antioch Marina, Amtrak Station and Prospects High School/Antioch Adult School, located about 300 feet from the proposed pipeline route. The pipeline will be located along the north side of the railroad tracks in order to avoid recently

installed landscaping at the Amtrak Station (Strachan 1999a, pers. comm.). There are no residents adjacent to Segment 2.

SEGMENT 3

This 0.31-mile segment begins near the Antioch Public Fishing Pier and is entirely within the BN&SF right-of-way. Commercial development abuts Segment 3 on the south side. There are no residents adjacent to this segment of the pipeline route.

SEGMENT 4

Near D Street the railroad tracks are carried on a rail bridge to make a water crossing. In order to avoid this crossing, this 0.41-mile segment of the pipeline route will deviate approximately 200 feet to the south of the BN&SF right-of-way. The pipeline will traverse vacant land between coastal marsh habitat to the north and residential housing about 150 feet to the south and at a higher elevation. The pipeline will travel through this vacant land for approximately 1,000 feet before rejoining the railroad right-of-way.

SEGMENT 5

This 0.25-mile long segment extends from McElheny Road to Fulton Shipyard Road. It is entirely within the BN&SF right-of-way and will travel along the north side of the tracks. Segment 5 is surrounded by heavy industrial uses. No residents are adjacent to this segment of the pipeline route.

SEGMENT 6

This segment extends from Fulton Shipyard Road to the new interconnection with Line 400. Segment 6 will travel within the BN&SF right-of-way on the south side of the tracks. It will then cross under the tracks and from the right-of-way parallel Line 400 until reaching the interconnection point about 600 feet north of the railroad right-of-way and 50 feet south of Wilbur Avenue on PG&E property (see **LAND USE Figure 3**). Existing land uses adjacent to this segment include the Antioch Dunes National Wildlife Refuge and heavy and light industrial uses such as Georgia Pacific Gypsum and Victory Packaging. At a point west of the intersection of Viera and Santa Fe Avenue, the pipeline enters unincorporated Contra Costa County (see **LAND USE Figure 4**). For about 900 feet, the pipeline runs behind a row of houses that border on the BN&SF right-of-way. The railroad right-of-way within the County's jurisdiction is subject to a Railroad Corridor Combining District overlay zone. At the eastern edge of the residential area, the pipeline crosses back into the City of Antioch. Along this portion of the route, the pipeline runs along about 2,100 feet of grape vineyards (DEC 1998a, AFC page 8.9-4). The pipeline once again

LAND USE Figure 3 - NOT AVAILABLE IN PDF VERSION

LAND USE Figure 4 - NOT AVAILABLE IN PDF VERSION

enters Contra Costa County when it exits the BN&SF right-of-way to travel north across vacant PG&E property — zoned Heavy Industrial (HI) by the County — to the interconnection point. At the interconnection with Line 400, there will be an above ground metering set, which will consist of a section of pipe with metering equipment and isolation valves. The metering set yard is 85' by 35" and will be fenced. The fencing will consist of non-reflective chain link with wood slat inserts. The area is industrial with a GWF power plant immediately to the east, and the Contra Costa Power Plant to the north and across Wilbur Avenue.

WATER PIPELINES

Water supply (for cooling) and discharge lines will run from the site for about 500 feet east to connect into the Delta Diablo Sanitation District Wastewater Treatment Plant. The existing land use is vacant land; zoning is IG. Potable water will be supplied by the Contra Costa Water District through an existing pipeline owned by Dow. The plant will be connected to this line, which runs down Arcy Lane, via a new 500-foot pipeline.

STEAM LINE

An 8-in. insulated steam line will supply steam to Dow Chemical. The 0.7-mile line will run above ground, parallel to the electrical transmission line servicing Dow. Adjacent land use is heavy industry and vacant land. Zoning is IG.

IMPACTS

According to Appendix G of the Guidelines to the California Environmental Quality Act (CEQA), a project may have a significant effect on land use if the project will:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.

A project may also have a significant impact on land use if it will create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or when it unduly restricts existing or planned future uses.

COMPLIANCE WITH LORS

Public Resources Code section 25525 states that the Energy Commission shall not certify any facility when it finds “that the facility does not conform with any applicable state, local, or regional standards, ordinances, or laws, unless the commission determines that such facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity.” When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically meets and consults with the applicable agencies to determine conformity and, when necessary, “to attempt to correct or eliminate any noncompliance” (Pub. Resources

Code, § 25523(d)(1)). The laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the project is consistent or at variance with each requirement or standard.

THE DELTA PROTECTION ACT OF 1992

The entire project is located in the Delta Secondary Zone as defined in Water Code section 12220; no part of the proposed project will encroach upon land within the Delta Primary Zone. Consequently, the proposed site is not subject to the Delta regional plan for long-term resource management, which applies only to the Delta Primary Zone.

PITTSBURG GENERAL PLAN

LAND USE ELEMENT, SECTION 2.8 INDUSTRIAL DEVELOPMENT

- Guiding Policy 2.8A seeks to “protect the supply of land suitable for industrial purposes and, in cooperation with the County, actively promote the development of appropriate industrial uses.”
- Guiding Policy 2.8B states Pittsburg’s intent to “retain existing industry, and allow existing industrial uses to expand, consistent with other General Plan policies.”
- Guiding Policy 2.8C encourages “new, clean, employment-intensive industry to locate in Pittsburg.”
- Guiding Policy 2.8D seeks to “protect existing and new residential areas from adverse effects of new industry and, wherever feasible, of existing industry.”

The project is consistent with Policy 2.8A because it would be located within an existing, heavy industrial area (Northeast River), and use of the site for power generation is consistent with the General Industry land use designation. The project is supportive of Policy 2.8B since it will supply an existing industrial facility, Dow Chemical, with its need for electricity and steam. Policy 2.8C seeks to encourage “new, clean, [and] employment-intensive” industry. Towards that goal, the DEC will be a combined-cycle/cogeneration plant, which will burn natural gas using state-of-the-art combustion technology. Calpine/Bechtel expects to employ 24 full-time plant operators and technicians once the plant is in operation. While not “employment-intensive” during operation, the average work force over the entire 22-month construction period is estimated to be about 186 personnel, with a peak of up to 575 construction jobs. Please refer to the **PROJECT DESCRIPTION** of this report for more information. In addition to providing a significant number of construction jobs, the DEC will provide steam and electricity to Dow Chemical, a major employer in Pittsburg. Policy 2.8D seeks to protect residential areas from “adverse effects of new industry.” Staff has identified a potential adverse visual impact because the project will block Casa Medanos residents’ views to the river. Please refer to the **VISUAL RESOURCES** section of this report for a more detailed discussion.

DOWNTOWN SPECIFIC PLAN

CHAPTER 3, DOWNTOWN RESIDENTIAL AREA – AREA II

Section 3.3B allows “public utility ...structures and uses” on approval of a use permit. The issuance of a certificate by the Energy Commission is in lieu of any local permit (Pub. Resources Code, § 25500), therefore a conditional use permit will not be required.

PITTSBURG ZONING ORDINANCE

Section 18.08.060.W classifies the water and natural gas pipelines as Minor Utilities. As Minor Utilities, the water and natural gas pipelines are a permitted use in all zoning districts and require no further land use regulation (Pittsburg 1999).

Section 18.08.100 classifies a power plant as a “heavy manufacturing industrial use.”

Section 18.36.200 requires design review of buildings proposed in an Industrial District. Section 18.36.210 specifies the information required in the design review application. Staff has proposed a condition of certification (**LAND-1**) to ensure compliance with Pittsburg’s requirement for design review.

Section 18.54.010 allows heavy manufacturing industrial uses in a General Industrial District on approval of a use permit. The issuance of a certificate by the Energy Commission is in lieu of any local permit (Pub. Resources Code, § 25500). Therefore a conditional use permit will not be required.

Section 18.54.015 prescribes the following property development regulations for General Industrial Districts:

Minimum Lot Area (sq. ft.)	20,000
Minimum Lot Width (ft.)	100
Minimum Yards (ft.)	
Front	10
Side	N/A
Corner Side	10
Rear	N/A
Maximum Height of Structures (ft.)	50
Maximum Lot Coverage	75%
Maximum Floor Area Ratio (FAR)	0.75
Minimum Site Landscaping	5%

The DEC’s three Heat Recovery Steam Generator (HRSG) stacks, each 144 feet in height, and two auxiliary boiler stacks, 115 feet in height, exceed the maximum height allowed within the IG District. The zoning ordinance allows two exceptions to the 50-foot height limitation. Section 18.54.100 allows one foot of additional height for each foot the structure is set back from the minimum yard requirements, but only up to a total height of 75 feet. Section 18.80.020 provides for an additional 20 feet

over the maximum height permitted in an Industrial District for a chimney or similar tower-like structure covering not more than 10% of the ground area occupied by the structure to which it is accessory. The latter exception applies to *all* zoning districts, not just the IG District. It provides additional height *over the maximum allowed* for a structure, which in this case is 20 additional feet over the 75-foot maximum, or 95 feet from grade. The 95-foot maximum height for a tower structure in an IG District has been the accepted interpretation in two previous variance applications in the Northeast River industrial area: the Pittsburg Marine Terminal coke storage domes (VA-95-02) and the Air Liquide gas manufacturing facility (VA-97-04) (Pittsburg 1999). Even with the additional height allowances provided by sections 18.54.100 and 18.80.020, the HRSG and auxiliary boiler stacks would exceed the 95-foot height maximum by 49 and 20 feet respectively; and thus, the project does not conform with this provision of the Pittsburg zoning ordinance.

In order to bring the project into conformance with the zoning ordinance, Calpine/Bechtel has applied for a variance (DEC 1999d, data response #28). Pursuant to section 18.28.010, a variance may be granted for structure height. Pursuant to section 18.16.050 of the zoning ordinance, a variance may only be granted if all of the following findings can be made:

1. Because of special circumstances concerning the subject property including size, shape, topography, location or surroundings, the strict application of the zoning regulations deprives the property of privileges enjoyed by other properties in the vicinity and in the same land use district (IG).
2. The variance will not constitute a grant of special privilege which is not generally available to other property in the vicinity and in the same land use district (IG).
3. The variance substantially complies with the intent and purpose of the land use district to which the property is classified (IG).

Staff assumes that this nonconformity will be handled in the DEC siting case as it was for the Pittsburg District Energy Facility (PDEF). In the PDEF case, the Energy Commission requested that an "advisory resolution" from the Pittsburg City Council be sent to the Energy Commission Siting Committee assigned to the project, advising the Committee of how the City would rule on the variance were it the permitting agency, and if any conditions would be attached to this entitlement, apart from those proposed by Energy Commission staff. The PDEF Siting Committee requested that the resolution be considered at a City Council meeting prior to issuance of the Presiding Member's Proposed Decision, so that this information could be incorporated into the Committee's decision. It is possible that this matter could be resolved earlier on in the DEC case, and the outcome reported in the Final Staff Assessment. Thus, until the Pittsburg City Council rules on an advisory resolution, staff cannot recommend a finding of conformity pursuant to Public Resources Code section 25525. Staff has proposed a condition of certification (**LAND-2**) to ensure compliance with the remaining property development regulations within the IG District (section 18.54.015).

Section 18.54.020 requires design review of all projects proposed within a General Industrial District (pursuant to Chapter 18.36).

18.54.105 states that in an IG District, required front and street side yards must be landscaped, except for access driveways, or be enclosed by a solid fence or wall at least 6 feet in height. Staff's proposed condition **LAND-2** will ensure compliance with section 18.54.105 of the zoning ordinance.

Chapter 18.78 applies regulations and design standards for off-street parking and loading facilities in all zoning districts. Section 18.78.040 requires heavy manufacturing uses to provide 1 off-street parking space per 1,000-sq. ft. of gross building floor area. Heavy manufacturing uses fall within Group Number II of Schedule B (section 18.78.040) and must comply with the following off-street loading space requirement:

<u>Gross Floor Area (sq. ft.)</u>	<u>Number of Spaces Required</u>
15,000 to 30,000	1
30,000 to 100,000	2
100,000 and over	3

Staff's proposed condition **LAND-2** will ensure compliance with applicable off-street parking and loading requirements in Chapter 18.78.

Section 18.80.030 allows "a public utility distribution and transmission line, tower and pole and underground facility for distribution or transmission of the same, and appurtenances" in all zoning districts, without the need for a use permit (unless it is proposed in a residential district) and not subject to building height limitation. The City of Pittsburg interprets this section to apply to merchant power plants such as the DEC since "it is governed by the rules and regulations of the California Energy Commission with the intent of generating electricity for general use" (Pittsburg 1999). Therefore, the transmission line and transition station are allowed in any zoning district in which they are proposed to be sited and not subject to height limitation. Since the proposed transmission line traverses a residential district, it would ordinarily require a conditional use permit, although the Energy Commission's authority over all project-related linear facilities supersedes this requirement.

Section 18.80.045 requires that signs erected on a site in any land use district are subject to the Sign Regulations (Title 19). Staff's proposed condition **LAND-2** would require compliance with section 18.80.045 of the zoning ordinance.

Section 18.84.010 requires that an accessory structure in a General Industrial District comply with all regulations applicable to the main building on a site. As aboveground structures, the electrical transition station and pump station would require design review pursuant to section 18.54.020 (as governed by Chapter 18.36).

ANTIOCH GENERAL PLAN

The Antioch General Plan contains goal statements which are followed by a series of policies that are “guiding directives.” Where appropriate, more specific “implementing policies” noted in the form of “bullet” statements are included.

Community Character Goal – Policy #5: The City should continue to develop and maintain suitable and adequate landscaping, *utility undergrounding* (emphasis added), sign control, site and building design, parking and performance standards to ensure that all existing and future commercial and industrial developments are compatible with surrounding land uses.

Waterfront Land Goal – Policy #4: Development adjacent to and nearby the Antioch Dunes National Wildlife Refuge should be of a type, intensity and design to minimize potential impacts on this important natural resource; future development plans in the vicinity of this area should be coordinated with the U.S. Fish and Wildlife Service.

Health and Safety Goal – Policy #3: The transportation of hazardous materials through the City of Antioch shall be conducted in the safest possible manner.

- New pipelines and other channels carrying hazardous materials shall avoid residential areas and other immobile populations to the greatest extent possible.

The project’s gas supply pipeline is consistent with Community Character Goal, Policy #5 since it will be underground for its entire length through the City of Antioch. Although segment 4 of the gas pipeline will travel within 150 feet of residential housing, the vast majority of the approximately 5-mile-long pipeline is within industrial areas in Antioch. Alternative routes presented in the AFC are adjacent to a greater amount of residences. Therefore, the proposed gas pipeline is consistent with Health and Safety Goal, Policy #3 which requires pipelines to avoid residential areas “to the greatest extent possible.” The proposed gas pipeline will be consistent with Waterfront Land Goal, Policy #4 since it will be located underground and entirely within the railroad right-of-way (on the south side of the tracks) as it travels by the Antioch Dunes National Wildlife Refuge to the north of the right-of-way. Please refer to the **BIOLOGY** section of this report for more discussion about potential impacts to the Antioch Dunes and measures proposed to mitigate those impacts.

ANTIOCH ZONING ORDINANCE

Section 9-5.3826(b)(6): “New pipelines and other channels carrying hazardous materials shall avoid existing and approved residential areas and other immobile populations to the greatest extent possible.” The gas pipeline avoids residential areas along the vast majority of its length, and thus is consistent with this zoning requirement.

Section 9-5.3826(g)(2): “Pipelines no longer in use shall be abandoned to the satisfaction of the City Engineer and shall comply with all applicable Environmental

Protection Agency (EPA) requirements for such abandonments.” Staff has proposed a condition of certification (**LAND-4**) that would require compliance with this zoning requirement in the event of permanent closure of the facility.

CONTRA COSTA COUNTY GENERAL PLAN

TRANSPORTATION AND CIRCULATION ELEMENT

Railroad Goal 5-V states that the County will “protect the existing railroad rights-of-way in the county for continued railroad use, utility corridors, roads, transit facilities, trails and other public purposes.”

Railroad Policies:

- Policy 5-72 states that “railroad rights-of-way shall generally be designated for Public/Semi-Public uses to reflect their importance to the County’s economy.”
- Policy 5-73 states that “encroachments into railroad rights-of-way by urban uses which would impact current rail operations or preclude future use of the corridors for trails or other public purposes shall be limited.”
-
- Policy 5-74 states that “trails shall be considered an appropriate interim use of an abandoned railroad right-of-way.”
- Policy 5-75 states that “encroachment of unsuitable land uses adjacent to abandoned railroad right-of-way shall be prevented where such uses would conflict with future uses of the right-of-way identified in the Land Use, and Transportation and Circulation Elements.”
-

The gas pipeline is consistent with Railroad Goal 5-V, which seeks to maintain railroad rights-of-way as “utility corridors.” The gas pipeline will be buried a minimum of 36 inches, or deeper, as required by the BN&SF Railroad; and all crossings of the BN&SF Railroad will be done by boring under the tracks (DEC 1998a, AFC pages 7-5 and 7-7). Based on the above, staff does not expect a land-use impact to current rail operations and therefore the gas pipeline is consistent with Policy 5-73. The DEC transmission line will be within an abandoned railroad right-of-way (former Sacramento Northern) as it skirts the southern boundary of the Delta Diablo Sanitation District pumping station. This portion of the right-of-way is within the unincorporated area of the County. Consistent with Policies 5-73 and 5-75, the DEC transmission line would be underground while within the right-of-way and would not preclude its future use for “trails or other public purposes.”

SAFETY ELEMENT

Hazardous Materials Goal 10-I seeks to protect the public from hazards associated with the transport of hazardous substances.

Hazardous Materials Policies:

- Policy 10-67 states that “to the greatest possible extent, new fuel pipelines should not be routed through centers of population nor should they cross major disaster evacuation routes.”
- Policy 10-70 states that “industry should be encouraged to utilize underground pipelines, rail, and water transportation of hazardous materials to the greatest extent feasible to take advantage of the greater separation from the general public provided by these modes of transportation.”

Although the gas pipeline travels for a short distance (about 900 feet) behind a row of houses that border on the south side of the BN&SF right-of-way, the pipeline primarily travels within industrial areas in Contra Costa County. Therefore, the pipeline is consistent with the Policy 10-67 that new pipelines, “to the greatest possible extent,” should not be routed through centers of population. Except for the gas metering set, the pipeline will be underground for its entire length. The above ground metering set, which is required for the interconnection with the PG&E gas supply line, is within an undeveloped parcel zoned H-I and adjacent to other industrial uses. Thus, the gas pipeline is consistent with Policy 10-70, which encourages utilization of underground pipelines for the transport of hazardous materials to take advantage of their “greater separation from the general public.”

CONTRA COSTA COUNTY ZONING ORDINANCE

Railroad Corridor Combining District (Ordinance No. 87-19): Ordinance No. 87-19 added a “Railroad Corridor Combining District” overlay zone to the existing zoning designations of all railroad rights-of-way owned or occupied by Santa Fe, Southern Pacific, Union Pacific, and Bay Point-Clayton within the unincorporated area of the County. The ordinance states:

“All land uses that were previously allowed under the existing, underlying zoning designations along the railroad right of way are allowed under this ‘Railroad Corridor Combining District’ Ordinance, provided that no new land uses and/or structures, including residences and pipelines for the transmission of oil, gas, water or other substances shall be established, and no such uses and/or structures presently existing shall be substantially expanded or altered, or demolished, without first having been granted a conditional use permit, through procedures established in the County Ordinance Code.”

The County zoning ordinance does not allow a land use permit to be approved unless 7 findings are made, which are as follows:

1. “That the proposed conditional use shall not be detrimental to the health, safety, and general welfare of the county.” Because the transmission line will be buried at a depth of 6 feet and encased in steel pipes, measured EMF levels are minimal. Conditions of certification proposed in the **FACILITY DESIGN** section of this report require compliance with all applicable state and federal LORS, which are adequate for ensuring that the gas pipeline is constructed in a manner that protects public safety.

2. "That it shall not adversely affect the orderly development of property within the county." Both the transmission line and gas pipeline will be within the railroad rights-of-way and will not physically divide any established community.
3. "That it shall not adversely affect the preservation of property values and the protection of the tax base within the county." Both the transmission line and gas pipeline primarily travel within industrial areas in the County.
4. "That it shall not adversely affect the policy and goals as set by the general plan." Both the transmission line and gas pipeline are consistent with all applicable General Plan policies and goals.
5. "That it shall not create a nuisance and/or enforcement problem within the neighborhood or community." For the reasons stated above for #1, the transmission line and gas pipeline will not create a nuisance or an enforcement problem within the community.
6. "That it shall not encourage marginal development within the neighborhood." Both the transmission line and gas pipeline primarily travel within industrial areas in the County and would not encourage "marginal" development.
7. "That special conditions or unique characteristics of the subject property and its location or surroundings are established." Both the transmission line and gas pipeline primarily travel within industrial areas in the County.

Because the issuance of a certificate by the Energy Commission is in lieu of any local permit (Pub. Resources Code, § 25500), a conditional use permit will not be required from Contra Costa County for either the transmission line or the gas pipeline. Staff believes that the transmission line and gas pipeline would meet the criteria established by the County for issuance of a use permit. Staff contacted Contra Costa County on June 10, 1999 for review and comment on the DEC project and awaits the County's input.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

POWER PLANT

The 20-acre site is currently undeveloped and designated General Industry (IG) on the Pittsburg General Plan Land Use Map, as are the immediately surrounding properties. A power plant is consistent with this land use designation and would not constitute a change in the current development pattern of the area — as established by the General Plan. Furthermore, the proposed facility is compatible with the industrial character of the immediate surrounding land uses, which include the Delta Diablo Wastewater Treatment Plant, Dow Chemical and USS-POSCO. No residential uses adjoin the power plant site. The nearest residences to the DEC site are located about 2,300 feet to the southwest and across the Pittsburg-Antioch Highway in an area zoned Service Commercial. Staff has identified a potential

adverse visual impact because the project as proposed will block Casa Medanos residents' views to the river. Please refer to the **VISUAL RESOURCES** section of this report for a more detailed discussion. Please refer to the **NOISE, AIR QUALITY, PUBLIC HEALTH** and **TRAFFIC AND TRANSPORTATION** sections for a discussion of indirect land-use impacts and measures proposed to mitigate those impacts.

TRANSMISSION LINE

Staff does not expect that the transmission line will cause a significant, permanent impact to existing land use. The proposed route will not disrupt or divide the physical arrangement of an established community. The line will generally follow existing utility easements in industrial areas, and the portion traversing a residential area will be located underground. Temporary construction impacts, such as increased dust, noise and traffic may affect land use along the transmission line route. Please refer to the **AIR QUALITY, NOISE** and **TRAFFIC AND TRANSPORTATION** sections of this report.

In preparation for the Preliminary Staff Assessment, an Issues and Data Response Workshop was held on April 15, 1999 for several technical areas, including Transmission System Engineering and Land Use. On May 14, 1999 Calpine/Bechtel submitted a written response to questions raised by Energy Commission staff during the workshop (DEC 1999i). As proposed in the AFC, the DEC transmission line has the potential to conflict with planned land use. Compatibility with planned land use is discussed below.

PDEF /USS-POSCO SERVICE LINE

Calpine/Bechtel has identified a conflict between the routing for the proposed Pittsburg District Energy Facility (PDEF) 115 kV service line to USS-POSCO, and the proposed location of the DEC 230 kV overhead/underground transition station. Both the PDEF and DEC propose locating their overhead transmission lines south of the BN&SF railroad and adjacent to the CEMCO manufacturing facility on USS-POSCO property (see **LAND USE Figures 5 and 6**). To accommodate the PDEF siting process and certification schedule, staff requested that Calpine/Bechtel seek an alternate location for the DEC transition station. In response, Calpine/Bechtel has suggested that the PDEF transmission line traverse the railroad at a point to the west of their proposed crossing (one or two tower positions). This modification would enable the DEC to locate its overhead/underground transition station just east of the CEMCO building and avoid the USS-POSCO pedestrian tunnel (see **LAND USE Figure 7**). Calpine/Bechtel is discussing the feasibility of this proposal with the PDEF and USS-POSCO (DEC 1999i).

TRUCK BYPASS ROAD AND LANDSCAPING

At the April 15th workshop, staff also requested that Calpine/Bechtel seek an alternate route for the portion of the underground transmission line that would run parallel to East Santa Fe Avenue. The PDEF plans to build a truck bypass road that would run parallel to East Santa Fe Avenue and south of the BN&SF Railroad tracks. As proposed in the Application for Certification (AFC), the DEC underground transmission line would travel underneath the truck bypass road in two

locations, and under the linear park which is being proposed between East Santa Fe Avenue and the sound wall for the new roadway. The Pittsburg Power Plant Advisory Committee (PPAC), whose membership includes one member from each of the four homeowner associations closest to the PDEF site, requested in a letter to Commissioner David Rohy, Presiding Member of the PDEF Siting Committee, that the Energy Commission require, as a condition of approval of the PDEF project, that landscaping along East Santa Fe Avenue be completed at the same time as the truck bypass road. The letter states that Sam Wehn of Enron (applicant) agreed to the PPAC request. In addition, staff proposed, as mitigation for construction traffic impacts, a condition of certification in the Traffic and Transportation section of the PDEF Staff Assessment that the truck bypass road be completed within 2 months after initial construction activities begin at the PDEF site. Thus, if the Energy Commission Siting Committee for the PDEF project accepts both of these conditions, the landscaping will already be in place when the DEC begins construction of its transmission line. Staff also raised concerns about the DEC proposal to "cut and cover" the truck route and possible future subsidence of the roadway at the two roadway crossings, especially due to the weight of the trucks that will utilize the new road.

In response to staff's comments, Calpine/Bechtel is investigating whether the BN&SF right-of-way to the north of the truck bypass road can accommodate the DEC transmission line. Calpine/Bechtel's initial discussions with BN&SF indicate that the route appears to be feasible; a final decision from the railroad is expected in July — and prior to publication of the Final Staff Assessment. It is Calpine/Bechtel's intent to seek this alternate route upon resolution of rights-of-way discussions with the railroad, and will file a formal amendment to the AFC if the route is determined to be feasible (DEC 1999i). If the DEC is not able to utilize the

BN&SF right-of-way, Calpine/Bechtel requests that construction of the park along the sound wall be delayed until the DEC has received certification from the Energy Commission and can install the transmission line (DEC 1999i). It is staff's belief that it does not make sense for the PDEF to install the landscaping, only to have it disturbed by construction of the DEC transmission line. But, staff can also understand the community's desire to have the landscaping in place as soon as possible for mitigation of the visual impacts of the sound wall. A potential compromise could be phased installation of the landscaping if Calpine/Bechtel could demonstrate that vines, shrubs or trees planted close to the wall, and prior to construction of the transmission line, would not be adversely affected. If use of the BN&SF right-of-way proves infeasible, staff will attempt to resolve this issue at a workshop with Calpine/Bechtel, the City of Pittsburg, and the public prior to release of the Final Staff Assessment. Please see the **TRAFFIC AND TRANSPORTATION** section of this report for a discussion of staff's proposed mitigation if it is necessary for the DEC transmission line to cross under the truck bypass road.

LAND USE Figure 5 - NOT AVAILABLE IN PDF VERSION

LAND USE Figure 6 - NOT AVAILABLE IN PDF VERSION

LAND USE Figure 7 - NOT AVAILABLE IN PDF VERSION

EIGHTH STREET MEDIAN AND LINEAR PARK

Calpine/Bechtel proposes to locate the underground transmission line within the median of 8th Street (an abandoned railroad right-of-way). The City of Pittsburg has proposed converting the 8th Street median into a linear park from Harbor Street to Beacon Street (Pittsburg 1998, Pg. 187). Calpine/Bechtel believes that the underground transmission line will be fully compatible with the park (DEC 1999i). This statement is made based on several factors, including the depth of the transmission line (6 feet), the very low electromagnetic fields (EMF) present, and the structural integrity of the conductor design (encased in seam welded, thick-wall carbon steel pipes). Calpine/Bechtel commissioned an EMF study, which determined that because the line will be buried at a depth of 6 feet and will be encased in steel pipes — which effectively cancels most EMF and electric fields — measured EMF levels will be approximately 2.0 to 3.0 milligauss (mG). The report concludes that given the minimal EMF present, there exists no impact to public health and safety. Please see the **TRANSMISSION LINE SAFETY & NUISANCE** section of this report for a more detailed discussion of public safety impacts associated with the transmission line. In addition, Calpine/Bechtel believes that there is little restriction for the placement of play structures and other typical park structures or for the types of landscaping that could be employed over the transmission line. Calpine/Bechtel has also commissioned a study to address any issues regarding tree selections or other vegetation for use in park landscaping. The results of this “compatibility” study are expected at the end of July (Strachan 1999b, pers. comm.). At the workshop on April 15, 1999, Doug Buchanan (Bechtel) reiterated Calpine/Bechtel’s commitment to participating with the City of Pittsburg and the Pittsburg District Energy Facility in the development of the 8th Street linear park. Staff has proposed a condition of certification (**LAND-5**) to ensure that the park is constructed and that it meets the specifications of the City of Pittsburg.

DELTA DIABLO PUMP STATION

As proposed in the AFC, the transmission line was routed north along the eastern side of the Delta Diablo Sanitation District (DDSD) pumping station. To avoid conflict with existing and planned land uses around the DDSD site, Calpine/Bechtel proposes to route the line to the south and around the west side of the DDSD pumping station (DEC 1999i). The first land-use conflict involved vacant property to the south of Marina Park and west of Montezuma Street, which has been identified by the City of Pittsburg as a possible site for either a Habitat for Humanity housing development or a new school. Secondly, the City of Pittsburg indicated that it wanted the DEC to avoid the retention basin between Marina Park and DDSD property that is used for storing harbor-dredging spoils. With the proposed PDEF underground transmission line running along the eastern and northern fence lines of DDSD property, Calpine/Bechtel believed it would be technically difficult to accommodate both the PDEF and DEC lines along the eastern edge of the pumping station without encroaching on the retention basin. When the routing to the south and west of the DDSD pumping station was proposed by PDEF, officials with Delta Diablo raised concerns that the transmission line might conflict with several underground wastewater pipelines that exit the pumping station (CEC 1999, Staff

Assessment pages 18-19). In response to these concerns, PDEF modified the routing of its transmission line to travel along the eastern and northern fence lines of DDSD property.

Calpine/Bechtel and DDSD have identified a technical solution that would allow the routing of the DEC transmission line to the south and west of the pumping station and not impact the wastewater pipelines. Three pipelines exit the DDSD pumping station. Two of the lines are buried at a depth of 14 feet; the other is buried at a depth of 6 feet. DDSD also has plans to add a fourth pipeline. Calpine/Bechtel proposes relocating the wastewater line that is buried at a depth of 6 feet to 14 feet. In addition, Calpine/Bechtel will construct a "deadhead" line to facilitate DDSD's future interconnection and expansion plans. Calpine/Bechtel will then construct the DEC transmission line at a depth of 6 feet, allowing 8 feet of separation between the two facilities (**see LAND USE Figure 8**). Greg Baatruup, an official with DDSD, does not expect the transmission line to cause any interference with the wastewater pipelines in the future and concurs with the DEC proposal (DEC 1999i).

NATURAL GAS PIPELINE

Staff does not expect that the natural gas pipeline will cause a significant, permanent impact to land use. The underground pipeline will be located within a railroad right-of-way for nearly its entire length and will not disrupt or divide the physical arrangement of an established community. Temporary construction impacts, such as increased dust, noise and traffic may affect land use along the pipeline route. Please refer to the **NOISE** and **TRAFFIC AND TRANSPORTATION** sections of this report. Any construction laydown areas will be situated at existing paved or graveled areas (DEC 1998a, AFC page 8.4-15). Dust control will be of special concern in the area where grape vineyards are adjacent to the gas pipeline since dust can increase the incidence of mites and downy mildew on grapes (DEC

LAND USE Figure 8 - NOT AVAILABLE IN PDF VERSION

1998a, AFC page 8.9-13). Vehicles will not be driven through vineyards unless they can be driven on areas designed to support them and with the express permission of the landowner (DEC 1998a, AFC page 8.9-14). Control of fugitive dust during construction of the gas pipeline will be ensured by staff's proposed condition of certification **AQ-1** in the **AIR QUALITY** section of this report.

CUMULATIVE IMPACTS

Cumulative impacts may be caused if a project would have effects that are individually limited but cumulatively considerable when viewed together with the effects of related projects. In addition to the Delta Energy Center, the Energy Commission is reviewing an Application for Certification for the Pittsburg District Energy Facility. The PDEF is requesting certification to construct a 500-MW power plant on a 12-acre site on East 3rd Street, east of Harbor Street. Both the DEC and PDEF projects will interconnect with the PG&E substation at the Pittsburg Power Plant and route their transmission lines along 8th Street. Both projects intended to use the median along 8th Street, which is an abandoned railroad right-of-way. But, at 50 feet, the median is not wide enough to handle the combined space requirements of the underground lines. In the Land Use section of the PDEF Staff Assessment, staff provided testimony that to accommodate both projects within the 8th Street corridor would require encroachment into the street right-of-way (CEC 1999, Staff Assessment page 30). As currently proposed by the two applicants, the PDEF transmission line will be located underneath the eastbound lane of 8th Street and the DEC line will be within the median. The City of Pittsburg is in the process of condemning an easement through the 8th Street corridor to allow for the public use of the corridor by the two transmission lines. The City of Pittsburg requests that the DEC and PDEF coordinate construction of the underground transmission lines along 8th Street to allow concurrent installation and decrease traffic disruption (Pittsburg 1999). Staff has proposed a condition of certification (**LAND-7**) requiring that the two applicants coordinate activities within the 8th Street corridor.

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 closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

The information provided in the AFC did not specifically address the effects of project closure on land use issues and concerns. The proposed DEC is expected to be in operation in excess of thirty years. The applicant will prepare a Facility Closure Plan for submittal to the Energy Commission for review and approval, at least twelve months prior to the proposed closure. At the time of closure, all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with.

There are at least two other circumstances under which a facility closure can occur, unexpected temporary closure and unexpected permanent closure. In the event of temporary facility closure, staff has not identified any LORS from a land use perspective with which the applicant would have to comply. In the event of

unexpected permanent closure and dismantling of the facility, the applicant would need to comply with the Antioch zoning ordinance, which requires removal of pipelines that are no longer in use.

MITIGATION

To avoid conflict between the DEC underground transmission line and Delta Diablo Sanitation District wastewater pipelines, Calpine/Bechtel proposes to relocate an existing pipeline and constructing a “deadhead” line stub both at a depth of 14 feet to provide 8 feet of clearance between the wastewater lines and the transmission line. Delta Diablo agrees with this proposal and staff has proposed a condition of certification (**LAND-6**) to ensure that these lines are constructed. The City of Pittsburg is concerned about disruption of traffic during construction of the DEC and PDEF transmission lines along 8th Street. Staff has proposed **LAND-7** requiring Calpine/Bechtel to coordinate construction activities with the PDEF along the 8th Street corridor to decrease traffic disruption.

CONCLUSION AND RECOMMENDATION

CONCLUSION

The project will not comply with all applicable LORS (laws, ordinances, regulations and standards) because the project will exceed Pittsburg’s 95-foot height restriction on structures in a General Industrial zoning district. To resolve this nonconformity, Calpine/Bechtel has applied for a height variance from the City of Pittsburg. Staff assumes that this nonconformity will be handled in the same manner as it was for the PDEF, in which the Energy Commission requested that an “advisory resolution” from the Pittsburg City Council be sent to the Energy Commission Siting Committee assigned to the project, advising the Committee of how the City Council would rule on the variance were it the permitting agency. If the City of Pittsburg resolves that if it were the permitting agency a variance would be issued, the DEC will be in compliance with all applicable LORS.

The proposed power plant will be compatible with existing and planned land uses because: 1) it is consistent with the current general plan and zoning designations of property; 2) it is compatible with the heavy industrial character of the immediate land uses; 3) the site does not abut any residential areas; and 4) distance and/or other structures will provide buffering for residential uses in the vicinity. Staff does not expect either the 230 kV or 13.8 kV electric transmission lines to have a significant adverse impact on existing land use, but the 230 kV line may conflict with planned land use. Calpine/Bechtel has identified potential solutions for these conflicts (i.e., modification of the PDEF/POSCO service line and use of the BN&SF right-of-way). Staff will work with Calpine/Bechtel to attempt to resolve these conflicts before release of the Final Staff Assessment. Although Calpine/Bechtel believes that there is little restriction on the type of landscaping that can be planted over the transmission line along 8th Street; the results of the “compatibility” study are not available at this time. If there are issues with particular tree species or other vegetation, any restrictions would need to be discussed with the City of Pittsburg to

determine if they affect plans for development of the park. Staff does not anticipate any significant adverse impacts on land use from the construction and operation of the natural gas, steam or water pipelines. Nor does staff expect any significant cumulative impacts on land use.

RECOMMENDATION

If the Energy Commission certifies the DEC project, staff recommends that the Commission adopt the following proposed conditions of certification.

CONDITIONS OF CERTIFICATION

LAND-1 The project owner shall comply with the Pittsburg Zoning Ordinance requirement for Design Review (section 18.36.210).

Protocol: The project owner shall submit to the CEC Compliance Project Manager (CPM) for review and approval a site plan as required by Design Review, providing evidence that the City of Pittsburg has been consulted regarding the plan, and attaching any recommendations from the City of Pittsburg. The project owner shall not implement the plan until approved by the CPM.

Verification: At least 90 days prior to the start of construction of the DEC, the project owner shall submit the site plan to the CPM for review and approval. The submittal to the CPM shall include any recommendations from the City of Pittsburg.

LAND-2 The project owner shall comply with the following requirements in the Pittsburg Zoning Ordinance:

- property development regulations for structures in a General Industrial District (section 18.54.015)
- required front and street side yards must be landscaped, except for access driveways, or be enclosed by a solid fence or wall at least 6 feet in height (section 18.54.105)
- off-street parking and loading spaces (Chapter 18.78)
- all signs erected on the site shall comply with Title 19 (Sign Regulations) of the Pittsburg Municipal Code
- all site developments shall comply with Title 12 (Streets, Sidewalks and Utilities), Title 13 (Water and Sewer) and Chapter 15.88 (Grading, Erosion and Sediment Control) of the Pittsburg Municipal Code

Verification: At least 90 days prior to the start of construction of the DEC, the project owner shall submit to the CPM a statement from the City of Pittsburg that

the project complies with the sections of the Pittsburg Zoning Ordinance listed in LAND-2.

LAND-3 The project owner shall submit landscaping and irrigation plans for minimum site landscaping and required planting areas in compliance with the Pittsburg Zoning Ordinance (Chapter 18.82, Article 7).

Protocol: The project owner shall submit to the CPM for review and approval landscaping and irrigation plans for minimum site landscaping and required planting areas, providing evidence that the City of Pittsburg Community Development Director and Public Services Director have been consulted, and attaching any recommendations from the City of Pittsburg. The project owner shall not implement the plan until approved by the CPM.

Verification: At least 90 days prior to start of construction, the project owner shall submit to the CEC CPM for review and approval landscaping and irrigation plans for minimum site landscaping and required planting areas. The submittal to the CPM shall include any recommendations from the Pittsburg Community Development Director and Public Services Director.

LAND-4 Upon the permanent closure of the facility, the project owner shall comply with Antioch Zoning Ordinance section 9-5.3826(g)(2) that requires pipelines no longer in use to be abandoned to the satisfaction of the City Engineer and in compliance with all applicable Environmental Protection Agency (EPA) requirements for such abandonment.

Verification: The project owner shall include abandonment of the natural gas pipeline in compliance with Antioch Zoning Ordinance section 9-5.3826(g)(2) and EPA requirements in its facility closure plan.

LAND-5 In a joint effort with the Pittsburg District Energy Facility, the project owner shall design, finance and construct a linear green belt within the 8th Street median between Harbor Street and Beacon Street.

Protocol: The project owner shall submit to the CPM for review and approval landscaping and irrigation plans for the 8th Street linear park, providing evidence that the City of Pittsburg Community Development Director and Public Services Director have been consulted, and attaching any recommendations from the City of Pittsburg. The project owner shall not implement the plans until approved by the CPM.

Verification: At least 90 days prior to start of construction of the 230-kV transmission line, the project owner shall submit to the CPM for review and approval

landscaping and irrigation plans for the linear green belt within the 8th Street median. The submittal to the CPM shall include any recommendations from the Pittsburg Community Development Director and Public Services Director.

LAND-6 The project owner shall relocate the pressurized wastewater line exiting the Delta Diablo Sanitation District (DDSD) pumping station from a depth of 6 feet to a depth of 14 feet. The project owner shall construct a second “deadhead” pressurized line stub of similar design at a depth of 14 feet.

Protocol: The project owner shall submit to the CPM for review and approval a plan for relocating the pressurized wastewater line and construction of the second pressurized line stub. The project owner shall provide evidence that the Delta Diablo Sanitation District has been consulted regarding the plan, and attach any recommendations from the District. The project owner shall not implement the plan until approved by the CPM.

Verification: At least 90 days prior to the start of construction of the 230-kV transmission line, the project owner shall submit to the CPM for review and approval a plan for relocating the pressurized wastewater line and construction of the second pressurized line stub. The submittal to the CPM shall include any recommendations from the Delta Diablo Sanitation District.

LAND-7 The project owner shall coordinate with the Pittsburg District Energy Facility (PDEF) construction activities within the 8th Street corridor to allow, to the greatest extent feasible, concurrent construction of the DEC and PDEF transmission lines. The objective of this effort is to minimize disturbance in the area.

Protocol: The project owner shall submit a construction plan to the CPM for review and approval describing how the project owner intends to coordinate construction activities within the 8th Street corridor with the PDEF, and provide a schedule that shows the construction start and completion dates for the two transmission lines. The project owner shall provide evidence that the City of Pittsburg has been consulted regarding the plan, attaching any recommendations from the City of Pittsburg. The project owner shall not implement the plan until approved by the CPM.

Verification: At least 90 days prior to start of construction of the 230-kV transmission line, the project owner shall submit a construction plan to the CPM for review and approval. The submittal to the CPM shall include any recommendations from the City of Pittsburg.

REFERENCES

- Antioch General Plan, December 1988.
- Antioch Zoning Ordinance, November 1994.
- Bendorff, Ron, 1999. Senior Planner, City of Antioch. Telephone conversation with Eric Knight (California Energy Commission), June 10.
- CEC (California Energy Commission) 1999. Staff Assessment of the Pittsburg District Energy Facility Application for Certification (98-AFC-1). Docketed on April 14, 1999.
- Contra Costa County General Plan, July 1996.
- DEC (Delta Energy Center). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.
- DEC (Delta Energy Center). 1999d. Response to CEC data requests #1-61 submitted to the California Energy Commission on March 31, 1999.
- DEC (Delta Energy Center). 1999d. Supplemental filing--reduction in length of the gas pipeline and inclusion of an additional outfall for wastewater discharge, dated June 11, 1999 and docketed June 16, 1999.
- DEC (Delta Energy Center). 1999i. Response to CEC data requests made at the workshops and submitted to the California Energy Commission on May 14, 1999.
- Pittsburg (City of Pittsburg/Kolin) 1999. Response to letter dated January 26, 1999 requesting information necessary for determining the Pittsburg District Energy Facility's conformity to Pittsburg's zoning requirements and for proposing conditions of certification. Submitted to the California Energy Commission, March 26, 1999.
- Pittsburg Downtown Specific Plan, April 1986.
- Pittsburg General Plan, September 1988.
- Pittsburg. 1998. Pittsburg General Plan Update: Existing Conditions and Planning Issues. June 1998.
- Pittsburg Zoning Ordinance, March 1990.
- Strachan, Susan, 1999a. Environmental Project Manager, Calpine. Gas pipeline site visit with Eric Knight (California Energy Commission), other CEC staff and Antioch Planning Department Staff, May 13.

Strachan, Susan, 1999b. Environmental Project Manager, Calpine. Telephone conversation with Eric Knight (California Energy Commission), June 10.

TRAFFIC AND TRANSPORTATION

David Flores

INTRODUCTION

The Traffic and Transportation section of the Preliminary Staff Assessment (PSA) addresses the extent to which the project may have an impact on the transportation system within the vicinity of its proposed location. This section summarizes the separate analyses by Delta Energy Center (DEC) and the Energy Commission staff of the potential traffic and transportation impacts associated with construction and operation of the project. These analyses included the identification of: 1) the roads and routings which are proposed to be used; 2) potential traffic related problems associated with those routes; 3) the anticipated number of trips to deliver oversized/overweight equipment; 4) the anticipated encroachment upon public right-of-ways during the construction of the proposed project and associated appurtenant facilities; 5) the frequency of trips and probable routes associated with the delivery of hazardous materials; and 6) the availability of alternative transportation methods such as rail.

Staff has used this information to determine the potential for the project to have significant traffic and transportation impacts, as well as to assess the availability of mitigation measures which could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to insure that the project complies with the applicable Laws, Ordinances, Regulations and Standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

The federal government addresses transportation of goods and materials in Title 49, Code of Federal Regulations:

- Title 49, Code of Federal Regulations, Section 171-177, governs the transportation of hazardous materials, the type of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, Section 350-399, and Appendices A-G, Federal Motor Carrier Regulations, addresses safety considerations for the transport of goods, materials and substances over public highways.

STATE

The California Vehicle Code, and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, the transportation of hazardous materials and right-of-way. In addition, the California Health and Safety Code addresses the transportation of hazardous materials. Specifically, these codes include:

- California Vehicle Code, section 353 defines hazardous materials.
- California Vehicle Code, sections 31303-31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- California Vehicle Code, section 31030 requires that permit applications shall identify the commercial shipping routes they propose to utilize for particular waste streams.
- California Vehicle Code, sections 31600-31620 regulate the transportation of explosive materials.
- California Vehicle Code, sections 32000-32053, regulate the licensing of carriers of hazardous materials and include noticing requirements.
- California Vehicle Code, sections 32100-32109, establish special requirements for the transportation of inhalation hazards and poisonous gases.
- California Vehicle Code, sections 34000-34121, establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code, sections 34500, 34501, 34501.2, 34501.4, 34501.10, 34505.5-7, 34507.5 and 34510-11, regulate the safe operation of vehicles, including those that are used for the transportation of hazardous materials.
- California Vehicle Code, sections 2500-2505, authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives.
- California Vehicle Code, sections 13369, 15275, and 15278, address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. In addition, this section requires the possession of certificates permitting the operation of vehicles transporting hazardous materials.

- California Streets and Highways Code, sections 117 and 660-72, and California Vehicle Code 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Streets and Highways Code, sections 660, 670, 1450, 1460. et seq., 1470, and 1480, regulate right-of-way encroachment and the granting of permits for encroachment on state and county roads.
- California Health and Safety Code, sections 25160 et seq., address the safe transport of hazardous materials

LOCAL

CITY OF PITTSBURG

The Traffic and Circulation Element of the City of Pittsburg General Plan sets up standards for traffic service and roadway improvements. It introduces planning tools essential for achieving the local transportation goals and policies (City of Pittsburg, 1988). Specific policies from the Traffic and Circulation Element that directly relate to this project include:

- The City shall plan, design, and regulate roadways in accordance with the functional classification system and circulation diagram contained within the General Plan.
- The City shall accept Level of Service (LOS) D on arterial and collector routes bordered by mostly non-residential development. The project will not cause any local roadway to fall below the minimum LOS D.
- The City's LOS standards for the state highway system and specific routes of regional significance will be those standards adopted in the Contra Costa Congestion Management Program.
- The City will require all new development projects to analyze their contributions to increased traffic and to implement improvements necessary to address these increases.

CITY OF ANTIOCH

The Streets and Highway Goals of the City of Antioch General Plan set standards to provide adequate capacity to, from, and within the City, to achieve acceptable operations on all roadways and all intersections.

Although the majority of the power plant and linear facilities are located in Pittsburg, the project reclaimed water lines and natural gas lines cross into the jurisdiction of the City of Antioch : along the Burlington Northern and Santa Fe (BN & SF) right-of-way east to the Antioch Terminal.

RAILROADS

The Union Pacific, Southern Pacific, and Burlington Northern and Santa-Fe (BN&SF) all operate active main line and spur tracks in the project vicinity. The Southern Pacific line parallels State Route 4, while the BN&SF and Union Pacific lines pass north of the project location. These three railroad lines provide freight service for the industrial uses in the area. A Southern Pacific crossing exists at Loveridge Road south of the Pittsburg-Antioch Highway. All three-rail lines will require Right of Entry Forms for any work conducted on their property. Additional permitting would be required for a permanent right-of-way for any applicable utility crossing.

SETTING

The partnership of Calpine and Bechtel is proposing to develop the Delta Energy Center (DEC), a natural gas fueled cogeneration facility, to be located 35 miles northeast of San Francisco in the community of Pittsburg, California. The Delta Energy Center is proposed to be located on an undeveloped 20-acre parcel at the Dow Chemical Company facility generally north and west of the adjacent Delta Diablo Sanitation District treatment facility. The site is south of the Burlington Northern Santa Fe Railroad, west of the Delta Diablo Sanitation District, north of the Pittsburg Highway and east of Loveridge Road.

The Pittsburg-Antioch Highway extends about 3 miles between East 14th Street and West 10th Street, providing access to Loveridge Road to Somersville Road, which are two major arterials in the project vicinity. The Pittsburg-Antioch Highway connects to Arcy Lane, which is the access road to the project site. The highway is classified as a 2-to-4 lane arterial street, and it has 12-to-13 foot wide lanes, a median, and shoulders. The posted speed limit along this highway is 50 miles per hour.

State Route 4 is the only state highway in Pittsburg providing east-west regional access from Hercules across the Sacramento Valley. It serves as a major recreational and commuter route between the Bay Area, the Central Valley, and the Sierra Foothills. SR 4 is classified as a 4-lane freeway within the Pittsburg City limits.

The major north-south roads in the area of the project site include Loveridge Road, Somersville Road, and Arcy Lane. Loveridge Road extends from Buchanan Road north of the Burlington Northern and Santa Fe railroad tracks. The road connects to the Pittsburg-Antioch Highway and SR 4 and is classified as a 4-lane arterial road. Loveridge Road has 12-14 foot lanes, a 6-foot bike lane, a 10-foot median, and paved shoulders. The posted speed limit along Loveridge Road is 35 mph.

ANALYSIS AND IMPACTS

The General Plan (City of Pittsburg, 1988) adopted the following level of service (LOS) policies on city streets:

5. Strive to maintain traffic LOS C or better as the standard at all intersections, with LOS D during no more than 3 hours of the day (a.m., p.m., and noon peaks).
6. Accept LOS D during 2-hour peak periods, with the possibility of intersections at or closely approximating the limits of LOS D, only on arterial routes bordered by nonresidential development where improvements to meet the City's standard would be prohibitively costly or disruptive.

The *Pittsburg Traffic Mitigation Fee Study* (Fehr & Peers Associates, 1997) utilized a mid LOS D (volume to capacity ratio = 0.85) as the peak hour signalized intersection standard for identifying significant impacts. This standard is consistent with the standards established in the (*Technical Procedures for Analysis of Growth*), Contra Costa Transportation Authority, 1998 update.

ANALYSIS

When evaluating a project's potential impact on the local transportation system, staff uses levels of service measurements as the foundation on which to base its analysis. Essentially, levels of service (LOS) measurements represent the flow of traffic. In general, levels of service range from A, free flowing traffic, to F, which is heavily congested with stoppage of the flow.

Table 1 summarizes the 1998 conditions of roadways in the project vicinity, including existing classification, level of service (LOS) D threshold, design capacity, daily volumes, P.M. peak-hour volume, and LOS. The P.M. peak hour (4p.m. - 6p.m.) is used as the critical time in this analysis because the City of Pittsburg General Plan and Master Plan Update concentrate on P.M. volumes versus A.M. (7a.m. -9 a.m.) volumes.

The LOS was calculated based on the roadway design capacity and the daily volume. Roadway design capacity represents the maximum vehicles per day that the roadway can serve. Daily volumes represent the 1998 Average Daily Traffic (ADT) counts in both travel directions.

Based on the traffic counts, 1998 daily traffic volumes on SR 4 average approximately 88,600 vehicles to the west of Somersville Road and 95,800 to the east. As shown in **TRAFFIC AND TRANSPORTATION Table 1**, during the P.M. peak hour, Loveridge Road between SR 4 and Pittsburg-Antioch Highway experiences LOS E and other local roadways in the project area currently experience a LOS C or better. SR 4 experiences LOS F.

TRAFFIC AND TRANSPORTATION TABLE 1

1998 Conditions of Affected Roadways

Street Segment	Classification	# of Lanes	Daily (Number of Vehicles)		P.M. Peak Hour (Number of Vehicles)		
			LOS D Threshold ①	Design Capacity	Actual Volume	Volume	LOS②
Pittsburg-Antioch Highway Loveridge Road to City Limits	Arterial	2-4	14,450	17,000	9,500	1,350	A
Somersville Rd. SR 4 to Pittsburg-Antioch Hwy.	Arterial	4 4	35,190	41,400	12,600	1,600	C
Loveridge Rd. North of Pittsburg Antioch Hwy.	Arterial	4	27,200	32,000	2,880	360	C
SR4 to Pittsburg-Antioch Hwy.	Arterial	4	27,200	32,000	24,120	3,015	E
State Route 4 Railroad Ave to Loveridge Road	Freeway	4	63,750	75,000	88,600	6,300	F
Loveridge Road to Somersville Rd.	Freeway	4	63,750	75,000	89,600	6,400	F
Somersville Road to Contra Loma Blvd.	Freeway	4	63,750	75,000	95,800	6,700	F

Source: AFC Table 8.10-1

- ① Sacramento Area Council of Government recommendations
- ② From HCS (Highway Capacity Software) arterial analysis
 Dyett & Bhatia 1998
 Pittsburg District Energy Facility AFC Transportation Section, 1997
 City of Pittsburg, 1998
 Caltrans, 1997

PUBLIC TRANSPORTATION

Bay Area Rapid Transit (BART) provides service to the recently opened Bay Point Station located west of the City of Pittsburg. Tri-Delta Transit and County Connection Transit provide fixed route bus service, with Tri-Delta serving the entire east county, which serves the project area. Tri-Delta routes No. 387 and 388 serve along the Pittsburg-Antioch Highway and the County Connection Transit operates Line 930 through the Pittsburg area. Both bus lines are about one third of a mile from the project site.

BICYCLE FACILITIES

There are few bicycle facilities within Pittsburg. Bicycle lanes along East Leland Road east of Railroad Avenue provide access between Pittsburg and Antioch. The

1995 Contra Costa County Countywide Bicycle Action Plan presents a bikeway plan for connecting the east county communities. In Pittsburg, the plan designates on-street facilities along major streets, including Loveridge Road south of the Pittsburg-Antioch Highway.

RAILROAD OPERATIONS

Southern Pacific, Burlington Northern and Santa Fe, and Union Pacific railroads all operate active main lines and spur tracks in the vicinity of the project. As noted in the PSA, the Southern Pacific line parallels SR 4, while the Burlington Northern and Santa Fe and Union Pacific lines pass north of the project location. These three railroad lines provide freight service for the industrial uses in the area. An at-grade Southern Pacific crossing exists at Loveridge Road south of the Pittsburg-Antioch Highway.

ACCIDENT ANALYSIS

Traffic accident records between January 1, 1996 and December 31, 1997 (City of Pittsburg, 1998) were reviewed and compared with statewide average accident rates to determine if any of the primary access roads experience unusually high numbers of accidents. The data provided by DEC=s consultant indicate that the primary access routes to the power plant site have accident rates well below the statewide average for similar types of roadways. None of the recorded accidents occurred at railroad crossings. This level of accident history does not indicate any unusual hazard or improperly designed facilities along these roads. Accident rates for selected roadways for 1995 through 1997 are shown in **TRAFFIC AND TRANSPORTATION Table 2**.

**TRAFFIC AND TRANSPORTATION Table 2
1995-1997 Accident History**

Roadway	Section	Accidents In 3-years	Average Accidents Per Year	Accident Rate
Pittsburg-Antioch Highway	Loveridge Road/City Limits east of Arcy Lane	16 ^a	5	1.44
Loveridge Road	SR 4/Pittsburg-Antioch Highway	36 ^a	12	1.36
Somersville Road	Century Boulevard/SR 4	14 ^a	5	1.12
SR 4	Loveridge Road/ Somersville Road	231 ^b	77	1.23

Source AFC Table 8.10-2

^aCity of Pittsburg, 1998 (data for 1/96 to 11/98).

^bCaltrans, 1998 (data for 1/95 to 12/97).

SITE AND VICINITY IMPACTS

CONSTRUCTION PHASE

COMMUTE TRAFFIC

Construction of the proposed DEC facility, including the power plant, gas pipeline, and electric transmission line, will take approximately 22-24 months. The applicant has indicated that the onsite construction work force required to build the DEC will be drawn from the local labor pool. Workers and deliveries from the east on SR 4 will access the site via Somersville Road interchange. They will travel approximately 5.3 miles to Arcy Lane and the DEC on the Pittsburg–Antioch Highway from the Somersville Road interchange. Workers and deliveries traveling from the west on SR 4 will access the site via the Loveridge Road interchange. They will travel approximately 1.3 miles to Arcy Lane and the DEC from Loveridge Road interchange. The reverse will be applicable for traffic exiting the DEC from Arcy Lane. At the peak of construction, a total work force of 575 workers per day will commute to the DEC, with an average workforce of 165 persons. The Pittsburg–Antioch Highway will experience the greatest volume of construction traffic because it is the primary route to the site. See **TRAFFIC AND TRANSPORTATION TABLE 3** for estimated traffic volumes during daily and peak hour timeframes.

TRUCK TRAFFIC

The increased construction traffic will consist of truck deliveries of plant equipment and construction materials, such as concrete and steel. Truck deliveries will occur between 8:00A.M. and 4:30P.M. on weekdays. The AFC has indicated that in total, approximately 4,451 truck deliveries are expected over the 22-24 month period, with an average of about 10 deliveries per weekday. An average of 26 trucks per weekday is expected during the month with the highest truck traffic, resulting in an additional 52 daily trips. All deliveries will be along Arcy Lane, utilizing the Pittsburg–Antioch Highway. Types of truck deliveries and percentage amounts are as follows:

- Equipment, at 26 percent
- Piping, supports, and valves, at 10 percent
- Concrete and reinforcing steel, at 32 percent
- Miscellaneous steel, roofing, and siding, at 4 percent
- Administration and warehouse buildings, at 4 percent
- Construction consumables, at 15 percent
- Office supplies, at 2 percent
- Contractor mobilization and demobilization, at 2 percent
- Construction equipment delivery and pickup, at 5 percent

TRAFFIC AND TRANSPORTATION TABLE 3
1998 and Future Daily and Peak-Hour Traffic Volumes and LOS during Construction

Street Segment	Daily Volumes/Additional Daily Trips				P.M. Peak Hour Volumes/LOS		
	1998 ADT	2000 ADT	With project ADT	Capacity	1998 Vol./LOS	2000 Vol./LOS	With Project Vol./LOS
Pittsburg-Antioch Highway Loveridge Road to City Limits	9,500	10,150	11,285	17,000	1,350/A	1,445/A	1,944/A
Somersville Rd. SR 4 to Pittsburg-Antioch Hwy.	12,600	13,480	14,048	41,400	1,600/C	1,715/C	1,965/C
Loveridge Rd. North of Pittsburg Antioch Hwy.	2,880	3,100	3,100	32,000	360/C	385/C	385/C
SR4 to Pittsburg-Antioch Hwy.	24,120	26,110	26,678	32,000	3,015/E	3,230/F	3,480/F
State Route 4 Railroad Ave to Loveridge Road	88,600a	93,996	94,280	75,000	6,300/F	6,686/F	6,811/F
Loveridge Road to Somersville Rd.	89,600a	95,060	95,628	75,000	6,400/F	6,790/F	7,0440/F
Somersville Road to Contra Loma Blvd.	95,800a	101,634	101,918	75,000	6,700/F	7,110/F	7,235/F

Source: AFC Table 8.10-5

HAZARDOUS MATERIAL TRUCK DELIVERIES

Staff's visual observations of the roadway system from State Route 4/Pittsburg-Antioch Highway to the proposed project site indicates that there are no unusual hazards and that the roadways can sufficiently and safely handle the delivery of anhydrous ammonia by approximately 4 trucks per month without incident.

The State Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to carry a manifest, available for inspection by the California Highway Patrol inspection stations along major highways and interstates; they check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take first aid instruction and procedures on handling hazardous waste spills.

Truck tank design for the anhydrous ammonia and other hazardous materials are federally mandated by DOT specifications and are designed for impact safety.

Staff analyzed potential safety hazards related to anhydrous ammonia truck deliveries for the purpose of assuring that necessary measures are in place at the federal, state, local, and the industry level to ensure public safety.

Staff's conclusion of the transport of anhydrous ammonia is that the roadway design along the proposed truck route is adequate, with no safety improvements needed. In addition, State Route 4/Pittsburg/Antioch Highway has been approved by the California Highway Patrol as roadways for use in the transportation of inhalation related hazardous materials.

Staff has not addressed the transport of ammonia (highway accident, roadway conditions) on State Route 4 or other interstate highways because these roads are used continuously by commercial trucks and the traveling public. The focus of this safety analysis is as the anhydrous ammonia truck deliveries leave the State Highway system to the project site.

As provided in the Laws, Ordinances, Regulations and Standards (LORS) section, federal and state regulations are in place to insure that the handling and transportation of hazardous materials are done in a manner that protects public safety. Federal laws specific to this issue are Title 49, Code of Federal Regulations, Sections 350-399 and Appendices A-G, of the Federal Motor Carrier Safety Regulations. These sections address safety considerations for the transport of goods, materials, and substances over public highways.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally significant to insure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

Based upon compliance with current state and federal regulations, the transportation of hazardous substances can be reasonably assumed to reduce the risk of public or worker exposure to an acceptable level. Mitigation measures and conditions of certification that ensure this compliance are discussed in the Waste Management, Worker Safety and Fire Protection sections.

Based on the aforementioned analysis and visual inspection, staff concludes the following:

1. The transportation of hazardous materials during the construction phase, increased roadway demand resulting from the daily movement of workers and materials, while noticeable, will not increase beyond thresholds that may have been established by local and regional authorities.
2. During the operational phase, increased roadway use from the daily movement of workers and materials will not significantly affect roadway LOS.

3. All transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate substances.

RAIL DELIVERIES

Numerous pieces of heavy equipment must be transported to the site by rail due to their weight. The equipment and total weight of the components to be transported include:

- The main components of the Combustion Turbine Generators (CTG) (330,000 lbs.);
- Heat Recovery Steam Generators (HRSG) (320,000 lbs.);
- Steam Turbine Generators (STG) (300,000 lbs.);
- main transformers (375,000 lbs.); and
- auxiliary boilers (250,000 lbs.).

These project components will be shipped on the Dow rail line 692 that enters through the Dow property in an east-west direction. A rail siding also located on the Dow property will be used for equipment off loading. The rail siding is located approximately 300 feet north of the existing Burlington Northern and Santa Fe right-of-way. A heavy transporter will be used to move heavy components from the rail siding to the site location. The transporter will travel along the rail siding and turn onto Arcy Lane. From Arcy Lane, the transporter will travel south and turn at the entry road to the facility. No access onto public highways will be required during these hauling trips.

NATURAL GAS PIPELINE

On April 15, 1999, the applicant amended its application to reflect a revision of the proposed natural gas pipeline from 16-inches to 20 inches, which will extend east from the project site for approximately 5 miles. The pipeline will interconnect to Pacific Gas & Electric's (PG&E's) Line 400, a backbone pipeline to the PG&E gas system, near PG&E's Antioch Terminal. The natural gas pipeline route will be placed primarily along the Burlington Northern and Santa Fe right-of-way. Work on the gas pipeline is expected to take approximately 3 to 4 months and will require a peak workforce of 140 workers daily. Peak construction traffic during the P.M. peak hour will result in approximately 242 additional daily trips. These workers will commute directly to the plant site and then be bused to their work locations. Approximately 40 additional daily trips will occur as a result of transporting the workers to and from their work location (based on bus occupancy of 40 to 50 passengers and the usage of 3 to 4 buses).

The number of trucks used during construction is expected to be small. Approximately 10 trucks will be used on a daily basis during construction of the gas pipeline. Most major pieces of construction equipment will remain on the railroad right-of-way during construction.

Types of construction involved include road crossings that will require trenching and back filling that will be completed as a single construction activity. In addition to open trenching methods, horizontal directional drilling will also occur at various intersections to avoid traffic delays.

Access during pipeline construction will be along existing roads and rights-of-way. Damage to existing roads by construction activity will be replaced to the original condition or as near as possible to the original condition.

As reflected in the AFC, between the Antioch Terminal and the DEC site, the gas pipeline will cross eight streets in the City of Antioch. The streets are Bridgehead Road, Viera Lane, Wilbur Avenue, Minaker Drive, Fulton Shipyard Road, McElheny Road, H Street and L Street. These streets will be open trenched. During each road crossing, through access will be provided at all times. Access for emergency vehicles, such as fire and ambulance services to local land uses will be maintained during construction.

All road crossing construction activities will be in accordance with local, state, and federal regulatory requirements and specifications. Adequate barricades and warning lights will be provided around excavations at crossings in accordance with Caltrans standards and California Vehicle Code Section 21400.

LINEAR FACILITIES

The proposed aboveground transmission line crosses Loveridge Road and Columbia Street. Underground, the line crosses Harbor Street and along 8th Street, East Street, Los Medanos, Cumberland, Railroad Avenue, Black Diamond, York Street, Cutter Street, West Street, and Montezuma Street.

In the area of the proposed Pittsburg District Energy Facility (PDEF) truck bypass road, the DEC AFC has the underground lines crossing the truck route in two places. In addition, the transmission lines will be routed through what is proposed to be the strip park running between Santa Fe and the truck bypass soundwall.

To maintain the structural integrity of the roadway-to prevent possible depression of the bypass road crossings at these two locations -staff is requesting the installation of a concrete apron or other approved method recommended in the Facilities Design section. The installation of these roadway reinforcements should be accomplished during the construction phase of the bypass road, which is anticipated to occur in the later part of 1999.

Staff is aware that DEC is reviewing alternative areas for the placement of the underground transmission lines in the area of the truck bypass road. At this time, there is insufficient information on any alternative placement of the transmission line in this area, therefore staff is recommending reinforcement of the two areas of the bypass road.

For aboveground installation, a crane will be used to set poles and to string the conductors. The plant site will serve as the laydown area, with the poles being set as they are removed from a truck at each pole location. Construction of the

transmission line and switchyard is expected to occur over a 5-month period. A peak workforce of approximately 30 workers will be required. An additional 52 vehicle trips will occur each day of the workweek. Similar to the natural gas pipeline installation, a workers will be transported to work location by bus and the bus will return to the plant site until it is time to pick up the workers at the end of the work day. It is anticipated that approximately 10 additional daily trips would occur.

Approximately 10 construction trucks will be used on a daily basis during construction of the transmission line and switchyard. These trucks will be parked along the road shoulders. The maximum traffic impact will be associated with short-term detours of residential vehicles several blocks at a time. Each of these construction activities will have short-term and minimal impacts on the function of area roadways. Use of typical signals, or warnings will also notify motorist of construction activity.

Construction of the electric transmission line is not expected to create long-term effects on the traffic system in the area. The transmission line will pass through areas with low levels of roadway traffic.

WATER SUPPLY AND WASTEWATER DISCHARGE LINES

The only roadway impacts by the construction of the water supply and wastewater discharge lines will be Arcy Lane, a private roadway. To insure continued access to the Delta Diablo Sanitation District and Dow Chemical Company during the installation of the water supply and wastewater discharge lines along Arcy Lane, through access on Arcy Lane will be provided either by: 1) routing traffic around the construction area directed along one-half of the roadway (while construction is underway on the adjoining half); or 2) routing traffic across temporary trench bridging. Access for emergency vehicles, such as fire and ambulance services will be maintained during construction of these lines.

Significant effects on the local transportation system are not expected to result from power plant construction activities for the following reasons:

- Due to the size of the peak construction workforce, the only noticeable impact will be localized near the construction site. **TRAFFIC AND TRANSPORTATION TABLE 3** shows current daily volume on nearby roadways and daily volumes under worst case (an additional 1,135 trips to and from the site).
- Construction work hours will be established which will avoid the morning (7 a.m. to 9 p.m.) and evening (4 p.m. to 6 p.m.) peak-hour traffic periods. However, under a "worst case" condition, all workers (power plant, gas line, and electric transmission line (total of 575) and 3 equipment truck trips would leave the site during the peak traffic period. **TRAFFIC AND TRANSPORTATION TABLE 3** shows evening peak-hour volumes and LOS with the "worst case" as described. Even under this condition, the LOS for the roads not already heavily impacted do not change.

- Assuming worst case on other roadways in the area, the distributed additional traffic generated from the peak construction workforce would not change significantly the level of service on most of these roadways. For the purposes of this analysis, it is assumed that 100 percent of the additional daily traffic will use the Pittsburg-Antioch Highway. Fifty percent of this additional volume would travel down Somersville Road, and 50 percent would use Loveridge Road. It is assumed that the entire volume of the additional traffic would utilize SR 4.

OPERATIONAL PHASE

POWER PLANT TRAFFIC

As indicated in the staff assessment, the DEC facility will be accessed from Arcy Lane. The proposed project will generate approximately 25 trips per day to the facility, including trips by employees and visits by trades people, vendors, consultants, and management personnel. Approximately 16 full-time employees will work at the plant (6 operators, 5 maintenance technicians, and 5 administrative personnel). Three operators will work a 12-hour rotating shift (8:00 a.m. to 8:00 p.m. and 8:00 p.m. to 8:00p.m.), and three operators per shift, 7 days per week. The standard shift for the maintenance technicians and administrative positions will be 8 hours per day (8:00 a.m. to 5 p.m.), 5 days per week, with unscheduled days and hours as required (weekends).

During plant operations, trucks will periodically deliver and pick up replacement parts, lubricants, liquid fuel, anhydrous ammonia, aqueous ammonia, sulfuric acid, trash, and other consumables. **TRAFFIC AND TRANSPORTATION TABLE 4** highlights expected truck deliveries for the project. On an average, there would be two truck deliveries to the project site per day.

TRAFFIC AND TRANSPORTATION TABLE 4
Estimated Truck Traffic at the DEC Facility during Operation

Delivery Type	Number and Occurrence of Trucks	Quantity
Anhydrous Ammonia	1 every 7 days	8,000 gal
Sulfuric Acid	1 per month	5,000 gal
Other Chemicals	1 per month	4,000-6,000 gal
Trash Pickup	1 per week	9 ft. ³

Source: AFC Table 8.10-6

Transportation effects associated with daily power plant operations will not be significant for the following reasons:

- Deliveries of hazardous materials will be limited. Delivery of these materials will occur over pre-arranged routes and will be in compliance with all LORS governing the safe transportation of hazardous materials.
- Visits by trade persons, vendors, consultants, and other non-plant personnel are expected to be minimal and are likely to occur primarily during non-peak commute periods.
- Level of Service on the Pittsburg-Antioch Highway will remain unchanged by traffic generated by the daily operations work force during the peak commute period.

CUMULATIVE IMPACTS

The only other project proposed in the area is the Pittsburg District Energy Facility, a nominal 500-megawatt (MW) generating facility to be located west of the USS-POSCO steel mill. During construction of the DEC, no cumulative impacts on traffic are expected for the following reasons:

- Peak construction traffic at the PDEF will occur before peak construction traffic at the Delta Energy Center begins.
- Traffic for the PDEF will not use the same access roads used by Delta Energy Center. Delta Energy Center will likely use Somersville Road turn-off from Highway 4, west on Pittsburg-Antioch Highway, and north on Arcy Lane to the project site. PDEF will utilize Loveridge Road turn-off from Highway 4, west on Pittsburg-Antioch Highway, northwest on the newly constructed Bypass Road to Harbor Street, north on Harbor Street to 3rd Street and east on 3rd to the project site.

After both facilities are constructed, they will both operate 7 days a week, 24 hours per day. The Delta Energy Facility will likely use the same number of operating personnel as the PDEF (approximately 25 people) Monday through Friday of each week. As explained earlier in this report, this small number of commuters will not significantly impact traffic.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

The applicant has stated its intention to comply with all federal LORS. A condition to ensure compliance is included below. Staff believes that the federal LORS will be met. Therefore, the project is considered consistent with identified Federal LORS.

STATE

The applicant has stated its intention to comply with all state LORS. A condition to ensure compliance is included below. Staff believes that the State LORS can be and will be met. Therefore, the project is considered consistent with identified State LORS.

LOCAL

For operational employees, trip reduction measures could be employed. But since the maximum number of employees assigned to any one shift is 20, trip reduction measures for this project would have an insignificant impact on traffic flow. However, operational traffic could be considered for such a program depending upon the eventual cumulative impacts from the full buildout of the industrial area.

The City of Antioch and the City of Pittsburg require encroachment permits for any operation or construction in any public right-of-way. However, the Energy Commissions Certification is an "in lieu" permit, which takes the place of other permits that would have been issued, absent the Energy Commission. Staff has addressed, in the **Conditions of Certification** of this report, the appropriate mechanism for the project owner to meet the requirements of the City of Pittsburg and the City of Antioch regarding the need to encroach on a public right-of-way. Staff's proposed condition **TRANS-9** references the adopted city ordinance sections, which apply to these encroachment requirements.

FACILITY CLOSURE

PLANNED CLOSURE

Planned closure occurs at the end of a project's life, 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. The applicant will prepare a Facility Closure Plan for submittal to the Energy Commission for review and approval, at least twelve months prior to the proposed closure. At the time of closure, all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with.

UNEXPECTED CLOSURE

Unexpected 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. From the perspective of traffic and transportation issues, in the event of temporary facility closure, the events would be similar to those for normal operation of the power plant facility, and the applicant would have to comply with all applicable policies contained in the LORS section of this report in respect to transportation permits for hazardous materials and equipment deliveries and removal.

UNEXPECTED PERMANENT CLOSURE

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. Staff assumes that the facility will either remain idle until such time that new ownership is established, or dismantling of the facility will occur. In any event, the owner will have to secure applicable transportation permits to satisfy the LORS requirements as stated in this report.

The event of permanent closure, the effects would be similar to those associated with project construction. Permanent closure will involve a peak work period with commute traffic. In either instance, the roadway systems within the vicinity of the project should be able to handle traffic without affecting the current level of service of the area (LOS C during normal daytime traffic and LOS D during peak hour traffic).

MITIGATION

The CEQA Guidelines (Title 14, California Code of Regulations, section 15370) define mitigation to include:

- a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- e) Compensating for the impact by replacing or providing substitute resources or environments.

The applicant has proposed three mitigation measures to reduce traffic impacts:

- Prior to construction, the construction contractor will prepare a construction traffic control plan and implementation program to address the timing of heavy equipment and building material deliveries. (**TRANS-5** Condition)
- The project construction hours will be established to avoid the p.m. peak traffic period. (**TRANS- 7** Condition)

- Any roadways opened during construction of the natural gas pipeline will be resurfaced to their pre-existing condition. (**TRANS-6** Condition)

The applicant's proposed mitigation measures will act to reduce the potential significance of traffic impacts associated with the generation project. Extensions of these measures and other measures, as proposed below by Energy Commission staff, will ensure that traffic impacts will be reduced to less than significant levels.

Staff has expanded upon the applicants mitigation measure by the development of a road maintenance and repair mitigation plan with the City of Pittsburg or any other affected jurisdictions in which construction activities and accelerated road wear occurs as a result of project construction. With this mitigation measure, the traffic and transportation issues will be reduced to less than significant. (**See TRANS-6**)

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes the following based on it's independent analysis of the proposed Delta Energy Center:

1. All transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate the transportation of hazardous substance.
2. The transportation of hazardous during the construction phase, increased roadway demand resulting from the daily movement of workers and materials, while noticeable, will not increase beyond thresholds established by local and regional authorities.
3. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be minimal.
4. Construction of the above ground transmission lines will have minimal impacts on the function of area roadways. Routine construction safety measures should be sufficient to ensure no significant impacts on traffic.
5. Because underground pipelines and electric transmission line construction requires trenching within public road rights-of-way, the installation of underground facilities will impact both roadway function and levels of service. However, these impacts are expected to be short-term and not result in significant traffic and transportation impacts. The applicant has indicated their intent to provide appropriate traffic control measures, and these are contained within the conditions of certification. In addition, all development will take place in compliance with California Department of Transportation, City of Pittsburg and the City of Antioch limitations for encroachment into public rights-of-way.

6. As required in the Conditions of Certification, the applicant will demonstrate that the underground construction within public right-of-ways is in accordance with the City of Antioch and City of Pittsburg adopted city ordinances.

Based on staff's conclusions, if the proposed mitigation measures are properly implemented, no significant traffic impacts are likely to occur. Further, if the conditions of certification proposed by staff are observed and properly implemented, the DEC will be in compliance with applicable laws, ordinances, regulations, and standards.

Staff recommends that, if the Energy Commission certifies the DEC, it adopt the following proposed conditions of certification.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall require that all truck traffic utilize the existing designated truck route: From SR 4 and Loveridge Road interchange, via Loveridge Road to the Pittsburg-Antioch Highway and then east to Arcy Lane to the construction access road to be built south of the Delta Diablo Sanitation District Administration Building.

Verification: The project owner shall include this specific route in its contracts for truck deliveries and shall report any noncompliance and any corrective measures taken to ensure future compliance in the Monthly Compliance Reports.

TRANS-2 The project owner shall comply with California Department of Transportation (Caltrans), the City of Pittsburg, the City of Antioch and Contra Costa County limitations on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any oversize and overweight transportation permits received during that reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-3 The project owner or its contractor shall comply with Caltrans, the City of Pittsburg and the City of Antioch for limitations of encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

Verification: In Monthly Compliance Reports, the project owner shall submit copies of any encroachment permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-4 The project owner shall ensure that all federal, state and local regulations for the transport of hazardous materials are observed.

Verification: The project owner shall include in its monthly compliance reports, copies of all shipping manifests related to hazardous material shipments.

TRANS-5 Prior to the start of construction, the project owner shall consult with the City of Pittsburg, the City of Antioch and Caltrans and will prepare a construction traffic control plan and implementation program which address the following issues:

-
- timing of heavy equipment and building materials deliveries and pick ups;
- signing, lighting and traffic control device placement;
- establishing construction work hours outside of peak traffic periods;
- emergency access;
- temporary travel lane closures;
- maintaining access to adjacent residential and commercial property and;
- off street employee parking in construction areas during peak construction.

Verification: At least 30 days prior to start of construction, the project owner shall provide to the CPM for review and approval, a copy of its construction traffic control plan and implementation program.

TRANS-6 Following construction of the power plant and all related facilities, the project owner shall meet with the CPM, City of Pittsburg, City of Antioch Caltrans, and Contra Costa County to determine the schedule and the necessary actions to complete the repair of all roadways to original or as near original condition as possible.

Protocol: At least thirty days prior to start of construction, the project owner shall photograph the roadway areas that will be affected by the gas pipeline construction (Bridgehead Road, Viera Lane, Wilbur Avenue, Minaker Drive, Fulton Shipyard Road, McElheny Road, H Street and L Street), and the underground electric transmission line installation (in the area of Harbor Street and along 8th Street, East Street, Los Medanos, Cumberland, Railroad Avenue, Black Diamond, York Street, Cutter Street, West Street, and Montezuma Street). The project owner shall provide the CPM, City of Pittsburg, City of Antioch, Caltrans, and Contra Costa County with a copy of these photographs.

Verification: Within 30 days of the completion of project construction, the project owner shall meet with the CPM and City of Pittsburg, City of Antioch, Contra Costa County and Caltrans. The project owner shall provide copies of letters from these agencies acknowledging satisfactory completion of the roadway repairs in the first Annual Compliance Report.

TRANS-7 The owner shall schedule construction work hours that avoid the morning (7 a.m. to 9 a.m.) and evening (4 p.m. to 6 p.m.) peak-hour traffic periods (includes heavy truck traffic).

Verification: The project owner shall maintain a delivery log which specifies, in part, the time and date of each delivery in the on-site compliance file.

TRANS-8 Construction of the reclaimed water supply and wastewater discharge lines along Arcy Lane shall provide for vehicle access to the existing businesses, including provisions for emergency vehicle access.

Protocol: At least thirty days prior to start of construction, the project owner shall contact the businesses which utilize Arcy Lane to discuss scheduling of pipeline construction activities, and establish appropriate construction timeframes for pipeline activities along this private roadway.

Verification: At least 30 days prior to start of construction activities in this specific area, the project owner shall in the Monthly Compliance Reports to the CPM, report on the use of the above measures in the construction of the underground pipeline. This condition shall be reflected in the construction traffic control plan and implementation program. The Monthly Compliance Reports shall also identify any alternative measures that were used to minimize impacts on Arcy lane.

TRANS-9 The project owner shall demonstrate compliance with the City of Pittsburg's and the City of Antioch's right-of-way encroachment requirements. These requirements are contained in the City of Antioch "Encroachment Regulations" Articles 1 through 7, and the City of Pittsburg "Encroachments Within Public Right-of-Ways", Title 12, Chapter 12.01. and referenced in Appendix A.

Protocol: Approximately thirty days prior to start of pipeline construction, the project owner shall contact the City of Antioch and City of Pittsburg and submit all documentation for their review and comment (insurance and construction bond as appropriate) and pay all fees applicable to encroachment. The project owner shall also contact various local agencies (City of Pittsburg, City of Antioch, Contra Costa County, and Caltrans) to discuss scheduling of construction activities within their jurisdiction, and establish appropriate construction timeframes for pipeline and electric transmission activities along key intersections.

Verification: The project owner shall provide a copy of the final encroachment documentation, including comments received from the City of Antioch and the City of Pittsburg in the next Monthly Compliance Report following their receipt for approval by the Energy Commission CPM.

REFERENCES

City of Pittsburg 1998-City of Pittsburg General Plan, 1998

DEC (Delta Energy Center) 1998a. Application for certification, Pittsburg District Energy Facility (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.

DEC (Delta Energy Center) 1998b. Amendments to the Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, May 7, 1999.

PDEF (Pittsburg District Energy Facility, LLC/Parquet) 1998a. Application for certification, Pittsburg District Energy Facility (98-AFC-1). Submitted to the California Energy Commission, June 15, 1998.

PDEF (Pittsburg District Energy Facility, LLC/Parquet) 1998k. Supplement to the Application for Certification, Pittsburg District Energy Facility (98-AFC-1). Submitted to the California Energy Commission, December 7, 1998.

NOISE

Steve Baker

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night during which it is produced, and the proximity of the facility to any sensitive receptors combine to determine whether the facility will meet applicable noise control laws and ordinances, and whether it will exhibit significant adverse environmental impacts.

The purpose of this analysis is to identify and examine the likely noise impacts from the Delta Energy Center (DEC) project; and to recommend procedures to ensure that the resulting noise impacts will comply with applicable laws and ordinances, and will be adequately mitigated.

Before certifying the DEC project, the Energy Commission must find that:

- the DEC will likely be built and operated in compliance with all applicable noise laws, ordinances, regulations and standards; and
- the DEC will present no significant adverse noise impacts, or none that have not been mitigated to the extent feasible.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C.A. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration has adopted regulations (29 C.F.R. § 1910 et seq.) that establish maximum noise levels to which workers at a facility may be exposed. These 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 during which the worker is exposed. (Please see **Noise: Appendix A, Table A4** immediately following this section.) OSHA regulations also dictate hearing conservation program requirements and workplace noise monitoring requirements.

There are no federal laws governing offsite (community) noise.

STATE

Similarly, there are no state regulations governing offsite noise. Rather, state planning law (Gov. Code, § 65302) requires that local authorities such as counties or cities prepare and adopt a general plan. Government Code section 65302(g) requires that a noise element be prepared as part of the general plan to establish acceptable noise limits. Other state LORS include CEQA and Cal-OSHA.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. The CEQA Guidelines (Cal. Code Regs., tit. 14, Appendix G, § XI) explain that a significant effect from noise may exist if a project would result in:

“a) 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.

“b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

“c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

“d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project....”

CAL-OSHA

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, § 5095 et seq.) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards described above.

LOCAL

CITY OF PITTSBURG GENERAL PLAN NOISE ELEMENT

The General Plan Noise Element identifies those noise levels compatible with community noise environments (Pittsburg 1988, Table 10-1). For all normal sensitive noise receptors (residences, schools, hospitals, libraries and places of worship), round-the-clock exposure levels up to 60 dBA (L_{dn} or CNEL)¹ are deemed normally acceptable, and levels up to 70 dBA are conditionally acceptable. The Noise Element further addresses increases in noise levels in existing community environments, stating that “[I]ncreases of more than 5 dB are significant and can generate adverse community response in residential areas.” The Noise Element goes on to list several “Guiding Policies,” including:

“A. Minimize vehicular and stationary noise sources, and noise emanating from temporary activities.”

The Pittsburg General Plan Update, now in the adoption process, reiterates the criteria that “[a] 5 dB change [in noise level] is often considered a significant

¹ For definitions of these and other noise measurement terms, please refer to **Noise: Appendix A** immediately following this section.

impact...” and “...maximum noise levels of 60 dB are considered ‘normally acceptable’ for unshielded residential development” (Pittsburg 1998). It further points out that “[n]oise descriptors used for analysis need to account for human sensitivity to nighttime noise.” The Update also identifies several issues, including:

“15-1 Minimizing sources of noise. Before considering ways to protect uses from noise, an effort should be made to minimize noise at its source.”

CITY OF PITTSBURG NOISE ORDINANCE

The Noise Ordinance (Pittsburg 1974) begins with the following statement:

“9.44.010 Prohibitions. It is unlawful for any person to make, continue or cause to be made or continued any noise which either unreasonably annoys, disturbs, injures or endangers the comfort, repose, health, peace or safety of others....”
Specifically included in this category are:

“G. Steam Whistles...attached to any stationary boiler.

“H. Exhausts...of any...stationary internal combustion engine....

“J. Pile Drivers, Hammers and Similar Equipment. The operation between the hours of ten (10) p.m. and seven (7) a.m. of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist or other appliance, the use of which is attended by loud or unusual noise, except in case of emergency.

“K. Blowers...unless the noise from such blower or fan is muffled...sufficient to deaden such noise....”

CONTRA COSTA COUNTY GENERAL PLAN NOISE ELEMENT

Two policies enunciated in this noise element (Contra Costa 1996) impact the construction and operation of a project such as the DEC. Policy 11-1 requires that new projects meet the exterior noise level standards established in the Noise and Land Use Compatibility Guidelines. The Guidelines specify that noise levels up to 60 dBA L_{dn} or CNEL are normally acceptable at residential receptors such as single family homes. Policy 11-8 requires that construction activities should take place during the normal work hours of the day to provide relative quiet during evening and morning periods.

CITY OF ANTIOCH GENERAL PLAN NOISE GOAL

The Noise Goal encompasses several relevant policies (Antioch 1988). Policy 1 delineates land use compatibility guidelines that consider noise levels at single family residential receptors up to 60 dBA L_{dn} or CNEL as normally acceptable. Policy 7, which would apply to construction of the DEC, requires that the impact of noise sources be minimized, if possible, by limiting them to the daytime hours, defined as 7:00 a.m. to 7:00 p.m. Policy 11 limits the background ambient noise level for outdoor living areas, defined as backyards for single family homes, to 60 dBA CNEL.

CITY OF ANTIOCH ZONING ORDINANCE

Article 19 of this ordinance (Antioch 1994) states that uses adjacent to single family homes shall not cause an increase in background ambient noise that exceeds 60 dBA CNEL.

SETTING

The DEC will be located on twenty acres leased from Dow Chemical Company in an industrial neighborhood in the northeastern portion of the City of Pittsburg zoned IG (General Industrial). Dow Chemical Company property lies to the northwest of the site; the Delta Diablo Sanitation District administration building lies immediately to the southeast of the site, with the water treatment plant immediately to its east. The Pittsburg-Antioch Highway passes 2,000 feet to the south of the site, with State Highway 4 2,000 feet further south. The Dow Chemical Company and USS-POSCO facilities lie approximately 4,000 feet to the west of the site. The electric interconnection line will be routed west along the Burlington Northern-Santa Fe railroad right-of-way, then underground along 8th Street, and finally aboveground to the PG&E substation adjacent to the existing Pittsburg power plant. A 16-inch diameter natural gas line will follow the BN-SF right-of-way east to PG&E's Line 400 trunk gas line in Antioch (DEC 1998a, AFC § 1.1). Water supply and discharge lines, and a cogeneration steam line to Dow Chemical Company, will also be included.

The nearest sensitive noise receptor is Casa Medanos, a 16-unit residential apartment facility on the south side of the Pittsburg-Antioch Highway, 2,300 feet south of the project site. The next nearest sensitive receptor is a residential neighborhood on the south side of State Highway 4, approximately 4,000 feet south of the project site. Other receptors are a residence behind Hazel's Restaurant, 4,500 feet east of the site, and a residential neighborhood in Antioch east of Somersville Road, approximately 5,000 feet east of the site (DEC 1998a, AFC § 8.5.3.2; Table 8.5-12). No other sensitive receptors lie near enough to be affected by project noise; with the exception of Casa Medanos, the neighborhood surrounding the site is strictly industrial.

In order to predict the likely noise effects of the DEC on these sensitive receptors, the applicant performed an ambient noise survey of the area. This survey was performed by a qualified consultant using typical monitoring and analysis equipment and methods (DEC 1998a, AFC §§ 8.5.2.1, 8.5.2.2).

The applicant's noise survey monitored noise levels at Casa Medanos, the nearest residence, for 25 continuous hours, with short-term measurements taken during that period at the other residences described above, as well as at the four corners of the project site. Survey results depict noise levels at Casa Medanos in terms of one-hour averages, while the spot measurements at the other monitoring locations were 15-minute averages. Figures are shown for L_{eq} , L_{10} , L_{90} , and CNEL (DEC 1998a, AFC § 8.5.2.2). The noise regime at Casa Medanos, as well as at the residence behind Hazel's Restaurant and the residential neighborhood in Antioch, was dominated by traffic noise (DEC 1998a, AFC § 8.5.2.2). In the case of Casa

Medanos, the Pittsburg-Antioch Highway lies immediately in front (north) of the buildings; the railroad track passes eighty feet behind (south of) the buildings, and State Highway 4 lies 1,500 feet to the south. All of these noise sources are nearer than the project site, which lies 2,300 feet to the north (CEC 1999c).

IMPACTS

Project noise impacts can be created by construction, and by normal operation of the power plant.

PROJECT SPECIFIC IMPACTS — CONSTRUCTION

COMMUNITY EFFECTS

Construction noise is a temporary phenomenon; the DEC construction period is scheduled to last two years (DEC 1998a, AFC § 1.2). Construction of the linear facilities will be shorter; the gas pipeline construction will last three to four months (DEC 1998a, AFC § 7.2). Construction of an industrial facility such as a power plant is typically and unavoidably noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours is commonly exempted from enforcement by local ordinances. The applicable law, the City of Pittsburg Noise Ordinance, allows high noise levels during the daytime, but prohibits exceptionally noisy construction work between the hours of 10 p.m. and 7 a.m. (Pittsburg 1974, § 9.44.010 J).

The applicant has predicted the noise impacts of project construction on the nearest sensitive receptors (DEC 1998a, AFC § 8.5.3.2). Construction noise levels (other than steam blows) are predicted to range between 49 dBA and 56 dBA at the residences nearest the site; these are lower than the existing daytime noise levels at these locations (DEC 1998a, AFC § 8.5.3.2; Table 8.5-12). This normal construction work will thus be barely noticeable at these locations, and practically inaudible at greater distances. The applicant commits to confining the noisiest construction work to the daytime hours (DEC 1998a, AFC § 8.5.3.2), when it will be least obtrusive.

STEAM BLOWS

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feedwater and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High pressure steam is then raised in the heat recovery steam generator (HRSG) or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing

action, referred to as a steam blow, is quite effective at cleaning out the steam system piping. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

These steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. This would attenuate to about 103 dBA, an exceedingly disturbing level, at Casa Medanos, the nearest residence. In order to minimize disturbance from steam blows, the applicant commits to installing a silencer on the steam blow piping that will reduce noise levels by 20 to 30 dBA (DEC 1998a, AFC § 8.5.3.2), or 73 to 83 dBA at Casa Medanos. This is still an annoying noise level; staff proposes that any high pressure steam blows be performed only during restricted daytime hours (see proposed Condition of Certification NOISE-4 below).

Alternatively, the applicant may elect to employ a new, quieter steam blow process, variously referred to as QuietBlow™ or Silentsteam™. This method utilizes lower pressure steam over a continuous period of approximately 36 hours. Resulting noise levels reach only about 80 dBA at 100 feet; noise levels at Casa Medanos would reach about 53 dBA, lower than the lowest nighttime L_{eq} level of 56 dBA. This should not significantly disrupt the residents. Staff proposes a notification process (see proposed Condition of Certification NOISE-5 below) to make neighbors aware of impending steam blows; this should help render the process tolerable.

LINEAR FACILITIES

Construction of the gas line, water lines, electric interconnection line and cogeneration steam line will produce noise. This noise will be noticeable, and possibly annoying, to persons outside their homes at residences nearest the construction. This work, however, is only a temporary phenomenon; the work will progress at such a pace that no single receptor will be inconvenienced for more than a few days. In addition, applicable noise LORS limit such construction to daytime hours, prohibiting noise impacts at night, when quiet is most important. For example, work within the City of Pittsburg is controlled by the Noise Ordinance, which limits use of noisy equipment such as "pile drivers, hammers and similar equipment" to the hours from 7 a.m. to 10 p.m. (Pittsburg 1974). For those portions of the transmission line lying in unincorporated land, construction activities will occur during the "normal work hours of the day," in accordance with the Contra Costa County General Plan Noise Element (Contra Costa 1996). Construction of the gas line within the City of Antioch is restricted by the General Plan Noise Goal to the hours from 7 a.m. to 7 p.m. (Antioch 1988).

Staff has proposed a Condition of Certification (NOISE-8, below) to restrict noisy construction work to the hours specified in the applicable LORS, above. Staff has further proposed a noise complaint process (Conditions of Certification NOISE-1 and NOISE-2, below) that will allow any person suffering annoyance to address the problem with the project owner. With these restrictions in place, staff believes no

significant adverse noise impacts are likely to occur due to construction of the linear facilities.

WORKER EFFECTS

The applicant does not specifically acknowledge the need to protect construction workers from noise hazards. The applicant does, however, recognize those applicable LORS that will protect construction workers, and commits in general to complying with them (DEC 1998a, AFC § 8.5.5). To ensure that workers are, in fact, adequately protected, staff has proposed a Condition of Certification (NOISE-3, below).

PROJECT SPECIFIC IMPACTS — OPERATION

COMMUNITY EFFECTS

The DEC will be constructed in a heavily industrial neighborhood. Ambient noise levels in such an environment typically are fairly high during the day, and significantly quieter at night, as industrial noise sources are shut down. This is demonstrated by the applicant's ambient noise monitoring (DEC 1998a, AFC § 8.5.2.2; Table 8.5-3), which shows daytime noise levels at Casa Medanos as much as 16 dBA (L_{eq}) above nighttime levels.²

During its operating life, the DEC will represent essentially a steady, continuous noise source day and night. Occasional short-term increases in noise level will occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant is shut down for lack of dispatch or for maintenance, noise levels will decrease.

POWER PLANT OPERATION

The applicant will design the power plant to produce noise levels at the nearest sensitive receptors that do not exceed the 60 dBA criterion in the City of Pittsburg General Plan Noise Element (Pittsburg 1988) and the City of Antioch General Plan Noise Goal (Antioch 1988). In addition, the plant's noise emissions will be restricted so they do not create an increase in background noise levels at any of these receptors exceeding 5 dBA, as specified in the Pittsburg Noise Element.

The applicant will apply mitigation measures as necessary to limit noise emissions. Mitigation can include barrier walls, acoustical enclosures for equipment, specification and purchase of quieter equipment, and rearrangement of features on the plant site to minimize noise emissions in the direction of receptors (DEC 1998a, AFC §§ 8.5.3.5, 8.5.4.1.1). Resulting noise contributions at the sensitive receptors are depicted in the application, thus (DEC 1998a, AFC § 8.5.4; Tables 8.5-14, 8.5-15):

² From 56 to 72 dBA L_{eq} . An increase of 16 dB represents a tripling of perceived noise level.

NOISE Table 1
Cumulative Noise Levels During Power Plant Operation

Receptor	Ambient Background Noise Level dBA	Power Plant Noise Contribution DBA	Cumulative Noise Level DBA	Increase dBA
Casa Medanos Apartments	48	52	53	5
Pittsburg Residences	51	44	52	1
Antioch Residences	46	42	47	1
Hazel's Restaurant	46	43	48	2

Source: DEC 1998a, Table 8.5-15

The ambient background levels upon which the above figures are based are the lowest nighttime L_{90} levels recorded for each of the receptors (DEC 1998a, AFC Tables 8.5-3 through -6), with one exception. At Casa Medanos, the lowest measured L_{90} was 45 dBA (from 12:15 a.m. to 1:15 a.m. Tuesday morning, September 15, 1998). Normally, in a typical residential setting, staff uses this lowest figure to measure increases in noise due to the project.

The Casa Medanos, however, is not a typical residential setting. A converted motel, the facility lies between a busy two-lane artery and a rail line, with a very busy freeway beyond the rail line. The nighttime noise regime is heavily dominated by traffic noise, as shown by the disparity between the background L_{90} and average L_{eq} noise levels of 10 to 15 dBA; see NOISE Figure 1, below. Instead of basing design on the single lowest nighttime L_{90} value, applicant has taken the approach of basing it instead on the average of the nighttime L_{90} readings (after excluding the increase between 5:00 a.m. and 7:00 a.m. due to morning rush hour traffic) (DEC 1998a, AFC § 8.5.3.3).

The resulting power plant design will present noise levels at Casa Medanos that exceed the nighttime average background levels by 5 dBA, and the lowest nighttime background level by 8 dBA. Energy Commission staff agrees with the applicant that this is a valid approach. The steady noise of the DEC superimposed on the loud, widely varying traffic noise will, in fact, barely be perceived. Imposing a more stringent level would be difficult to justify in this location; the Casa Medanos lies in an area zoned CS (Service Commercial), adjacent to an area zoned IG (General Industrial). The existing CNEL noise level is 73 dBA (DEC 1998a, Table 8.5-3), far in excess of the 60 dBA level that is declared Normally Acceptable by the City of Pittsburg General Plan Noise Element (Pittsburg 1988). Staff has proposed a Condition of Certification (see NOISE-6, below) to ensure that the completed facility does, in fact, adhere to the intended noise limit.

TONAL AND INTERMITTENT NOISES

One possible source of noise annoyance would be strong tonal noises, individual sounds that, while not louder than the permissible levels, stand out in sound quality. To ensure the avoidance of such tonal sound, the noise control design of the DEC can be balanced to bring as many noise sources as possible to the same relative sound level, causing them all to blend without any one source standing out. Another potentially annoying source of noise from a combined cycle power plant such as the DEC is the intermittent or occasional actuation of steam relief valves. The hissing noise from these valves can be largely mitigated by the installation of adequate mufflers.

The applicant commits to designing the project such that no single noise source will be allowed to stand out (DEC 1998a, AFC § 8.5.4.1.1). To ensure that adequate measures are taken to mitigate tonal and intermittent noise sources, staff has proposed a Condition of Certification (see NOISE-6, below) to ensure that tonal and intermittent steam relief noises are not allowed to cause a problem.

LINEAR FACILITIES

The linear facilities, once placed in operation, will likely produce no audible noise. The gas line will be silent from any distance. The cogeneration steam line to the Dow Chemical Company facility will be located entirely on Dow property, and its thermal insulation will provide adequate muffling (DEC 1998a, AFC §§ 2.1, 2.2.8.5). The electric transmission line will normally be inaudible from any distance. A humming from corona effect would occur in rainy or highly humid conditions, but would be practically unnoticeable, masked by traffic sounds and other ambient noises (DEC 1998a, AFC §§ 1.1, 8.5.4.3).

WORKER EFFECTS

The applicant recognizes the need to protect plant operating and maintenance personnel from noise hazards, and commits to comply with applicable LORS (DEC 1998a, § 8.5.5.1). Areas of the plant with noise levels exceeding 85 dBA will be posted and hearing protection required, and a hearing conservation plan will be implemented to protect workers.

CUMULATIVE IMPACTS

Requisite to any discussion of cumulative impacts are nearby projects existing or planned for the future. No such projects have been identified (DEC 1998a, AFC § 8.4.6). The Enron Pittsburg District Energy Facility (PDEF) power plant project is too distant from the DEC to create any cumulative noise impacts. While construction of linear facilities from the PDEF project could conceivably produce minor cumulative impacts in relation to construction of the DEC if such construction were to occur simultaneously, staff deems such impacts as speculative. Staff therefore concludes that the DEC will not create any significant cumulative noise impacts.

FACILITY CLOSURE

Upon closure of the facility, all operational noise will cease; no further adverse impacts from operation will be possible. The remaining potential noise source will be that caused by dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise will be similar to that caused by the original construction of the DEC, it can be treated similarly. That is, noise work can be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS then in existence would apply; applicable Conditions of Certification included in the Energy Commission Decision would also apply unless properly modified.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff concludes that the DEC will likely be built and operated to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that the DEC, mitigated as described above, will likely present no significant adverse noise impacts, individually or cumulatively. The DEC will likely represent an unobtrusive, nearly undetectable addition to existing noise levels.

RECOMMENDATIONS

Staff recommends that the following proposed Conditions of Certification be adopted to ensure compliance with all applicable noise LORS, and implementation of the applicant's proposed mitigation measures.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of rough grading, the project owner shall notify all residents within one-half 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. 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: The project owner shall transmit to the CPM in the first Monthly Construction Report following the start of rough grading a statement, signed by the project manager, attesting that the above notification has been performed, and describing the method of that notification. This statement shall also attest that the telephone number has been established and posted at the site.

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project related noise complaints.

Protocol: The project owner or authorized agent shall:

- use the Noise Complaint Resolution Form (see below for example), or 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 complainant's satisfaction.

Verification: Within 30 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, or similar instrument approved by the CPM, with the City of Pittsburgh Planning Division and 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 30 day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is finally implemented.

NOISE COMPLAINT RESOLUTION FORM

DELTA ENERGY CENTER (98-AFC-3)		
NOISE COMPLAINT LOG NUMBER _____		
Complainant's name and address:		
Phone number: _____		
Date complaint received: _____		
Time complaint received: _____		
Nature of noise complaint:		
Definition of problem after investigation by plant personnel:		
Date complainant first contacted: _____		
Initial noise levels at 3 feet: _____ dBA	Date: _____	
Initial noise levels at complainant's property: _____ dBA	Date: _____	
Final noise levels at 3 feet: _____ 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.)

NOISE-3 Prior to the start of project construction, the project owner shall submit to the CPM for review a noise control program. 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 rough grading, the project owner shall submit to the CPM the above referenced program. The project owner shall make the program available to OSHA upon request.

NOISE-4 If a traditional, high-pressure steam blow process is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 110 dBA measured at a distance of 100 feet. The project owner shall conduct steam blows only during the hours of 8:00 a.m. to 5:00 p.m. If a low-pressure continuous steam blow process is employed, the project owner shall submit a description of this process, with expected noise levels and projected hours of execution, to the CPM.

Verification: At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer, and a description of the steam blow schedule. At least 15 days prior to the first low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

NOISE-5 At least 15 days prior to the first steam blow(s), the project owner shall notify all residents within one-half mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: Within five (5) days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

NOISE-6 Within 30 days of the project first achieving an output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey, utilizing the same monitoring sites employed in the pre-project ambient noise survey as a minimum. The survey shall also include the octave band pressure levels to ensure that no new pure-tone noise components have been introduced. No single piece of equipment shall be allowed to stand out as a dominant source of noise. Steam relief valves

shall be adequately muffled to preclude noise that draws complaints. If the results from the survey indicate that the project noise levels are in excess of 52 dBA measured at the property line of the Casa Medanos Apartments, additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

Verification: Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to the City of Pittsburg Planning Division and the CPM. Included in the report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. Within 30 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

NOISE-7 The project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey shall be conducted within 30 days after the facility is in full operation, and shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095—5100 (Article 105) and Title 29, Code of Federal Regulations, Part 1910. 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.

NOISE-8 Noisy construction work (that which causes offsite annoyance) shall be restricted to the times of day delineated below:

Within the Pittsburg City Limits:	7:00 a.m. to 10:00 p.m.
Within the Antioch City Limits:	7:00 a.m. to 7:00 p.m.
Within unincorporated areas of Contra Costa County:	7:00 a.m. to 7:00 p.m. weekdays, and 8:00 a.m. to 5:00 p.m. weekends

Verification: The project owner shall transmit to the CPM in the first Monthly Construction Report a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

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NOISE: APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

Noise levels can be measured in a number of ways. One common measurement, the equivalent sound level (L_{eq}), is the long-term A-weighted sound level that is equal to the level of a steady-state condition having the same energy as the time-varying noise, for a given situation and time period. (See NOISE: Table A1, below.) A day-night (L_{dn}) sound level measurement is similar to L_{eq} , but has a 10 dB weighting added to the night portion of the noise because noise during night time hours is considered more annoying than the same noise during the day.

NOISE Table A1	
Definition of Some Technical Terms Related to Noise	
Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dB	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 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 5 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}	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.
Source: California Department of Health Services 1976.	

In order to help the reader understand the concept of noise in decibels (dBA), NOISE: Table A2 has been provided to illustrate common noises and their associated dBA levels.

NOISE Table A2			
Typical Environmental and Industry Sound Levels			
Source and Given Distance from that Source	A-Weighted Sound Level in Decibels (dBA)	Environmental Noise	Subjectivity/ Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		
	110	Rock Music Concert	Very Loud
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')			
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	Quiet
Large Transformer (200')	40		
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		
	0		Threshold of Hearing
Source: Peterson and Gross 1974			

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 (Kryter 1970) can be helpful in understanding the significance of human exposure to noise.

- Except under special conditions, a change in sound level of one dB cannot be perceived.
- Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.
- A change in level of at least five dB is required before any noticeable change in community response would be expected.
- A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

COMBINATION OF SOUND LEVELS

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

NOISE Table A3 Addition of Decibel Values	
When two decibel Values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Thumann, Table 2.3

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

NOISE Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: OSHA Regulations

VISUAL RESOURCES

Joe Donaldson, ASLA

INTRODUCTION

The purpose of this analysis is to determine whether the proposed Delta Energy Center project would cause significant adverse visual impacts, including whether the project would be in conformance with applicable laws, ordinances, regulations, and standards pertaining to visual resources. Staff concludes that the project would cause significant adverse visual impacts for some views. Some of these significant adverse visual impacts would be mitigated to less than significant levels by implementation of mitigation measures identified in this analysis and some of these impacts require discussion with the applicant and City of Pittsburg regarding possible mitigation. The proposed project would conflict with three local policies regarding visual resources that are part of applicable laws, ordinances, regulations, and standards.

ORGANIZATION OF ANALYSIS

This analysis is organized as follows:

- describes staff's analysis methodology;
- describes applicable laws, ordinances, regulations and standards;
- assesses the visual setting of the proposed power plant site, including linear facility routes;
- evaluates the visual impacts of the proposed project on the existing setting;
- evaluates compliance of the project with applicable laws, ordinances, regulations, and standards; and
- recommends measures needed to mitigate any potential significant adverse visual impacts of the proposed project and to achieve compliance with applicable laws, ordinances, regulations, and standards.

METHODOLOGY

Staff's methodology for assessing visual impacts is described below and includes a description of the approach and process, the criteria, and the basis for the criteria used in evaluating the impacts of the proposed project.

APPROACH AND PROCESS

Visual resources are the natural and cultural features of the environment that can potentially be viewed. The evaluation of existing conditions of visual resources requires the application of a process that objectively identifies the visual features, or resources, of the landscape; assesses the character and quality of those resources

relative to overall regional visual character; and identifies the importance to people (i.e., viewer sensitivity) of views of visual resources in the landscape. With this preliminary establishment of the baseline (existing) condition, a proposed project or another change to the landscape can be systematically evaluated for its degree of impact. The degree of impact depends on both the magnitude of change to the visual resource (i.e., visual character and quality) and viewers' responses to and concern for those changes. This general process is similar for all established federal procedures for visual assessment (Smardon et al. 1986) and represents a suitable methodology for visual assessment for other projects and areas.

The approach for this visual assessment is based on the Federal Highway Administration's (FHWA's) visual impact assessment system (Federal Highway Administration 1983) in combination with other established visual assessment systems. The visual impact assessment process for this project involves identification of the following:

- applicable laws, ordinances, regulations, and standards for protection of visual resources;
- visual resources (i.e., visual character and quality) of the region, the immediate project area, and the project site, including linear facility routes;
- important viewing locations (e.g., roads, residential areas, and public use areas) and the general visibility of the project area and site;
- viewer groups and their sensitivity;
- significance criteria for visual impacts;
- impacts and the levels of significance of visual impacts of the proposed project; and
- mitigation measures that would reduce impacts to less-than-significant levels.

Data used in conducting this visual assessment were gathered from existing local government policy documents, documents prepared by the applicant for this project, and field visits to the project area and site. It should be noted that the analysis relies heavily on the data, including photographs, maps, and written information, provided by the applicant for this project.

CRITERIA FOR VISUAL ASSESSMENT

The visual character and quality of the region and the project site are evaluated using established FHWA criteria for visual landscape relationships. These criteria are vividness, intactness, and unity. They are defined as follows:

- Vividness is the visual power or memorability of landscape components as they combine in striking or distinctive visual patterns.

- Intactness is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the artificial landscape. (Federal Highway Administration 1983.)

For this analysis, the appearance of the landscape is described using these criteria and the dominance elements of form, line, color, and texture. These dominance elements are the basic components, or attributes, of landscape character and are used to describe visual character and quality for most visual assessments (U.S. Forest Service 1974, U.S. Forest Service 1995, Federal Highway Administration 1983, Smardon et al. 1986).

Viewer sensitivity is based on the visibility of resources in the landscape, the proximity and elevational position of viewers relative to the visual resource, the frequency and duration of views, the number of viewers, and the type and expectations of individuals and viewer groups. The criteria for identifying viewer sensitivity are related in part to the position and speed of travel of viewers relative to the resource. Visual resources located more directly in front of traveling viewers (i.e., within their primary field of view) tend to be more noticeable and take on greater importance. The slower the speed of travel, the wider the traveler's primary field of view becomes. Fields of view for passengers tend to be broader than for drivers.

Viewer sensitivity also depends on the number and type of viewers and the frequency and duration of views. Generally viewer sensitivity increases with an increase in total numbers of viewers, the frequency of viewing (e.g., daily or seasonally), and the duration of views (i.e., how long a scene is viewed). Also, viewer sensitivity is generally high for views seen by people who are traveling for pleasure; people engaging in recreational activities such as hiking, biking, picnicking, camping, boating, and fishing; and residents for views from in and around their homes. Viewer sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (U.S. Forest Service 1974, Federal Highway Administration 1983, U.S. Soil Conservation Service 1978). Views from recreation trails and areas, scenic highways, scenic overlooks, and residences are generally assessed as having high visual sensitivity.

A viewshed is an area of the landscape that is visible from a particular location (e.g., an overlook or residence) or series of points (e.g., a road, trail, or water body). To identify the importance of views of resources, a viewshed may be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater is its importance to the viewer. Although distance zones in viewsheds may vary between different geographic regions or types of terrain, a commonly used set of criteria

identifies the foreground distance zone as the area from the viewer to 1/4- to 1/2-mile from the viewer, the middleground zone as extending from the foreground zone to 3-5 miles from the viewer, and the background zone as extending from the middleground zone to infinity (U.S. Forest Service 1974). Also, visual resources viewed from nearby (i.e., in the foreground distance zone) that are higher in elevation than the viewer tend generally to take on greater visual importance than resources located at a lower elevation than the viewer.

Key observation points (KOPs) are used in the analysis to provide examples of representative or typical views from general viewing areas and locations in and around the project area and are not the sole points from which views are analyzed. Data provided by the applicant includes photographs taken of the project area and site from a variety of locations. KOPs generally represent the most important viewing locations and the applicant has provided photographs of existing conditions and photosimulations of the project for the KOPs.

Significance criteria for determining the significance of visual impacts are based on the State CEQA Guidelines. The specific criteria for determining significance of impacts for this project are identified in the "Impacts" section.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL AND STATE

The proposed project, including the linear facilities, is located on private lands and is not subject to federal land management requirements. Likewise, no roadway in the project vicinity is a designated or eligible State Scenic Highway. Therefore, the project is not subject to any federal or state regulations pertaining to visual resources other than the state requirements under CEQA that are addressed in this analysis.

LOCAL

The proposed power plant, including all of the above-ground power transmission lines, would be located in the City of Pittsburg. Most of an underground gas pipeline would run through the City of Antioch and a short portion of the gas line near its eastern terminus would be located in Contra Costa County. Also, a short portion of the underground power line near its western terminus is located in Contra Costa County. Therefore, the project will be subject to local laws, ordinances, regulations, and standards pertaining to protecting and maintaining visual character and quality for the City of Pittsburg, City of Antioch, and Contra Costa County. Applicable laws, ordinances, regulations, and standards are from the City of Pittsburg General Plan (1988) and Zoning Ordinance (1990), the City of Antioch General Plan (1988), and the Contra Costa County General Plan 1990-2005 (1991) and are identified below.

CITY OF PITTSBURG

GENERAL PLAN

Policies contained in the City of Pittsburg General Plan (1988) that apply to protecting and maintaining visual resources are identified below. Relevant policies are from the Land Use Element; Public Facilities, Institutions, and Utilities Element; and Parks and Recreation Element, and are described below. The City of Pittsburg distinguishes between Guiding policies which identify the City's philosophy and implementing policies which represent its commitment to action.

2. Land Use Element

2.1 Community Image

Guiding Policies

A. Design aesthetically pleasing roadways lined with trees or other appropriate landscaping, that connect Pittsburg neighborhoods and serve planned development.

C. Develop standards for entry points to the city, including landscape design and a coherent signage design.

E. Preserve the feel of a city surrounded by open space, and preserve corridors to the hills and to the waterfront.

Implementing Policies

R. Rely on the Architectural Review Process, City Planning Commission, and City Council to ensure that both public and private design meet the high standards of the City of Pittsburg and are consistent with the overall General Plan.

S. Make preservation of view corridors to the hills and to the waterfront a consideration in project and design review.

2.8 Industrial Development

Guiding Policies

D. Protect existing and new residential areas from adverse effects of new industry and, wherever feasible, of existing industry.

Implementing Policies

J. Adopt setback, landscaping, and screening requirements for industrial development to protect adjacent non-industrial uses.

4. Parks and Recreation Element

4.2 Park and Recreation Facilities, Planning and Management

Implementing Policies

N. Maintain view corridors for views of the river.

5. Public Facilities, Institutions, and Utilities Element

5.3 Utilities and Public Services

Guiding Policies

C. Require buffer landscaping and multiple use, where feasible, of utility sites and rights-of-way to harmonize with adjoining uses.

Zoning Ordinance

The project site is designated in the City of Pittsburg's zoning ordinance as General Industrial District (IG). The City zoning ordinance includes the following regulations that apply to protecting and maintaining visual resources in the City. These regulations are intended to support stated purposes in the zoning ordinance that "ensure that the appearance and effects of industrial uses are compatible with the character of the area in which they are located" and "minimize the impact of industrial uses on adjacent residential districts".

Section 18.54.015: This section requires that a minimum of 5 percent of a site in the IG District be landscaped.

Section 18.54.105: Requires front and street side yards to be landscaped, except for access driveways, or be enclosed by a solid fence or wall at least 6 feet in height.

Section 18.80.035: This section requires that a refuse storage area located within a building or screened on three sides by a 6-foot high concrete or masonry wall and including a gate constructed to city design standards be provided before occupancy for uses other than a single-family or duplex dwelling. The city planner may waive this screening requirement in the IG district for refuse collection and storage equipment, including a dumpster and waste storage container that is not visible from a public street.

Section 18.80.045: This section requires that signs erected on a site in any land use district comply with the Sign Regulations (Title 19).

Section 18.82.045: This section requires that each exterior of a building or other structure be kept in a good state of repair and the exterior finish be clean and well maintained; and the entire site including paved, unpaved, and landscaped areas

must be kept in a neat and orderly manner, free of weeds, loose trash, debris and other litter.

CITY OF ANTIOCH

GENERAL PLAN

The City of Antioch General Plan (Antioch 1988) contains several goals that are relevant to the protection and enhancement of visual resources. The “overall image goal” for the City of Antioch is “to preserve and enhance aesthetic and cultural elements that contribute to the City’s image of small town neighborhoods position(ed) at the gateway to the delta.” Relevant policies for visual resources that support the community design goal include the following.

Policy 1 states: “View corridors to the San Joaquin River, to distant hills and to local ridge lines should be preserved by prohibiting the siting of structures or landscaping that would block views from adjacent properties...”.

Policy 2 states: “Views along utility easements should be retained and enhanced through the use of planting materials to frame and focus views and to provide a sense of orientation.”

Policy 4 states: “Edges, the visual boundaries between neighborhoods and adjacent communities, should be maintained to provide relief from urban sprawl and to reinforce neighborhood identity”. The “western edge between Pittsburg and Antioch” is identified as one of the important edges to be enhanced.

CONTRA COSTA COUNTY

GENERAL PLAN

The Contra Costa County General Plan (Contra Costa County 1991) contains the following policies and implementation measures that would apply to the proposed project.

Land Use Element

Policies

3-19 - Buffers shall be provided between new industrial developments and residential areas by establishing setbacks, and park-like landscaping or other appropriate mechanisms.

Implementation Measures

3-z - Initiate and enforce, if necessary, specific development standards for both proposed and existing businesses to achieve appropriate landscaping design and sign structures.

Open Space Element

Scenic Resource Policies

9.17 – New power lines shall be located parallel to existing lines in order to minimize their visual impact.

9.24 – The appearance of the County shall be improved by eliminating negative features such as non-conforming signs and overhead utility lines, and by encouraging aesthetically designed facilities with adequate setbacks and landscaping.

SETTING

This section identifies the existing, or baseline, conditions for the visual resources of the surrounding region and the project site and vicinity. The existing visual character and quality of the area and views of the project site and surrounding areas are described using the FHWA visual impact assessment system. Visual quality of views is assessed using the criteria of vividness, intactness, and unity as applicable. Dominance elements of form, line, color, and texture are described where necessary to help further clarify the assessment of landscape character and quality. The character and quality of views is also based on visual resources identified in local plans as scarce or important to protect. For this analysis, these include views of open space, water, hills, and the Delta landscape. Where applicable, viewer sensitivity is described for views of the site and area.

VISUAL CHARACTER OF THE REGION

Describing the visual character of the region provides a context and frame of reference for assessing the visual quality of the site and its surroundings. The proposed project is located in the City of Pittsburg just south of New York Slough and the San Joaquin River in northern Contra Costa County (Figures 1 and 2 in Project Description). The landscape of the region consists of a fairly flat and gently sloping plain about 1 to 2 miles wide bordered on the south by the Los Medanos Hills and on the north by open water, islands, and wetlands of the Sacramento- San Joaquin Delta. Portions of the plain are punctuated by wetlands and small creek channels that drain north from the Los Medanos Hills. The area is a patchwork of developed urban land uses, agricultural fields, grasslands, wetlands, and areas of scattered trees. Much of the remaining open space in the lowland plain area consists of low-growing grasslands and wetlands with some areas of larger riparian vegetation and scattered pockets of trees (e.g., eucalyptus and oaks). Urban land uses are varied, ranging from heavy industrial facilities to commercial, residential, and developed parks.

The region's landscape pattern reflects the area's long history as a transportation and industrial corridor and its more recent role as a bedroom community for the San Francisco Bay Area's suburban expansion. The area's industrial development is concentrated along the water and along the two major railroad lines: the Southern Pacific, and the Burlington Northern & Santa Fe (BN&SF), both of which run

generally parallel to the water. The industrial facilities include Dow Chemical and USS-POSCO, as well as other heavy industries. The region is also a center for electric production with the existing Pittsburg Power Plant located near the water at the west end of Pittsburg and several small cogeneration plants in the industrial area at the east end of Pittsburg. Power transmission lines, scattered exhaust stacks of industrial facilities, and several water towers are some of the larger, vertical features that are most noticeable in the landscape. Steam plumes from a number of the industrial facilities in the region are regularly visible under certain meteorological conditions. State Route 4 separates the older portion of Pittsburg, including the project site, existing industrial development, the historic town center, older residential areas, and open space including wetlands, from more recent suburban residential and commercial development to the south.

Views north from the area are generally of the open water, wetlands, and islands of the Delta and distant hills. Middleground and background views of these areas, where unobstructed by industrial facilities and power transmission lines, are highly vivid (i.e., distinctive, of high quality, and memorable). Views south of the mostly undeveloped hills are also highly vivid, especially from shoreline and open water areas. Largely because of the mixed land use patterns and scattered industrial facilities, visual intactness and unity is generally moderate to low throughout the region. However, some areas within the region maintain high intactness and/or unity; these are generally areas of residential development; downtown centers and recent commercial development; and open space areas containing wetlands, agricultural lands, open fields, and hills.

Because open space areas and corridors with unobstructed views to the water and hills are scarce in much of the region, these areas and corridors have been recognized as sensitive and important to protect (Pittsburg 1988). The City of Antioch, immediately east of Pittsburg and the project site, has identified the importance of preserving views of the river, distant hills, and local ridgelines and maintaining visual edges and gateways to maintain and enhance its community image (City of Antioch 1988). Contra Costa County has recognized that its scenic vistas, especially views of ridges, hillsides, and the Delta area, are major contributors to the perception that the county is a desirable place to live and work and preserving the quality of visually sensitive features of the landscape would help preserve and reinforce the county's landscape character and balance the effects of development (Contra Costa County 1991 [General Plan]). Because of their local scarcity and importance as identified in local plans, views of water, hills, open space, and the Delta landscape are generally of high or moderately high visual quality.

Viewer groups that live, work, or travel in the area are varied. They include residents, workers, travelers, and recreationists. Area residents and people traveling through or recreating in and around the area generally have the highest concern for visual quality and are the most sensitive viewer groups. Recreationists in the area include the high volume of travelers using Highways 4 and 160 that travel to and from recreation areas and people engaged in boating, fishing, hunting, birding, hiking, and other outdoor activities in the region. Because of the high

volume of recreationists using the area and the large amount of residents, viewer sensitivity is generally high in the region. Viewer sensitivity in the region is highest for the roads that regularly carry high volumes of recreationists (e.g., Highways 4 and 160) and low to moderate for most local roads in the area (e.g., Pittsburg-Antioch Highway). Viewer sensitivity is highest for multiple residences where visual resources are readily and regularly visible in the foreground distance zone. Also, visual sensitivity is high for recreationists engaged in recreation and leisure activities in the region, including boating, fishing, picnicking, socializing at eating establishments, hiking, bird watching, and other similar passive and active recreation and leisure pursuits.

VISUAL CHARACTER OF THE SITE AND VICINITY

The existing character and quality of visual resources of the project site and vicinity, including areas of linear project features, are described below. Important views from surrounding areas from which the project features may be visible are described. These descriptions provide a basis for identifying changes to the existing visual character and quality of views of the project site and assessing the level of significance of any visual impacts that would be produced by the proposed project.

The 20-acre project facility site is located in eastern Pittsburg, near the Antioch city boundary, and about ½-mile south of the shoreline of New York Slough. Linear facility corridors (i.e., aboveground and underground power transmission lines and an underground gas line) associated with the project extend from the project facility site to the east and west for several miles. A corridor for an underground wastewater discharge line runs north from the site toward the shoreline and connects with an existing discharge line.

The project site is undeveloped, generally flat, and covered with mostly low-growing annual grasses and weeds. To the north of the site is industrial development, a drainage swale, and open fields. The BN&SF railroad line runs along the north edge of the site and the Pittsburg-Antioch Highway is about 1/4-mile south of the site. Between the facility site and the Pittsburg-Antioch Highway is an open grass-covered field and a drainage canal adjacent to the highway. Immediately west of the site is a broad drainage swale and marsh. To the east of the site is the Delta Diablo Sanitation Plant and a small open field.

The above-ground portion of the transmission line route runs west from the site along the BN&SF rail line for about 1 1/4 miles to Columbia Street. For most of this distance, the route follows an existing power transmission line route. The above-ground portion of the route runs adjacent to industrial development and open fields. The project transmission line will be underground for the remainder of the route from Columbia Street west to the Pittsburg Power Plant and runs through residential and industrial areas.

The natural gas line route is entirely underground. It runs from the facility site about 5 miles east to the Antioch Terminal through or adjacent to industrial, residential, and open space areas, including two preserve areas.

VIEWS OF THE PROJECT SITE

The project site is visible from a variety of locations in the area. The character and quality and viewer sensitivity for views of the project site from these locations are described below.

VIEWS FROM THE PITTSBURG-ANTIOCH HIGHWAY

The Pittsburg-Antioch Highway is a two-lane road that is well-traveled by local area residents and people traveling to and from work or as part of their work. Although some recreationists use the highway, it is probably not highly used by recreationists and visitors because there are other area travel routes (e.g., Highway 4) that would be more accessible, efficient, and available to them for travel to and from recreation destinations. Vehicles travel along the highway at moderate speeds of around 35-45 mph. Viewer sensitivity for the portion of the highway near the project site is moderate because some recreationists use the highway, the highway is an entry to the communities of Pittsburg and Antioch, and there are some foreground views of the project site.

Views of the site and above-ground power line route from much of the highway are fairly limited because they are either obscured by landforms, buildings, or vegetation or they are generally perpendicular to the road and therefore outside the travelers' primary view cone or area of focus. However, for east-bound travelers, the site and power line route are highly visible for about 1/4 mile from the curve near Dowest Slough to around the Casa Medanos apartment complex. Views of the site from this portion of the highway are across the open marsh area of Dowest Slough and adjacent open fields and include middleground and background views of the water and islands in the Delta and distant hills (Figure Vis-2). From this reach of the highway, the site is in the foreground distance zone, generally within the travelers' view cone, and prominent. Views of the above-ground power line route are also fairly prominent, especially near the project site. Although industrial development and power lines are present in the area, the views of open space and the Delta landscape are moderately vivid, especially because these views are somewhat scarce in the area. Intactness and unity of these views are also moderate because of the prominence of open space in the foreground and somewhat open but distant views of the Delta landscape in the background. Therefore, views from this portion of the highway are of moderate visual quality.

For west-bound travelers on the highway, the site and power line route are less visible because views are mostly blocked or focused away from the site and the Delta landscape and toward existing industrial development. Views of the site and power line route for west-bound travelers are generally of low vividness. Also, intactness and unity of these views are generally low because of the incongruous mix of forms, lines, colors, and textures of the industrial and other land uses and the general lack of any apparent design unity or aesthetic consideration. Views for west-bound travelers on the highway are therefore of low visual quality.

VIEWS FROM RESIDENCES NEAR THE PITTSBURG-ANTIOCH HIGHWAY

The Casa Medanos apartment complex is located on the south side of the Pittsburg-Antioch Highway and is about 1/4 mile south of the site. Although views from

residents' windows do not face toward the site, residents can view the site and power line route from outside areas around the building and as they drive out of the interior courtyard. Because the site is within the foreground distance zone for views from this location and views are by residents which are a sensitive viewer group, viewer sensitivity is high for views of the site from this location.

Figure Vis-3 shows the view from KOP 1 north toward the site from near the apartment complex. Views are of the open, grass-covered fields south of and on the site in the foreground; a water tower and several buildings and industrial facilities in the middleground; and water and hills in the middleground and background. These views from the apartment complex are moderate in intactness and unity and moderate to low in vividness. Although a low chain link fence and wooden power poles in the immediate foreground slightly reduce the intactness of the views, the overall quality of these views is moderate because of the views of the open space and the Delta landscape.

The site is visible from one additional residence near the intersection of Somersville Road and the Pittsburg-Antioch Highway. However, views from this residence are of low vividness, intactness, and unity because the site is in the middleground distance zone, views are somewhat obscured by existing structures, and distant views include other industrial facilities. Views of the site from this location are generally of low visual quality.

VIEWS FROM PUBLIC RECREATION AREAS EAST OF THE SITE

The project site is visible to the general public from public recreation facilities located east of the site and the Dow Wetland Preserve lands. These facilities are the Babe Ruth Baseball Field, located about 3/4 mile from the project site on the eastern fringe of the Dow lands and just west of Somersville Road, and the Antioch Marina, located about 1 1/4 miles east and slightly north of the project site on the waterfront. Both facilities are located in the City of Antioch. Views from both of these areas are important and sensitive because they are public gathering areas and destinations for recreationists and community residents. Because the marina area also attracts recreationists and visitors from outside the community, views from this location are particularly important.

Views of the project site from the baseball complex are across the Dow Wetland Preserve lands which occupy most of the foreground. This view is depicted from KOP 2 (Figure Vis-4). The site is located in the middleground distance zone. Buildings and other structures of the sanitation plant are visible in the middleground zone between the Dow preserve and the project site. Industrial buildings and structures occupy much of the middleground and background. The above-ground portion of the power transmission line route is not easily visible from this area, because it is behind the site and extends away from the viewers. Views west toward the project site from the baseball complex are generally of low to moderate intactness because of the mix of industrial and open space land uses. Although the view of the Dow preserve is of high quality open space and a natural area, the overall view that includes the project site is low in vividness and unity because of the presence of industrial structures in the vicinity of the site and along the horizon

and the absence of views of the Delta landscape and background hills. Therefore, visual quality is low for this view.

The project site is visible from northerly portions of the Antioch Marina area which includes several public gathering facilities: the marina, Veteran's Memorial Park, and Humphrey's Restaurant (Figure Vis-5). Therefore, viewer sensitivity is high for views from this area. The site is in the middleground distance zone with some industrial structures visible to the north of the project site in the middleground. The background contains good views of distant hills. The foreground contains natural wetlands, water, shoreline, and open space and is of very high visual quality. Industrial facilities along the horizon north of the project site are partially obscured by vegetation in the foreground. The above-ground portion of the power transmission line route is not easily visible from this area, because it is behind the site and extends away from the viewers. The site's position in the middleground distance zone and the industrial structures located in the general vicinity of the site reduce the vividness, unity, and intactness slightly; however, views of the site from this area are of moderately high intactness, vividness, and unity and are generally of moderately high quality.

VIEWS FROM WATERWAYS AND ISLANDS

The project site is visible to the general public from a broad area of open water and islands in the portion of the Delta north of the project site (Figure Vis-1). Areas with views of the site include portions of New York Slough, Middle Slough, Broad Slough, the San Joaquin River, Brown's Island, and Winter Island, as well as some wetland areas along the shoreline northeast of the project site. The sloughs and river in this area receive moderate to heavy use by recreationists for sport fishing and sailing and other types of pleasure boating. Recreation use is highest during the summer with peaks in use on weekends and holidays. Also, New York Slough, Broad Slough, and the San Joaquin River are heavily used by commercial watercraft.

The two islands north of the site consist mostly of wetlands, channels, and a few small levees. Most of Brown's Island is owned by the East Bay Regional Park District (EBRPD), managed as part of its land reserve as a wildlife area, and designated as a regional shoreline. It is undeveloped and receives light visitation by recreationists, mostly in small watercraft. Winter Island is privately owned, operated as a game preserve for hunting, and receives light public use due to restricted access. A private clubhouse is located at the southern edge of the island about 3/4 mile north of the project site. Because of the high volume of use by recreationists in this area, viewer sensitivity is high for views from the waterways and islands.

The project site is in the middleground for views south from portions of the water areas and islands described above. The view from near the south end of Winter Island is shown from KOP 4 (Figure Vis-6). Some structures, including buildings, power poles, and water towers, are visible in the middleground. The foreground includes mostly water, shorelines, and wetlands. The background includes vivid and high quality views of the Los Medanos Hills and Mt. Diablo, an important regional landmark. Views from the water toward the project site from the northeast

are of moderately high intactness, unity, and vividness and are therefore of moderately high quality because they are dominated by natural landforms and features in the foreground and background. Views toward the site from the northwest and Middle Slough (Figure Vis-7) contain more noticeable structures in the middleground and are of moderate intactness, unity, and vividness, and therefore visual quality.

VIEWS FROM THE COLUMBIA STREET/EAST SANTA FE AVENUE NEIGHBORHOOD

Part of the above-ground portion of the power transmission line route is visible in the foreground from some residences and residential streets in the vicinity of Columbia Street and East Santa Fe Avenue. Because the viewers are largely residents of the nearby neighborhood, the views from this area are of high visual sensitivity. Existing views of the route from this area are mostly of industrial facilities and structures and overhead power lines. The view from KOP 3 is depicted in Figure Vis-8. Views of the route are of low intactness, unity, and vividness because of the haphazard mix of industrial structures, power lines, and fences, many of which are in poor condition, and the lack of visual integrity, coherence, and compositional harmony of the built elements. The visual quality of the existing route visible from this area is low.

A portion of the power line route is also visible from a portion of Loveridge Road that is in an industrial area (Figure Vis-9). Although this part of the route is visible to the general public from the public road, most users of this portion of the road are driving to and from work or as part of their work and viewer sensitivity for views in this area is low. Views of the route from this section of the road are of low visual quality for similar reasons as explained above for views from the vicinity of Columbia Street and East Santa Fe Avenue.

VIEWS FROM HIGHWAY 4

The project site is visible from portions of Highway 4, portions of other roads, and limited areas in the vicinity. Highway 4 carries high volumes of recreationists traveling to and from recreation sites. However, views of the site from the highway are generally of moderate viewer sensitivity because the site is in the middleground and background distance zones, views of the site from the highway are limited to a few locations with fairly short-duration views, and the site is not generally within the primary field of view of travelers. Also, for views from the highway and nearby areas, existing structures near the site and between the site and the highway tend to reduce the intactness, vividness, and unity of these views to low levels and visual quality is therefore generally low.

VIEWS FROM RESIDENCES IN SOUTHERN HILLS

Residences in the hills approximately 2 to 3 miles south of the site have views of the project site in the middleground distance zone (Figure Vis-10). For these views, visual sensitivity is moderately high because although viewers are a sensitive viewer group and views are of long duration, the project site is located in the middleground where it tends to blend with other features in the landscape. Panoramic views from these residential areas include the Delta landscape and distant hills and are

generally of moderately high intactness, unity, and vividness. The area along portions of the waterfront and in the vicinity around the project site contains various industrial facilities, structures, and intermittent steam plumes from industrial plants that reduce the intactness, unity, and vividness of these panoramic views to moderately high levels. However, overall intactness, unity, and vividness remains moderately high for panoramic views from portions of these residential areas and visual quality is therefore moderately high.

IMPACTS AND MITIGATION MEASURES

This section briefly describes the visual elements of the proposed project; identifies the applicant's proposed mitigation measures to reduce the visual impacts of the project; identifies the specific criteria used to evaluate the significance of any identified visual impacts resulting from implementation of the proposed project; describes changes to views of visual resources that would result from implementation of the proposed project; describes the level of significance of any identified impacts; and identifies mitigation measures that would reduce significant impacts to less-than-significant levels.

PROJECT VISUAL ELEMENTS

The proposed project consists of a variety of structures and forms that in combination or separately may cause it to be noticeable or visually prominent relative to its surroundings. The main elements of the power plant include three tall HRSG stacks (approximately 144 feet high) and associated HRSG units (approximately 80 feet high), two auxiliary boiler stacks (approximately 115 high), a massive cooling tower array (approximately 60 feet high and 412 feet long by 135 feet wide), and electric transmission towers (ranging in height from 105 to 125 feet) both on the facility site and extending west in an alignment from the site for a little over 1 1/4 miles. A transition station consisting of a structure and terminal poles (approximately 105 feet high) will be located where it can be seen from a residential area and a gas line interconnect meter set containing a metal shed structure and above-ground piping will be visible from a public road (i.e., Wilbur Avenue).

Construction of the project is expected to require about two years. Construction activities including use of construction staging areas would be temporary. Construction staging areas would be removed and cleaned up immediately following completion of their use. Any construction activities, including use of construction staging areas, that persist longer than one year would be of concern, especially if they are visible and regularly seen by sensitive viewer groups.

Several routes for below-ground electric, water, and gas lines would be visible from some locations. With the exception of the interconnect meter set near Wilbur Avenue, these routes will not contain any above-ground elements after construction and the construction period for these elements will be less than one year. For these reasons, visual impacts of these below-ground utility routes would be less than significant and are not described. For the interconnect meter set near Wilbur Avenue in Antioch, the facility would be located in an existing industrial area with low intactness, unity, and vividness; visual quality of the surrounding area is low;

viewer sensitivity is low; and the applicant has identified that the facility will be screened using fencing with wood slats. For these reasons, visual impacts of the interconnect meter set would be less than significant.

Other elements of the project that could create visual impacts include night lighting and exhaust steam plumes that would be visible intermittently under certain atmospheric conditions. These elements are described below in the assessment of views from various areas and in more detail in separate sections on lighting and steam plumes in the section "Project Specific Impacts".

APPLICANT'S PROPOSED MITIGATION MEASURES

The applicant has identified mitigation measures that will be included as part of the proposed project to reduce the visual impacts of the project. These measures are identified below and are considered part of the proposed project for this analysis.

POWER PLANT MITIGATION MEASURES

The applicant has identified the following mitigation measures to be included in the project design to reduce the visual impacts of the proposed power plant.

1. All structures, stacks, buildings, and tanks will be constructed of materials that will restrict glare, and will be finished with flat, neutral gray tones that blend with the surrounding environment. Calpine/Bechtel will consult with the CEC during final color selection for the project features.
2. All fencing will be constructed of non-reflective materials and will be treated or painted to blend with the surrounding environment.
3. Signs at the site will be constructed of materials that are non-glare and will be painted using colors that are non-obtrusive.
4. Lighting at the power plant site will be limited to areas required for safety and will be shielded from public view to the extent possible.
5. Lighting will be directed and shielded to reduce light scatter and glare. Highly directional, high-pressure sodium vapor fixtures will be used.
6. Calpine/Bechtel will comply with the applicable provisions of the City of Pittsburg Design Review Guidelines for project features such as structures, signs, and landscaping.
7. Calpine/Bechtel will work with the City of Pittsburg to develop a landscape plan for the area along the north side of the Pittsburg-Antioch Highway. The purpose of the plan is to screen views of the plant and improve the overall appearance of the highway corridor.

TRANSMISSION LINE MITIGATION MEASURES

The applicant has identified the following mitigation measures to be included in the project design to reduce the visual impacts of the proposed overhead power transmission line.

7. The transmission towers and the elements of the overhead/underground transmission [transition] station will be finished with flat, neutral gray tones that blend with the surrounding environment. Calpine/Bechtel will consult with the CEC during final color selection for project features.
8. Nonspecular conductors and nonreflective and non-refractive insulators will be used to reduce conductor and insulator visibility.
9. Calpine/Bechtel will work with USS-POSCO, the City of Pittsburg, and nearby residents to develop a landscape plan for the area around the overhead/underground transition station at the intersection of East Santa Fe Avenue and Columbia Streets. This landscape plan will screen the transition structures and make a positive contribution to the views from the adjacent neighborhood.

SIGNIFICANCE CRITERIA

Criteria for determining the significance of visual impacts are based on Appendix G of the State CEQA Guidelines. The CEQA Guidelines 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”. (Cal. Code Regs., tit.14, § 15382.) Appendix G of the Guidelines, under Aesthetics, lists the following four questions for lead agencies to address:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

In addition, the CEQA Guidelines, under the Land Use and Planning section, pose the question as to whether the project would conflict with any applicable land use plan, policy, or regulation (including, but not limited to a general plan, specific plan,

local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. Applicable land use plans, policies, and regulations for this project are identified in detail above in the section "Applicable Laws, Ordinances, Regulations, and Standards". Conflicts with such laws, ordinances, regulations, and standards as they relate to visual concerns could constitute significant visual impacts; these conflicts are described below in the section "Compliance with Laws, Ordinances, Regulations, and Standards."

Based on the CEQA Guidelines and the application of professional standards and practices, significant impacts for this project would result from the following:

- conflict with any applicable policies, ordinances, or other regulations for visual resources identified in the general plans or zoning ordinances of the local governments with jurisdiction over the project;
- substantial reduction in the visual quality of views identified to be of moderate or high visual quality and high or moderately high viewer sensitivity; or
- creation of a new source of substantial light or glare in a location where it didn't exist before and which would adversely affect day or nighttime views with high or moderately high viewer sensitivity.

PROJECT SPECIFIC IMPACTS

CONSTRUCTION IMPACTS

IMPACTS TO VIEWS FROM THE PITTSBURG-ANTIOCH HIGHWAY AND CASA MEDANOS

Visual impacts associated with construction of the power plant and use of the 10-acre construction laydown area immediately south of the project site and north of the Pittsburg-Antioch Highway would persist for more than one year and are of concern.

The view from KOP 1 (Figure Vis-3) shows an existing view of the power plant site and construction laydown area from a portion of the highway near the Casa Medanos apartment complex. Visual quality is moderate for views of this area from the highway and Casa Medanos. Viewer sensitivity is moderate for travelers on the highway and high for residents of Casa Medanos. Construction activities and use of this area for construction laydown would continue for approximately 2 years, which is a substantial period of time. Construction activities and use of the area for storage of materials, vehicles, and equipment would introduce new forms, textures, lines, and colors that would substantially reduce the intactness, unity, vividness, and therefore visual quality of existing views of open space and obscure some views of the water and other features of the Delta landscape from the apartments and a portion of the highway. Visual quality of views from the highway would be substantially reduced from moderate to low; however, because viewer sensitivity is moderate for views from the highway, this impact would be less than significant. Visual quality for views from the Casa Medanos apartments would be substantially reduced from moderate to low. Therefore, because views from the apartments have

high viewer sensitivity this impact would be significant. Construction activities and use of this area would also introduce new sources of lighting necessary for safety and security. The visual impact of introducing a new and substantial source of light where it did not previously exist in an area of high viewer sensitivity would be significant. Also, construction activities and use of this site as a construction laydown area would conflict with the City of Pittsburg's General Plan policies E, S, and N which address preservation of open space and view corridors to the waterfront and river. Conflicts with these local policies also would constitute significant visual impacts.

Implementation of the following mitigation measure would reduce the visual impacts of substantially reducing visual quality and creating a new source of substantial light to a less than significant level. However, the visual impact of conflicting with local policies for preserving open space and view corridors would remain significant. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

Mitigation Measures

MM V1. Aesthetic screening shall be placed along the south and west portions of the perimeter of the construction laydown area for the duration of the use of the area. Screening shall be high enough to obscure views of most of the lighting, as well as equipment, vehicles, and materials in the area, from the highway and apartments. Immediately upon completion of construction of the project, the aesthetic screening shall be removed and the construction laydown area shall be revegetated using primarily plants that are native to the local region. The goal of the revegetation shall be to maintain the open space character of the site and area.

IMPACTS TO VIEWS OF OTHER AREAS DURING CONSTRUCTION

Construction of all elements of the project other than the power plant would require less than 1 year. Therefore, construction activities, including use of construction staging areas other than the construction laydown area described above would be of short duration. Because visual impacts of short duration construction activities are less than significant, the visual impacts of construction for these other areas would be less than significant.

OPERATION IMPACTS

IMPACTS TO VIEWS FROM THE PITTSBURG-ANTIOCH HIGHWAY

For east-bound travelers along the highway, the project would be highly visible within their primary field of view in the foreground distance zone, substantially reduce local views of open space, and obscure an existing view corridor to the water. A visual simulation of the view from KOP 1 (Figure Vis-11) shows the project from near the eastern end of the portion of the highway with the highest visibility for travelers. The project dominates the view and its form, line, and texture contrast strongly with its surroundings. New power poles would be placed in an alignment where there are existing power lines and poles that would be removed. Although the

new poles would be taller than the existing poles, they would not be substantially more noticeable than the existing poles.

Multiple steam plumes of varying heights and widths would be visible emanating from the tall HRSG exhaust stacks and the cooling towers on a regular but intermittent basis depending on atmospheric conditions. The presence of plumes would increase the visibility and visual dominance of the project, especially for foreground views of the project.

The unity, intactness, and vividness of views of the open space and the Delta landscape would be substantially reduced from moderate to low by the project. However, because viewer sensitivity is moderate for views from the highway, the visual impacts of reducing visual quality from moderate to low are less than significant.

Although other lighting from industrial facilities is visible in the vicinity, the proposed project would create a substantial new source of light that did not previously exist in this location. Although intended to be somewhat shielded, this new lighting in and around the project would nevertheless be visible to travelers on the highway. However, because viewer sensitivity for views from the highway is moderate, the visual impacts of this new lighting would be less than significant.

The power plant as proposed would substantially reduce existing views of open space and obscure an existing view corridor to the water from the highway. Because of this, the project would conflict with Policies E, S, and N of the City of Pittsburg General Plan that involve preservation of open space and view corridors to the water and these visual impacts would be significant. In its proposed location and configuration, the power plant would block views of the water and reduce views of open space substantially. However, if the layout of facilities on the power plant site could be reconfigured to maintain view corridors to the water, it may be possible to lessen the visual impacts. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

The applicant has proposed mitigating visual impacts for views of the project from the highway and nearby apartments by developing a landscape plan for the north side of the highway that would use landscaping to screen views of the plant. However, screening views of the plant from the highway would further reduce views of open space and view corridors to the water. Because of this, the mitigation proposed by the applicant also would conflict with Policies E, S, and N of the City of Pittsburg General Plan that involve preservation of open space and view corridors to the water. Therefore, these visual impacts also would be significant. However, the applicant has recently identified to staff that landscaping along the north side of the highway would probably not be feasible. If this landscape screening is not implemented, visual impacts of the screening blocking views to the water and of open space would probably be less than significant.

If the landscape screening is implemented along the highway, the visual impacts conflicting with local policies for preserving open space and view corridors would be

significant. However, by reducing the amount of proposed landscape screening along the north side of the highway to maintain some views of open space and partial view corridors to the water and implementing the mitigation measure below, conflicts with the local policies would be lessened.

Mitigation Measures

MM V2. Landscape screening proposed by the applicant to be placed along the north side of the Pittsburg-Antioch Highway to screen views of the power plant should be placed in a manner that maximizes views of remaining open space and view corridors to the water. No large vegetation that would screen views of open space or view corridors to the water should be placed in the vicinity of Dowest Slough in the western portion of the area along the north side of the highway. Larger screening vegetation may be placed along the eastern portion of the highway east of the Casa Medanos apartments where it would not block views of the water and open space from the highway or apartments.

IMPACTS TO VIEWS FROM RESIDENCES NEAR THE PITTSBURG-ANTIOCH HIGHWAY

Residents of the Casa Medanos apartments located just south of the project site would have views of the site and power line route in the foreground distance zone from in and around the residential complex. Viewer sensitivity is high for views by residents from in and around the apartments. The project would be highly visible in the foreground distance zone, introduce new sources of light, substantially reduce local views of open space, and obscure an existing view corridor to the water.

The visual simulation of the view from KOP 1 (Figure Vis-11) shows the project from near the apartment complex. The project dominates the view and its form, line, and texture contrast strongly with its surroundings. New power lines and poles would be taller and more visible but would not be substantially more noticeable than the existing poles that would be removed. Multiple steam plumes of varying heights and widths would be visible emanating from the tall HRSG exhaust stacks and the cooling towers on a regular but intermittent basis depending on atmospheric conditions. The presence of plumes would increase the visibility and visual dominance of the project for views by the residents.

The unity, intactness, vividness and visual quality of views of the open space and the Delta landscape from the Casa Medanos apartment complex would be substantially reduced from moderate to low by the project. Because viewer sensitivity is high for views from the apartment complex and the visual quality of these views would be reduced substantially from moderate to low, these visual impacts would be significant.

For views of the project from the residence near the intersection of Somersville Road and the Pittsburg-Antioch Highway, the project site is in the middleground distance zone and intactness, unity, vividness, and therefore visual quality are moderate largely because of views of industrial buildings in the immediate vicinity of the proposed project. For these reasons, the visual impacts for views of the proposed project from this residence would be less than significant.

Although other lighting from industrial facilities is visible in the vicinity, the proposed project would create a substantial new source of light that did not previously exist in this location and would be visible to residents of the Casa Medanos apartment complex in the foreground distance zone. Although intended to be somewhat shielded, this new lighting in and around the project would nevertheless be visible for the views with high viewer sensitivity. Therefore, the visual impacts of this new lighting would be significant.

The power plant would substantially reduce existing views of open space and obscure an existing view corridor to the water from the apartment complex. Because of this, the project would conflict with Policies E, S, and N of the City of Pittsburg General Plan that involve preservation of open space and view corridors to the water and these visual impacts would be significant. The power plant is proposed for this location, and its presence in this location would block views of the water and reduce views of open space substantially. As described above for views from the Pittsburg-Antioch Highway, if facilities can be reconfigured on the project site to maintain views to the water, it may be possible to lessen the visual impacts. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

The applicant has proposed mitigating visual impacts for views of the project from the apartments and highway by developing a landscape plan for the north side of the highway that would use landscaping to screen views of the plant. However, screening views of the plant from the apartments would further reduce views of open space and view corridors to the water. Because of this, the mitigation proposed by the applicant also would conflict with Policies E, S, and N of the City of Pittsburg General Plan that involve preservation of open space and view corridors to the water. Therefore, these visual impacts also would be significant. As described above for views from the Pittsburg-Antioch Highway, if landscape screening is not implemented along the north side of the highway, the visual impacts of the landscaping blocking views to the water and of open space would probably be less than significant.

The visual impacts of conflicting with local policies for preserving open space and view corridors would be significant. However, by reducing the amount of proposed landscape screening along the north side of the highway to maintain some views of open space and partial view corridors to the water and implementing the mitigation measure below, conflicts with the local policies would be lessened.

Implementation of the following mitigation measures would reduce the visual impacts of substantially reducing visual quality and creating a new source of substantial light to less than significant levels. The visual impacts of reducing and obscuring views of the water and Delta landscape and conflicting with local policies for preserving open space and view corridors would remain significant. However, by implementing the mitigation measures below for reducing and carefully placing proposed landscape screening along the north side of the highway to maintain some views of open space and partial view corridors to the water and providing landscape screening in close

proximity to the plant to help blend it with its surroundings, conflicts with the local policies and visual impacts would be lessened.

Mitigation Measures

MM V2. This mitigation measure is described above.

MM V3. Aesthetic screening should be placed along the south and west edges of the project site and should be designed to partially screen the lower portion of the facility. Screening may consist of a combination of plants, aesthetic berms, and walls or fencing. Vegetation selected for landscape screening should consist primarily of plants that are native to the local region. Screening vegetation should consist of trees and shrubs in groupings designed to form a varied visual edge. Planting of screening vegetation should be initiated as soon as possible during facility construction and should achieve a minimum of 50 percent screening of the lower 40 feet of the facility within 10 years of the startup of operation of the facility. The goal of the screening should be to maintain the open space character of the remaining area, reduce impacts of new sources of lighting, and partially screen the lower portion of the power plant to help blend it with its surroundings and soften the visual impacts of the project.

Condition of Certification VIS-3 should also be implemented.

IMPACTS TO VIEWS FROM PUBLIC RECREATION AREAS EAST OF THE SITE

Recreationists using the Babe Ruth Baseball Field complex located about 3/4 mile east of the proposed project site would have views of the project in the middleground distance zone. For recreationists with views from this area, viewer sensitivity is high and visual quality is low. The visual simulation of the view from KOP 2 (Figure Vis-12) shows the project from the baseball complex. Although the HRSG stacks and units and cooling towers would be noticeable, their form, line, color, and texture do not contrast strongly with the project's surroundings for the view in this direction and the intactness, unity, and vividness of the view would not be substantially reduced. For this view, new power lines and poles would be behind the facility and would not be easily more noticeable than the existing towers that would be removed.

Multiple steam plumes of varying heights and widths would be visible emanating from the tall HRSG exhaust stacks and the cooling towers on a regular but intermittent basis depending on atmospheric conditions. The presence of plumes would increase the visibility of the project for views by the recreationists. However, the view in this direction includes several other existing sources of steam plumes in the distant middleground or background and steam plumes from the project would not substantially reduce the intactness, unity, or vividness of the view.

Because the existing views are of low visual quality, the visual impacts for views of the project from the baseball complex would be less than significant.

Although new lighting is intended to be somewhat shielded, it would nevertheless be visible in views from the baseball facility. However, because other lighting from

industrial facilities is visible in front of and immediately around the proposed project and the facility is in the middleground distance zone, it would not create a substantial new source of light for views from the baseball facility. Therefore, the visual impacts of this new lighting would be less than significant.

Because the project site is in the middleground distance zone and other industrial structures are in close proximity to the project for this view, the project would not substantially reduce views of open space or obscure an existing view corridor to the water or hills. For this view, the project would not conflict with applicable policies of local plans.

For views of the project from northerly portions of the Antioch Marina, the project would be in the middleground distance zone and viewer sensitivity is high. The view from this location includes high quality views of distant hills in the background and natural vegetation and water in the foreground (Figure Vis-5). This view is of moderately high intactness, unity, vividness, and visual quality. The project would introduce forms and lines, including the tall HRSG stacks and units, the massive cooling tower array, and intermittent steam plumes, that would be easily and regularly seen by recreationists. The vividness, unity, and intactness of the overall view of distant hills would be slightly diminished, but because the project is in the middleground and the overall quality of the view is dominated by the visual elements of the natural landscape in the foreground, the overall intactness, vividness, unity, and quality of the view would not be substantially reduced by the project. Therefore, for the reasons described above, the visual impacts of the view of the project from the Antioch Marina area would be less than significant.

Because the project is located in the City of Pittsburg, the City of Antioch's policy for preserving view corridors to the river, distant hills, and local ridgelines would not be applicable for this view.

The project would introduce new and noticeable sources of nighttime lighting that would be easily and regularly visible to patrons of Humphrey's Restaurant at the marina. Viewer sensitivity is high for these views. Although the project is in the middleground for views from this area, lighting would be introduced to a location where it is currently not a strong element of the view. Other lighting is visible in the general vicinity, but is not readily apparent in the immediate vicinity of the proposed project. For these reasons, the project would create a new source of substantial light that would affect nighttime views and this impact would be significant. This impact would be reduced to a less than significant level by implementation of the mitigation measure described below.

Mitigation Measures

Condition of Certification VIS-3 shall be implemented to reduce this impact to a less than significant level.

IMPACTS TO VIEWS FROM WATERWAYS AND ISLANDS

For southerly views from broad areas of open water and islands in the Delta area north of the project site, the project would be visible in the middleground distance

zone. This area is heavily used by large numbers of recreationists and viewer sensitivity is high for views from this area. Views from this area are dominated by open water, shorelines, and wetlands in the foreground and distant hills and Mt. Diablo in the background. The middleground contains some structures and power poles which are more noticeable when viewed from northwest than northeast of the site. Views from the northeast are of moderately high intactness, vividness, unity, and visual quality and views from the northwest are of moderate intactness, vividness, unity, and quality.

The project would introduce forms and lines, including the tall HRSG stacks and units, the massive cooling tower array, power poles, and intermittent steam plumes, that would be easily and regularly seen by recreationists using the area. A visual simulation from KOP-4 (Figure Vis-13) shows a view of the project from the north. For views from the north and northwest, the vividness, unity, and intactness of the overall views of distant hills would be slightly diminished by the project. In particular, the tall HRSG stacks and the intermittent steam plumes would break the horizon line of the background hills and create vertical elements that would contrast with the dominant horizontal landforms in the foreground and background. However, the overall quality of the views is moderate and dominated by the visual elements of the natural landscape in the foreground and broad expanses of hills in the background. Nearby structures are similar in mass to some structures of the proposed project, although the HRSG stacks are taller and contrast somewhat with their surroundings. Because the project is in the middleground with other somewhat similar structures nearby, the overall intactness, vividness, unity, and quality of views from the north and northwest would not be substantially reduced by the project.

Views from the northeast are dominated by the natural landscape elements of wetlands in the foreground, broad expanses of hills in the background, and Mt. Diablo positioned more directly behind the project. Also, few structures are visible near the project in the middleground. For views from the northeast, the vividness, unity, and intactness of the overall views of distant hills would be somewhat diminished by the tall HRSG stacks and the intermittent steam plumes that would contrast with the dominant horizontal landforms in the foreground and background. However, the intactness, vividness, unity, and overall quality of the views from the northeast would not be substantially reduced to less than moderately high because the project is in the middleground, some similar structures are visible in the vicinity, and the views would still be dominated by broader natural landscape elements in both the foreground and background. Therefore, for the reasons described above, the visual impacts of the view of the project from the waterways and islands would be less than significant.

Nighttime use of the waterways and islands by recreationists is very low and other sources of lighting are visible in the vicinity of the project; therefore the impact of creating a substantial new light source is less than significant.

Because the viewers' positions are outside the jurisdictional boundaries of the cities of Pittsburg and Antioch, these cities' policies regarding preserving view corridors to hills and ridgelines would not be applicable for the views from the water and islands.

Therefore, if viewed from these northeast positions, the project would not conflict with applicable policies.

Mitigation Measures

None required.

IMPACTS TO VIEWS FROM THE COLUMBIA STREET/EAST SANTA FE AVENUE NEIGHBORHOOD

A transmission system transition structure and two tall power transmission poles would be located just east of the intersection of Columbia Street and East Santa Fe Avenue. They would be visible in the foreground of views from public streets and residences by residents of the neighborhood. Viewer sensitivity is high for views from this area. A view of these facilities from KOP 3 is shown in Figure Vis-14. Existing views of this area are dominated by a haphazard mix of industrial structures, power poles and lines, and fences and are of low intactness, unity, vividness, and visual quality. The addition of the transition station metal building and the two tall power poles would be noticeable as additional structures in the foreground of views of this area, but would not contrast strongly with the existing elements or substantially reduce the intactness, unity, vividness, or quality of the views. Therefore, the impact on reducing visual quality is less than significant.

Although the visual quality of the area of the proposed transition station is low and visual impacts for placement of the transition station and power poles near the intersection of Columbia Street and East Santa Fe Avenue are less than significant, these new elements nevertheless would be noticeable for views from portions of the adjacent residential neighborhood with high viewer sensitivity. Because of this, placement of these elements would potentially conflict with applicable local policies of the City of Pittsburg that involve requiring buffer landscaping of utility sites, minimizing impacts of industrial uses on adjacent residential districts, and ensuring that the appearance and effects of industrial uses are compatible with the character of the surrounding area. This potential impact of conflicting with local regulations would be significant.

To help reduce potential visual impacts and effects on the residential neighborhood and reduce conflicts with local policies, the applicant has identified that it will participate in the design process proposed for mitigating impacts of the proposed PDEF project in the same location. The proposed mitigation is a screening wall that would be built and landscaped at this location. The applicant has committed to participating in the design process for this effort to ensure that the design will help screen the transition station's taller elements proposed as part of this project.

The applicant's proposed mitigation, in combination with implementation of the mitigation measure described below (Condition of Certification VIS-4) and additional conditions of certification involving non-reflective colors and fencing, lighting, and site maintenance (VIS-1, VIS-2, VIS-3, VIS-6), would reduce this potential impact to a less than significant level.

In addition, the applicant has identified in its May 14, 1999 submittal of responses to informal requests for information that the transition station may be relocated further

to the east and a taller power pole of 140-150 feet in height may also be added to the project. If these become part of the proposed project, the potential conflicts with local regulations may be reduced to less than significant levels because these elements may not be readily visible from the nearby residential neighborhood. The taller power pole may be more noticeable from some areas, but it is unlikely to be more noticeable from the residential neighborhood because of its distance of over a mile away and the other industrial facilities around it.

As part of the proposed project, power line poles would be placed near a portion of Loveridge Road that is in an existing industrial area and that contains power poles and other structures. Views of this area from Loveridge Road are of low visual quality and viewer sensitivity is low. For this reason, visual impacts of placement of power poles in this area are less than significant.

Mitigation Measures

MM V4. The applicant will ensure that the transition station's taller elements will be partially screened as much as possible by participating in the process for a related project for the design of aesthetic screening in the vicinity of the transition station or otherwise developing and implementing an alternative design that ensures partial visual screening of the transition station's taller elements as much as possible. The taller elements would be partially screened by planting trees as part of the landscape screening that would eventually grow to at least 50 feet in height and placing these trees in locations that would maximize their screening of the transition station's taller elements. The goal of the screening should be to soften the visual impacts of the project and aesthetically enhance this part of the neighborhood.

IMPACTS TO VIEWS FROM HIGHWAY 4

The proposed project would be visible to travelers intermittently from portions of Highway 4 and nearby areas, including small portions of other roads and limited areas in the vicinity. Although the highway carries high volumes of recreationists, which constitute a sensitive viewer group, views of the project from the highway and nearby areas are limited to a few locations with short-duration views and the project would be in the middleground and background distance zones for these views. Although the volume of travelers is high, the short duration of views of the project area in combination with the project's location in the middleground and background distance zones, causes viewer sensitivity to be moderate for views of the project from Highway 4 and nearby areas. The existing intactness, vividness, unity, and quality of these views is low because of other industrial facilities nearby and between the project and the highway and nearby areas. Because other lighting exists in the vicinity, the additional lighting of the project would not be easily seen or noticed for intermittent middleground and background views of the project from the highway and nearby areas. Views of the project from the highway and nearby areas would not conflict with local policies, ordinances, or regulations for visual resources. For these reasons, visual impacts for views from Highway 4 and nearby areas are less than significant and no mitigation is required.

Mitigation Measures

None required.

IMPACTS TO VIEWS FROM RESIDENCES IN SOUTHERN HILLS

The proposed project would be visible from residences in the Los Medanos Hills of Pittsburg and Antioch approximately 2 to 3 miles south of the project. For these views, the project would be located in the middleground distance zone. Viewer sensitivity for views from these residential areas is moderately high. Views include scenic and panoramic vistas of the Delta landscape and distant hills which are generally of moderately high visual quality. Various industrial facilities and structures are visible in the middleground of these views.

The project would introduce forms and lines, including the tall HRSG stacks and units, the massive cooling tower array, power poles, intermittent steam plumes, and lighting that would be easily and regularly seen from residences. For these panoramic views, the vividness, unity, intactness, and visual quality of the overall views of the Delta landscape would be slightly diminished by the introduction of these elements of the project. In particular, the intermittent steam plumes would be highly visible elements. However, the plumes would be visible on an irregular basis in the middleground, other plumes of similar sizes would be seen within several miles of the new plumes, and they would tend to be subordinate to the overall character of the views.

Likewise, the new source of lighting produced by the project would not substantially reduce the quality of views because other existing sources of light would be visible in the vicinity of the project and lighting produced by the project in the middleground would be subordinate within the overall panoramic view.

Because the project is in the middleground with other structures of similar size nearby, the overall intactness, vividness, unity, and quality of views from residences in the southern hills would not be substantially reduced by the project. Also, for views from the southern hills, the project would not conflict with applicable local policies. For these reasons, visual impacts for views from residences in the southern hills are less than significant and no mitigation is required.

Mitigation Measures

None required.

LIGHTING

Although the proposed power plant is in an industrial area, existing lighting levels are generally low in the immediate vicinity of the power plant. The power plant will be located in an existing area of open space and will be visible both in foreground and middleground distance zones from a variety of locations, including several with high viewer sensitivity. Many of the structures are massive and over 50 feet in height. Exterior lighting for safety, security, and operations for the proposed power plant has the potential to considerably increase lighting levels, creating glare, backscatter to the nighttime sky, and illumination of visible plumes. The applicant has not

submitted specific information on the lighting plan or lighting levels for the project. However, the applicant has proposed measures to reduce these visual impacts (see “Applicant’s Proposed Mitigation Measures”) and Energy Commission staff has expanded on these measures in a proposed condition of certification (see below). When viewed from several locations with high viewer sensitivity, the new sources of lighting produced by the power plant in locations where it didn’t previously exist would produce significant visual impacts. These significant impacts are described in the analysis of views above in this section and mitigation measures are identified that reduce these impacts to less than significant levels.

VISIBLE PLUMES

The proposed project would produce visible steam exhaust plumes from cooling towers and HRSG exhaust stacks. The cooling towers contain 14 cells and are about 60 feet high and the three HRSG exhaust stacks are about 144 feet high.

According to the applicant, the cooling tower would emit visible vapor plumes that average 110 meters above the ground with a maximum height of about 650 meters above the ground. Average and maximum widths respectively are 20 meters per cell and 500 meters. Water vapor plumes would be visible about 34 percent of the daylight hours and 85 percent of these would be less than 400 meters in length. According to the applicant, the HRSG exhaust stacks would emit visible vapor plumes that average 270 meters above the ground with a maximum height of about 1,100 meters above the ground and would have average width of about 65 meters and a maximum width of about 370 meters. Water vapor plumes would be visible about 34 percent of the daylight hours and 85 percent of these would be less than 400 meters in length. Water vapor plumes would be visible about 3 percent of the daylight hours and 84 percent of these would be less than 400 meters in length. (CH2MHill 1999, Data Responses 51 and 52)

The applicant states that these visible plumes from the cooling towers would not be as visually prominent as the plumes from the GWF Power Systems power plant near Loveridge Road because that plant is near a major intersection and receives night-time illumination from the plant’s lights and the proposed project is much farther from viewers and lighting would be carefully controlled to minimize night-time illumination. Also, the applicant states that meteorological conditions would reduce the overall visibility of the plumes because the plumes form under the same conditions that create fog and would therefore not be noticeable much of the time (CH2MHill 1999, Data Responses 51 and 52)

Several existing plants in the region produce steam plumes. Plants in the vicinity of the proposed project include the DOW/Calpine plant, the GWF River power plant, the GWF Loveridge Road power plant, and the USS-POSCO steel plant. Energy Commission staff prepared an analysis of the steam plumes to provide an indication of impacts of the plumes projected for the proposed project relative to plumes for other power plants in the area (Loyer 1999). Conclusions of this analysis are that steam plumes for the proposed project would be slightly larger than the plumes for the DOW/Calpine plant and slightly smaller than the plumes for the GWF River power plant and the GWF Loveridge Road power plant.

As described above in the analyses of impacts of views from locations around the area, the steam plumes, when visible, would add new visual elements to views for sensitive viewer groups, including residents and recreationists, in a location where views of plumes do not currently exist. Intactness, unity, and vividness would be reduced slightly for some views. Because other plumes that would be slightly larger in size would also be visible within 2 to 3 miles of the proposed project, the addition of the project's plumes would not substantially reduce the visual quality of views of the project area. The most substantial visual impacts would be for views from waterways and islands and residences in the southern hills. However, because plumes would be visible intermittently and other plumes would be visible nearby, these impacts would be less than significant.

CUMULATIVE IMPACTS

The proposed power plant would increase the amount of industrial land use, structures, power poles and lines, and plumes visible in the existing industrial area of northeast Pittsburg. In combination with the proposed Pittsburg District Energy Facility (PDEF), the visual impacts of the proposed Delta Energy Center plant would be noticeable to viewers in the surrounding communities of Pittsburg and Antioch with views of both project areas; these would primarily be residents in the southern hills with panoramic views that include both facilities. Visual impacts would include a reduction in the amount of visible open space in the local area and reduced intactness due to the addition of large structures and intermittent plumes. Also, the siting of the PDEF approximately 2,000 feet northwest of the transition station near East Santa Fe Avenue and Columbia Street could create substantial cumulative visual impacts for residents of the neighborhood. A sound and visual screen wall and landscaping has been proposed along Santa Fe Avenue to mitigate visual and noise impacts of the PDEF. The transition station proposed for the DEC project would have a cumulative effect on the visual character of this area by adding more elements to the views for residents of this area. Construction of the proposed sound wall and landscaping could help limit the cumulative impacts to acceptable levels. In conclusion, the proposed DEC power plant would increase the visual impacts for viewers in the area, but these increases would not be substantial enough to create significant cumulative visual impacts.

FACILITY CLOSURE

PLANNED CLOSURE

Planned closure occurs at the end of a project's life, 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. The closure plan that the project owner is required to prepare should address removal of the power plant structures and the transmission poles to reduce visual impacts.

UNEXPECTED TEMPORARY CLOSURE

Unexpected 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. No special conditions regarding visual resources are expected to be required to address temporary closure.

UNEXPECTED PERMANENT CLOSURE

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. The contingency plan that the project owner is required to prepare should address removal of the power plant structures and the transmission poles to reduce visual impacts.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

This section assesses the proposed project's compliance with applicable laws, ordinances, regulations, and standards that affect visual resources. Additional laws, ordinances, regulations, and standards that affect the appearance of new facilities are identified in the Land Use section.

LOCAL

Portions of the proposed project are variously located in the City of Pittsburg, City of Antioch, and Contra Costa County and would be subject to the applicable laws, ordinances, regulations, and standards relevant to visual resources for those portions of the project within their jurisdictional boundaries. The power plant would be located in the City of Pittsburg. Linear facilities would be located in the City of Pittsburg, the City of Antioch, and Contra Costa County. Linear facilities in Pittsburg include a short portion of an underground gas pipeline; an underground water line; and most of the power transmission line route, including underground power lines and above-ground power lines, poles, and a transition station. Linear facilities in the City of Antioch consist of most of the underground natural gas pipeline and an above-ground interconnect meter set facility. The western portion of the proposed electric transmission line to the PG&E Pittsburg Power Plant substation would cross unincorporated land under the jurisdiction of Contra Costa County. A short portion of the underground gas line near the Antioch Terminal is in Contra Costa County.

CITY OF PITTSBURG

GENERAL PLAN

As identified previously, several policies relating to visual resources which are relevant to the project are contained in the City of Pittsburg General Plan (Pittsburg 1988). The project's compliance with these policies is described below.

Land Use Element

2.1 Community Image

Guiding Policies

A. Design aesthetically pleasing roadways lined with trees or other appropriate landscaping, that connect Pittsburg neighborhoods and serve planned development.

The applicant has proposed as part of its mitigation measures to work with the City of Pittsburg to develop plans for landscape screening along the north side of the Pittsburg-Antioch Highway to screen views of the plant and near Columbia Street and East Santa Fe Avenue to screen views of the power line transition station and power poles to reduce visual impacts. Implementation of these measures as part of the project would comply with this policy. However, if implemented, landscape screening along the north side of the Pittsburg-Antioch Highway would potentially conflict with other City policies for preserving open space and view corridors. These potential conflicts are described below for the appropriate policies.

C. Develop standards for entry points to the city, including landscape design and a coherent signage design.

This policy has been included in this analysis because the applicant included it in the AFC. Although this policy recognizes the importance of entry points to the City, it refers only to the development of standards for entry points and does not identify any specific standards that should be adhered to. For this reason, it appears that this policy is not relevant to this project and the project would not conflict with this policy.

E. Preserve the feel of a city surrounded by open space, and preserve corridors to the hills and to the waterfront.

The proposed project would reduce the amount of open space surrounding the City. The project would be constructed on a 20-acre site that is currently open space and an adjacent 10-acre area of open space would be used as a construction staging area for 2 years, which is considered a substantial time period. The site is located adjacent to Dowest Slough, a natural freshwater marsh wetland and an area of open space that is similar in size to the project site and staging area. There are few areas of open space remaining within the northeastern area of the City of Pittsburg that are visible from within the City. This area, including the project site, construction laydown area site, and Dowest Slough, appears to be the largest area of contiguous open space remaining in northeastern Pittsburg. Most of the surrounding area is already in industrial development. The project would reduce the amount of remaining visible open space by about half for this contiguous area, thereby substantially reducing the amount of visible open space in the area. In addition, the applicant's proposed mitigation to screen the project with landscape screening along the north side of the Pittsburg-Antioch Highway, if implemented, would further reduce visible open space in this area. Therefore, the proposed project would not

preserve the “feel of a city surrounded by open space” and it would conflict with this policy. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

Implementing Policies

R. Rely on the Architectural Review Process, City Planning Commission, and City Council to ensure that both public and private design meet the high standards of the City of Pittsburg and are consistent with the overall General Plan.

The applicant has stated in the AFC that this project will undergo design review by the City. Providing the project complies with any conditions imposed by the City and with implementation of LAND-1, the proposed project would not conflict with this policy.

S. Make preservation of view corridors to the hills and to the waterfront a consideration in project and design review.

The proposed project would substantially reduce some existing views of the Delta landscape, including views of the water and shoreline areas and distant low hills to the north. These views are along an existing view corridor from the Pittsburg-Antioch Highway and Casa Medanos northward toward the water. With the project, it may still be possible to glimpse the waterfront area from the portion of the highway nearest Dowest Slough; however, the view corridor would be substantially narrowed and views of the waterfront would be reduced by the project. In addition, the applicant’s proposed mitigation of screening views of the project with landscape screening along the north side of the Pittsburg-Antioch Highway, if implemented, would further reduce views to the waterfront in this area. Therefore, unless the power plant facilities can be reconfigured on the project site to maintain views to the water, the proposed project would not preserve existing view corridors to the waterfront and it would conflict with this policy. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

2.8 Industrial Development

Guiding Policies

D. Protect existing and new residential areas from adverse effects of new industry and, wherever feasible, of existing industry.

Existing views would be affected for residential areas that include Casa Medanos, the East Santa Fe Avenue/ Columbia Street neighborhood, and neighborhoods in the southern hills. Based on the analysis in the section “Impacts and Mitigation Measures” in this chapter, the visual quality of views from these areas, with the exception of views from Casa Medanos, would not be substantially reduced. The applicant has identified mitigation measures as part of the proposed project that would help to reduce some of the visual impacts. In addition, mitigation measures have been identified as part of this analysis that would help further protect existing residential areas from adverse visual impacts. Proposed conditions of certification

involving non-reflective colors and fencing, lighting, landscape screening at the transition station, site maintenance, screening during construction, landscape screening of the power plant, and limiting landscaping along the highway (VIS-1, VIS-2, VIS-3, VIS-4, VIS-7, VIS-8, VIS-9, and VIS-10) would ensure the project's partial compliance with this policy; however, adverse visual impacts for views from Casa Medanos would remain significant because of reduced views of open space and blocked views of the water by the power plant. For this reason, the proposed project would not be in compliance with this policy, unless it could be reconfigured to maintain views to the water.

Implementing Policies

J. Adopt setback, landscaping, and screening requirements for industrial development to protect adjacent non-industrial uses.

The applicant has identified mitigation measures for screening and landscaping as part of the proposed project that would help to reduce some of the visual impacts of the proposed project. Landscape screening would be used along the north side of the Pittsburg-Antioch Highway to partially screen views of the project from the highway and Casa Medanos and at the transition station at East Santa Fe Avenue and Columbia Street to help screen views of the transition station and power poles. However, landscape screening along the north side of the Pittsburg-Antioch Highway, if implemented, would potentially conflict with other City policies for preserving open space and view corridors. These potential conflicts are described for the appropriate policies elsewhere in this section. With implementation of proposed conditions of certification discussed under Policy D above (VIS-4, VIS-8, VIS-9, and VIS-10) , the project would comply with this policy.

4. Parks and Recreation Element

4.2 Park and Recreation Facilities, Planning and Management

Implementing Policies

N. Maintain view corridors for views of the river.

The City of Pittsburg has determined that this policy applies throughout the City and is therefore applicable to this analysis (R. Jerome pers. comm.). The City has also determined that the Dowest Slough area should be maintained as open space and the view corridor through this area to the water from the vicinity of the Pittsburg-Antioch Highway should be maintained (R. Jerome, pers. comm.). The proposed project would substantially reduce some existing views of the Delta landscape, including views of the river, shoreline areas and distant low hills to the north. These views are along an existing view corridor from the Pittsburg-Antioch Highway and Casa Medanos northward toward the river. With the project, it may still be possible to glimpse the river from the portion of the highway nearest Dowest Slough; however, if the power plant is built in the proposed configuration, the view corridor would be substantially narrowed and views of the river would be reduced by the

project. In addition, the applicant's proposed mitigation of screening views of the project with landscape screening along the north side of the Pittsburg-Antioch Highway, if implemented, would further reduce views of the river for this area. Therefore, the proposed project would not maintain view corridors for views of the river and it would conflict with this policy. Implementation of proposed condition of certification VIS-10 would preclude blockage of views by landscaping along the highway. However, the power plant itself, unless reconfigured, would still block views of the river and not comply with this policy. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

5. Public Facilities, Institutions, and Utilities Element

5.3 Utilities and Public Services

Guiding Policies

C. Require buffer landscaping and multiple use, where feasible, of utility sites and rights-of-way to harmonize with adjoining uses.

The applicant has identified mitigation measures for buffer landscaping as part of the proposed project that would help to reduce some of the visual impacts of the proposed project. Buffer landscaping would be placed along the north side of the Pittsburg-Antioch Highway to partially screen views of the project from the highway and Casa Medanos and at the transition station at East Santa Fe Avenue and Columbia Street to help screen views of the transition station and power poles. However, if implemented, landscape screening along the north side of the Pittsburg-Antioch Highway would potentially conflict with other City policies for preserving open space and view corridors. These potential conflicts are described for the appropriate policies elsewhere in this section. With implementation of proposed conditions of certification discussed under Policy D above (VIS-4, VIS-9, and VIS-10), the project would comply with this policy.

Zoning Ordinance

The project site is designated in the City of Pittsburg's zoning ordinance as General Industrial District (IG). The project has been analyzed for its compatibility with the following regulations contained in the City zoning ordinance that apply to protecting and maintaining visual resources.

Section 18.54.015: This section requires that a minimum of 5 percent of a site in the IG District be landscaped.

Compliance with this regulation regarding requirements for landscaping 5 percent of the site would be satisfied in part by VIS-9 requiring landscape screening along the south and west edges of the power plant site. Additional areas required to meet the 5 percent landscaping requirement would be satisfied by proposed condition of certification LAND-3 in Energy Commission staff's testimony regarding Land Use.

Section 18.54.105: Required front and street side yards must be landscaped, except for access driveways, or be enclosed by a solid fence or wall at least 6 feet in height.

Compliance with this regulation regarding landscaping or fencing would be ensured by proposed condition LAND-2 in Energy Commission staff's testimony regarding Land Use.

Section 18.80.035: This section requires that a refuse storage area located within a building or screened on three sides by a 6-foot high concrete or masonry wall and including a gate constructed to city design standards must be provided before occupancy for uses other than a single-family or duplex dwelling. The city planner may waive this screening requirement in the IG district for refuse collection and storage equipment, including a dumpster and waste storage container that is not visible from a public street.

Compliance with the requirements of Section 18.80.035 regarding screening of refuse storage areas would be ensured by proposed condition VIS-5 (see the Proposed Conditions of Certification).

Section 18.80.045: This section requires that signs erected on a site in any land use district comply with the Sign Regulations (Title 19).

Compliance with this regulation regarding signs would be ensured by proposed condition LAND-2 in Energy Commission staff's testimony regarding Land Use.

Section 18.82.045: This section requires that each exterior of a building or other structure must be kept in a good state of repair and the exterior finish must be clean and well maintained; and the entire site including paved, unpaved, and landscaped areas must be kept in a neat and orderly manner, free of weeds, loose trash, debris and other litter.

Compliance with the requirements of Section 18.82.045 regarding site maintenance would be ensured by proposed condition VIS-6 (see the Proposed Conditions of Certification).

CITY OF ANTIOCH

GENERAL PLAN

Policy 1 states: "View corridors to the San Joaquin River, to distant hills and to local ridge lines should be preserved by prohibiting the siting of structures or landscaping that would block views from adjacent properties..."

The proposed project would not impact view corridors because elements of the project located in Antioch are underground utility corridors and one gas line meter set that is located in an existing industrial area and visible to the public only from a small portion of Wilbur Avenue. The proposed project would comply with this policy.

Community Design Policy 2 states: “Views along utility easements should be retained and enhanced through the use of planting materials to frame and focus views and to provide a sense of orientation.”

Portions of the underground natural gas pipeline would be visible in some areas between the Antioch Marina and the Antioch Terminal and the ground surface would be disturbed during construction. The applicant has stated in the AFC that following construction, the surface of the right-of-way would be restored by removing construction debris, grading to the original grade and contour, and revegetating it. Implementing these measures would ensure that the project is in compliance with this policy. Proposed condition of certification VIS-7 requiring restoration of underground utility corridors disturbed during construction or operation of the pipeline would ensure the project’s compliance with this policy.

Policy 4 states: “Edges, the visual boundaries between neighborhoods and adjacent communities, should be maintained to provide relief from urban sprawl and to reinforce neighborhood identity”. The “western edge between Pittsburg and Antioch” is identified as one of the important edges to be enhanced.

The proposed project would not impact neighborhood or community visual edges because elements of the project located in Antioch are underground utility corridors and one gas line meter set that is located in an existing industrial area visible to the public only from a small portion of Wilbur Avenue. The proposed project would comply with this policy.

CONTRA COSTA COUNTY

Portions of utility corridors for the proposed project are located in Contra Costa County. These include the western portion of the underground power transmission line near its terminus at the PG&E Switchyard and the eastern portion of underground gas line near its terminus at the Antioch Terminal.

GENERAL PLAN

Land Use Element

Policies

3-19 - Buffers shall be provided between new industrial developments and residential areas by establishing setbacks, and park-like landscaping or other appropriate mechanisms.

Portions of the utility lines that are in the county are not adjacent to residential areas. Therefore this policy is not applicable to the project as currently proposed.

Implementation Measures

3-z - Initiate and enforce, if necessary, specific development standards for both proposed and existing businesses to achieve appropriate landscaping design and sign structures.

Portions of the utility lines that are in the county are in existing industrial areas, would not have landscaping or signs, and would not be easily seen or noticed by potential viewers. For this reason, the proposed project would comply with this policy.

Open Space Element

Scenic Resource Policies

9.17 – New power lines shall be located parallel to existing lines in order to minimize their visual impact.

The applicant has identified that the portion of the new power line that will be in the county will be underground and therefore not visible. Because it is underground and located in an existing industrial area, the proposed project would comply with this policy.

9.24 – The appearance of the County shall be improved by eliminating negative features such as non-conforming signs and overhead utility lines, and by encouraging aesthetically designed facilities with adequate setbacks and landscaping.

The project would be in compliance with this policy because the portion of the utility lines in the county are underground and not visible.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project as proposed has the potential to cause significant adverse visual impacts due to the visual effects of reducing and obstructing views of open space and view corridors to the water resulting from construction of the power plant and use of the construction laydown area, reduced visual quality of views from nearby residences, visual effects of the transition station and power poles viewed from a local residential area, and visual effects of new sources of light. Effective implementation of the applicant's proposed mitigation measures, as modified and expanded by staff's recommendations, is expected to reduce visual impacts to less than significant levels, except for impacts due to substantially reducing views of open space and the water and Delta landscape. With the proposed mitigation, the project, except for visual impacts affecting preservation of open space and view corridors, is expected to be in compliance with applicable laws, ordinances, regulations, and standards regarding visual resources. If power plant facilities can be reconfigured to maintain views of open space and the water, the project may become compliant with applicable laws, ordinances, regulations, and standards. Staff is continuing to address this issue with local government staff and the applicant to determine possible options.

RECOMMENDATIONS

The Energy Commission should adopt the following conditions of certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 Prior to the start of commercial operation, the project owner shall treat the project structures, buildings, and tanks visible to the public in a non-reflective color to blend with the surroundings. The project owner shall treat the exhaust stacks with a heat-resistant color that minimizes contrast and harmonizes with the surrounding environment.

Protocol: The project owner shall submit a treatment plan for the project to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

- specification, and 11" x 17" color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;
- a detailed schedule for completion of the treatment; and,
- a procedure to ensure proper treatment maintenance for the life of the project.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall submit to the CPM a revised plan.

After approval of the plan by the CPM, the project owner shall implement the plan according to the schedule and shall ensure that the treatment is properly maintained for the life of the project.

For any structures that are treated during manufacture, the project owner shall not specify the treatment of such structures to the vendors until the project owner receives notification of approval of the treatment plan by the CPM.

The project owner shall not perform the final treatment on any structures until the project owner receives notification of approval of the treatment plan from the CPM.

The project owner shall notify the CPM within one week after all precolored structures have been erected and all structures to be treated in the field have been treated and the structures are ready for inspection.

Verification: Not later than 30 days prior to ordering the first structures that are color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Not less than thirty days prior to the start of commercial operation, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

VIS-2 Any fencing for the project shall be non-reflective.

Protocol: At least 30 days prior to ordering the fencing the project owner shall submit to the CPM for review and approval the specifications for the fencing documenting that such fencing will be non-reflective.

If the CPM notifies the project owner that revisions of the specifications are needed before the CPM will approve the submittal, the project owner shall submit to the CPM revised specifications.

The project owner shall not order the fencing until the project owner receives approval of the fencing submittal from the CPM.

The project owner shall notify the CPM within one week after the fencing has been installed and is ready for inspection.

Verification: At least 30 days prior to ordering the non-reflective fencing, the project owner shall submit the specifications to the CPM for review and approval. If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the fencing that the fencing is ready for inspection.

VIS-3 Prior to the start of commercial operation, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized. To meet these requirements:

Protocol: The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;
- A lighting complaint resolution form (following the general format of that in attachment 1) will be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Lighting shall not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

Verification: At least 90 days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval. The CPM will notify the project owner of approval or disapproval within 15 days of receipt of the lighting plan.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting is ready for inspection.

VIS-4 Immediately following completion of construction of the transition station and power poles near the intersection of East Santa Fe Avenue and Columbia Street, and, if applicable, following construction of a proposed sound wall as part of another proposed project, the project owner shall implement the installation of landscape screening that will screen views of the transition station and partially screen views of the power poles from nearby portions of streets and residences. The objective of the landscape plan shall be to minimize visual impacts and to maximize the potential for community benefit.

Protocol: The project owner shall submit to the CPM for review and approval a specific plan describing its landscape plan, providing evidence that the Power Plant Action Committee and the City of Pittsburg have been

consulted regarding the plan, and attaching any recommendations from the Power Plant Action Committee and the City of Pittsburg. The plan shall include, but not be limited to:

- a detailed landscape plan, at a reasonable scale, which includes a list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives.
- maintenance procedures, including any needed irrigation; and
- a procedure for replacing unsuccessful plantings.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

The landscaping and any other plan features shall not be installed before the plan is approved. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg when the plan has been implemented and is ready for inspection.

Verification: At least 90 days prior to the completion of construction of the transition station and power poles, the project owner shall submit the proposed landscape plan to the CPM for review and approval. The project owner shall also submit the proposed landscape plan to the Power Plant Action Committee and to the City of Pittsburg for review and comment. The project owner shall submit any required revisions within 30 days of notification by the CPM. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg within seven days after implementing the proposed plan that the landscape installation is ready for inspection.

VIS-5 The project owner shall comply with the requirements of Section 18.80.035 of the City of Pittsburg Zoning Ordinance regarding screening of refuse storage areas.

Protocol: The project owner shall submit a plan for screening refuse storage areas that conforms to the requirements of Section 18.80.035 of the zoning ordinance to the CPM for review and approval and to the City of Pittsburg for review and comment.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

The project owner shall notify the CPM within one week after the screening has been installed and is ready for inspection.

Verification: At least 30 days prior to installing the screening, the project owner shall submit the plan to the CPM for review and approval and to the City of Pittsburg for review and approval. If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the screening that the screening is ready for inspection.

VIS-6 The project owner shall comply with the requirements of Section 18.82.045 of the City of Pittsburg Zoning Ordinance regarding site maintenance.

Verification: In each Annual Compliance Report the project owner shall submit a statement that the requirements of Section 18.82.045 of the City of Pittsburg Zoning Ordinance have been met.

VIS-7 The project owner shall restore any and all areas that are disturbed during the construction or operation of any portions of the proposed underground utilities.

Protocol: The project owner shall submit a plan for restoring the surface conditions of any rights-of-way disturbed during construction of underground utilities. The plan shall include grading to the original grade and contour and revegetation of the rights-of-way. For rights-of-way located in the City of Antioch, the submittal shall include evidence from the City of Antioch that the plan conforms to the requirements of Community Design Policy 2 in the City of Antioch General Plan. For rights-of-way located in the City of Pittsburg or elsewhere, the submittal shall include similar detail and information for restoration of surface conditions.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

The project owner shall notify the CPM within one week after the grading and revegetation has been installed and is ready for inspection.

Verification: At least 30 days prior to beginning implementation of the surface restoration, the project owner shall submit the plan to the CPM for review and approval and to the cities of Pittsburg and Antioch for review and comment.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing the surface restoration that it is ready for inspection.

VIS-8 Immediately before beginning use of the 10-acre construction laydown area for power plant, the project owner shall implement the installation of temporary aesthetic screening along the south and west portions of the perimeter of the construction laydown area. The aesthetic screening shall remain in place for the duration of the use of the area. Screening shall be high enough to obscure views of most of the lighting, as well as equipment, vehicles, and materials in the area, from the highway and apartments to the south. Immediately upon completion of construction of the project, the aesthetic screening shall be removed and the construction laydown area shall be revegetated using primarily plants that are native to the local region. The goal of the revegetation shall be to maintain the open space character of the site and area.

Protocol: The project owner shall submit to the CPM for review and approval a specific plan describing its temporary aesthetic screening plan, providing evidence that the City of Pittsburg has been consulted regarding the plan, and attaching any recommendations from the Power Plant Action Committee and the City of Pittsburg. The plan shall include, but not be limited to:

- a detailed plan, at a reasonable scale, which identifies the type, character, colors, and other detailed information for the proposed temporary screening.
- elevations of the views of the temporary aesthetic screening showing how the objectives of the screening will be accomplished.
- any maintenance procedures; and
- a procedure and plan for removing the temporary aesthetic screening and revegetating the open space area, including a detailed revegetation plan, at a reasonable scale, which includes a list of proposed plant species and sizes; a discussion of the suitability of the plants for the site conditions and mitigation objectives; and procedures for irrigation, maintenance, and replacement planting.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

The temporary aesthetic screening and revegetation plans and any other plan features shall not be installed before the plans are approved. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg when the plans have been implemented and are ready for inspection.

Verification: At least 90 days prior to the start of use of the construction laydown area for the power plant, the project owner shall submit the proposed temporary aesthetic screening plan to the CPM for review and approval. The project owner shall also submit the proposed aesthetic screening plan to the Power Plant Action Committee and to the City of Pittsburg for review and comment. The project owner shall submit any required revisions within 30 days of notification by the CPM. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg within seven days after implementing the proposed plan that the temporary aesthetic screening installation is ready for inspection. The owner shall follow a similar schedule and procedures for submittal and inspection of the revegetation plan starting with submittal of the plan at least 90 days before intended removal of the temporary aesthetic screening.

VIS-9 Immediately following completion of construction of the power plant, the project owner shall implement the installation of aesthetic screening along the south and west edges of the power plant site that will partially screen views of the lower portion of the facility from the Pittsburg-Antioch Highway and nearby residences. Screening may consist of a combination of plants, aesthetic berms, and walls or fencing. Vegetation selected for landscape screening shall consist primarily of plants that are native to the local region. Screening vegetation shall consist of trees and shrubs in groupings designed to form a varied visual edge. Planting of screening vegetation shall be initiated as soon as possible during facility construction and shall achieve a minimum of 50 percent screening of the lower 40 feet of the facility within 10 years of the startup of operation of the facility. The goal of the screening should be to maintain the open space character of the remaining area, reduce impacts of new sources of lighting, and partially screen the lower portion of the power plant to help blend it with its surroundings and soften the visual impacts of the project.

Protocol: The project owner shall submit to the CPM for review and approval a specific plan describing its aesthetic screening plan, providing evidence that the City of Pittsburg has been consulted regarding the plan, and attaching any recommendations from the Power Plant Action Committee and the City of Pittsburg. The plan shall include, but not be limited to:

- a detailed landscape and grading plan, at a reasonable scale, which includes a list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives.

- Elevations of the views of the aesthetic screening projected for 5 years and 10 years from the time of startup of operation of the facility that show how the planting will achieve the required screening objective of 50 percent screening of the lower 40 feet of the facility within 10 years of the startup of the facility.
- maintenance procedures, including any needed irrigation; and
- a procedure for replacing unsuccessful plantings.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

The landscaping and any other plan features shall not be installed before the plan is approved. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg when the plan has been implemented and is ready for inspection.

Verification: At least 90 days prior to the completion of construction of the power plant, the project owner shall submit the proposed aesthetic screening plan to the CPM for review and approval. The project owner shall also submit the proposed aesthetic screening plan to the Power Plant Action Committee and to the City of Pittsburg for review and comment. The project owner shall submit any required revisions within 30 days of notification by the CPM. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg within seven days after implementing the proposed plan that the aesthetic screening installation is ready for inspection.

VIS-10 Immediately following the beginning of construction of the power plant, the project owner shall implement the installation of aesthetic landscape screening along the north side of the Pittsburg-Antioch Highway. The landscape screening shall be placed in a manner that maximizes views of remaining open space and view corridors to the water from the western portion of the Pittsburg-Antioch Highway and the Casa Medanos apartments. No large vegetation that would screen views of open space or view corridors to the water shall be placed in the vicinity of Dowest Slough or the Casa Medanos apartment complex in the western portion of the area along the north side of the highway. Larger screening vegetation may be placed along the eastern portion of the highway east of the Casa Medanos apartments where it would not block views of the water and open space from the highway or apartments. Vegetation selected for landscape screening shall consist primarily of plants that are native to the local region.

Protocol: The project owner shall submit to the CPM for review and approval a specific plan describing its aesthetic landscape screening plan for the north side of the Pittsburg-Antioch Highway, providing evidence that the Power Plant Action Committee and the City of Pittsburg have been consulted regarding the plan, and attaching any recommendations from the

Power Plant Action Committee and the City of Pittsburg. The plan shall include, but not be limited to:

- a detailed landscape and grading plan, at a reasonable scale, which includes a list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives.
- Elevations of the views of the aesthetic landscape screening projected for 5 years and 10 years from the time of startup of operation of the facility that show how the planting will appear.
- maintenance procedures, including any needed irrigation; and
- a procedure for replacing unsuccessful plantings.

If the CPM notifies the project owner that revisions to the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

The landscaping screening and any other plan features shall not be installed before the plan is approved. The project owner shall notify the CPM, the Power Plant Action Committee, and the City of Pittsburg when the plan has been implemented and is ready for inspection.

Verification: At least 90 days prior to the start of construction of the power plant, the project owner shall submit the proposed aesthetic landscape screening plan to the CPM for review and approval. The project owner shall also submit the proposed aesthetic landscape screening plan to the City of Pittsburg for review and comment. The project owner shall submit any required revisions within 30 days of notification by the CPM. The project owner shall notify the CPM and the City of Pittsburg within seven days after implementing the proposed plan that the aesthetic landscape screening installation is ready for inspection.

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CULTURAL RESOURCES

Gary D. Walker

INTRODUCTION

This analysis discusses cultural resources that are defined as the evidence of the history of human development and life on earth. Evidence of California's early occupation is becoming increasingly vulnerable to the ongoing development and urbanization of the state.

Cultural resource materials may be found nearly anywhere in California: along the ocean coastline and on coastal islands; along rivers and streams; in coastal and inland valleys and lowlands; throughout the coastal and inland mountain ranges; and throughout the interior deserts. Cultural resources may be found on the ground or may be found at varying depths beneath the surface. In some areas of the state, a sequence of settlements on the same site may cover multiple layers of cultural resources. In other areas, the distribution of cultural materials may be much more dispersed

Cultural resources are significant to our understanding of our culture, our history and heritage. Critical to the analysis of cultural resources are the spatial relationships between an undisturbed cultural resource site and the surface environmental resources and features, and the analysis of the locational context of the resource materials within the site and beneath the surface. These relationships provide information that can be used to piece together the sequence of human occupation and use of an area, and they begin to create a picture of the former inhabitants and their environment.

Staff's primary concerns in its cultural resource analysis are to ensure that all potential impacts are identified and that significant adverse impacts are avoided or reduced to a level of insignificance. The determination of potential impacts to cultural resources from the proposed Delta Energy Center (DEC) is required by the Siting Regulations of the California Energy Commission (Energy Commission) and by the California Environmental Quality Act (CEQA). Three aspects of cultural resources are addressed in Staff's analysis: prehistoric archaeological resources, historic archaeological resources, and ethnographic resources

PREHISTORIC RESOURCES

Prehistoric archaeological resources are those resources that resulted from prehistoric human occupation and use of an area. Such resources include sites and deposits, structures, artifacts, rock art, and trails. In California the prehistoric period began over 11,500 years ago and extended into the 18th century when the Euro-Americans first explored and settled the region.

HISTORIC RESOURCES

Historic archaeological resources are those resources that resulted from human activity after the beginning of a written historical record. In California the historic

period began in the 18th Century when Euro-Americans first explored and settled the region. Historic archaeological resources include archaeological deposits, sites, structures, traveled ways, artifacts, and documents. Under state requirements cultural resources must be greater than 100 years old, while under federal requirements such resources must be greater than 50 years old.

ETHNOGRAPHIC RESOURCES

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, § 431-433) and subsequent related legislation, policies, and enacting responsibilities. The following laws, ordinances, regulations, standards, and policies apply to the protection of cultural and ethnographic resources in California. Projects licensed by the Energy Commission are reviewed for compliance with these laws.

FEDERAL

Federal Guidelines for Historic Preservation Projects: The US Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The Secretary's standards and guidelines are used by federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. The State Historic Preservation Office, refers to these standards in its requirements for mitigation of impacts to cultural resources on public lands in California.

Section 106 of the federal guidelines sets forth procedures to be followed for determining eligibility for nomination, the nomination, and the listing of cultural resources in the National Register of Historic Places. The eligibility criteria and the process are used by federal, state and local agencies in evaluating the significance of cultural resources. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the State Register of Historic Resources.

Executive Order 11593, "Protection of the Cultural Environment," May 13, 1971, (36 Federal Register, 8921) orders the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.

American Indian Religious Freedom Act; Title 42 United States Code, Section 1996 protects Native American religious practices, ethnic heritage sites, and land uses. Native American Graves Protection and Repatriation Act (1990); Title 25, United States Code Section 3001, *et seq.* defines “cultural items”, “sacred objects”, and “objects of cultural patrimony”; establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for return of specified cultural items.

STATE

Public Resources Code, Section 5020.1 defines several terms, including the following:

(j) “Historical resource” includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

(k) “Substantial adverse change” means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired.

Public Resources Code, Section 5024.1 establishes a California Register of Historic Places; sets forth criteria to determine significance; defines eligible properties; and lists nomination procedures.

Public Resources Code, Section 5097.5 states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority or public corporation, or any agency thereof.

Public Resources Code, Section 5097.98 defines procedures for notification of discovery of Native American artifacts or remains and for the disposition of such materials. This section also prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions.

California Environmental Quality Act (CEQA) requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.

Public Resources Code Section 21083.2 states that the lead agency determines whether a project may have a significant effect on “unique” archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, mitigation measures shall be required as prescribed in this section. The section discusses

excavation as mitigation; limits the applicant's cost of mitigation; sets time frames for excavation; defines "unique and non-unique archaeological resources"; and provides for mitigation of unexpected resources.

Public Resources Code Section 21084.1 -- indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource; the section further defines a "historic resource" and describes what constitutes a "significant" historic resource.

CEQA Guidelines, Title 14, California Code of Regulations, section 15126.4(b) 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 discusses 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, section 15064.5 defines the term "historical resources," explains when a project may have a significant effect on historic resources, describes CEQA's applicability to archaeological sites, and specifies the relationship between "historic resources" and "unique archaeological resources".

Penal Code, Section 622 1/2 -- Anyone who willfully damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.

CEQA Guidelines, Appendix G, section V lists questions that are relevant to evaluating a project's impacts on archaeological, historic, and paleontological resources.

California Health and Safety Code Section 7050.5. If human remains are discovered during construction, the project owner is required to contact the county coroner.

LOCAL

Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

CONTRA COSTA COUNTY

One of the goals in the Contra Costa County General Plan (Contra Costa County 1996) is "to identify and preserve important archaeological and historic resources within the county." The policies related to this goal and set forth in the plan are as follows:

1. Areas which have identifiable and important archaeological or historic significance shall be preserved for such uses, preferably in public ownership.

2. Buildings or structures that have visual merit and historic values shall be protected.
3. Development surrounding areas of historic significance shall have compatible and high quality design in order to protect and enhance the historic quality of the area (Contra Costa 1996).

CITY OF PITTSBURG

Verification: The General Plan for the City of Pittsburg (Pittsburg 1998) sets forth goals related to cultural resources. The relevant sections are as follows:

- A. To encourage the preservation, protection, enhancement and use of structures that represent past eras, events and persons important in history, or which provide significant examples of architectural styles of the past, or are landmarks in the history of architecture, or which are unique and irreplaceable assets to the city and its neighborhoods, or which provide for this and future generations, examples of the physical surroundings in which past generations lived.
- B. To encourage the preservation of varied architectural styles which reflect the cultural, social, economic, political, and architectural phases of the city's history.
- C. To provide for the educational and cultural enrichment of this and future generations by fostering knowledge of our heritage.

CITY OF ANTIOCH

Staff for the City of Antioch indicated that Antioch does not have written ordinances or guidelines concerning the protection of cultural resources. City planning staff indicated they typically rely on environmental documentation provided by project developers (Bendorff 1999a). However, the City has recently requested that a number of conditions be added to the PSA regarding the natural gas pipeline to be constructed as part of the project (Bendorff 1999b). One of those conditions states

“Portions of the project may disturb archaeological remains, particularly in the City's riverfront area. Should remains be uncovered, work shall be halted and proper protocol followed regarding these remains.”

SETTING

REGIONAL DESCRIPTION

NATURAL ENVIRONMENT

The project is located at the northern end of the Diablo Range of the northern Coast Ranges Physiographic Province of California. The Coast Ranges are characterized by a northwesterly trending series of mountains and valleys. The Diablo Range is

dominated by Mt Diablo, which rises 3,849 feet above the surrounding rivers, valleys, and coastal range. The project site is located on relatively flat land, just above sea level, that lies on the southern edge of the delta system below the confluence of the Sacramento and San Joaquin rivers. Refer to the **PROJECT DESCRIPTION** section of this Staff Assessment for a regional map of the project development area.

While this part of California has been subjected to a series of climatic fluctuations over the past several thousand years, studies have indicated that the flora and fauna have not changed as dramatically in the project area, as they have in other parts of California. There are three principal plant communities near the project area: Valley Grasslands, Oak Woodland and Chaparral. A fourth vegetation community, Brackish and Freshwater Marsh, exists in lands adjacent to the project area. The Sacramento / San Joaquin Delta was once dominated by this marshy environment, but has now been much reduced to discontinuous patches of marshland as a result of extensive development during this past century (PDEF 1998a; 1998bb; 1998cc).

PREHISTORIC SETTING

Evidence from archaeological sites located in the vicinity indicates that human occupation began at least 5,000 years ago (DEC 1998a, p.8.3-5). Most of the evidence of these early occupation sites has been inundated by rising sea levels, covered by alluvial deposits during seasonal flooding of the rivers, and buried by the deposition of extensive sediments during the up-river hydraulic mining efforts in the late 1800s (PDEF 1998a; 1998bb; 1998cc).

Prehistoric village sites were located near permanent fresh water sources, often at the mouths of streams along the bay shore. Several villages were established inland along permanent streams at the base of hills. Special-use sites and seasonal-use sites are often found in association with rock outcrops or abundant food resources. Most of the archaeological sites in the project area are small to large shell middens, some of which may contain human remains. These shell middens tend to be located on alluvial flats and along historic bay margins, as well as near water sources. The City of Pittsburg has designated its entire Planning Area, extending from the shoreline to about Highway 4, as a Sensitive Area for Native American Cultural Resources (DEC 1998a, p.8.3-4).

ETHNOGRAPHIC BACKGROUND

The project area falls within the recorded territory of the Bay Miwok, who lived in the area extending from the Suisun Bay to just south of Mount Diablo and eastward to the Sacramento / San Joaquin Delta. The Bay Miwok exploited a wide range of plants and animal resources. They used an extensive inventory of stone tools, baskets, and wood and bone implements. They also traded with surrounding groups for obsidian, shell, beads, and other ornaments (PDEF 1998a; 1998bb; 1998cc; DEC 1998a, p.8.3-8).

At the time of Spanish contact in the late 1700s, the Bay Miwok were divided into tribelets consisting of several hundred individuals. Each tribelet controlled and

exploited the resources within a recognized territory. The tribelet associated with the immediate project area was known as the Chupcan (PDEF 1998a; 1998bb; 1998cc). Each tribelet had one or more permanent villages and its territory included a number of smaller campsites that were used during the annual seasonal cycle of resource exploitation (DEC 1998a, p.8.3-8).

CONTACT AND EARLY SETTLEMENT

SPANISH PERIOD

Euro-American contact with the native Bay Miwok people first occurred during a series of Spanish expeditions into the area between 1769 and 1776. Anza and Font visited the Chupcan when they passed through this region. Mission Dolores was established in 1776, and by 1811 most of the Indians in the region had been baptized and taken to the mission. By 1817 the Chupcan had been removed from the area.

MEXICAN PERIOD

By 1822 the Mexican government replaced Spanish colonial rule. During the Mexican Period the missions were secularized and the lands fell out of mission control. To protect its holdings the Mexican government granted large tracts of land to private individuals and by 1845 most of the land holdings were in the form of large ranchos. Rancho Los Medanos, named after the sand hills common in the area, stretched from the San Joaquin River south toward Mt. Diablo (an area now the site of the modern cities of Pittsburg and Antioch).

AMERICAN PERIOD

In 1848 Mexico relinquished California to the United States under the Treaty of Guadalupe Hidalgo. In 1849 the discovery of gold brought an influx of people seeking gold or jobs producing goods or services for gold miners. Land in the region was used to excess as livestock grazed some native grasses to extinction, woodlands were cut for lumber, and railroads, mines, and agriculture developed on nearly all arable land (PDEF 1998b).

SITE AND VICINITY DESCRIPTION

The proposed project is located in northern Contra Costa County where, in the 1850's, New York Landing (now the City of Pittsburg) and Antioch were founded. The early economy of the vicinity was based on farming, herding, trading, and coal mining. In 1859 coal was discovered at the base of Mt. Diablo and coal mining had a brief, but important role in the development of Contra Costa County. In the 1860's, railroads were built to transport coal to both the Pittsburg Landing and the New York Landing near Port Chicago. Coal mining ended in 1907. The present nearby steel and chemical industries (now USS-POSCO and Dow Chemical Company, respectively) began in the early 20th century.

RESOURCES INVENTORY

As part of the preparation of the AFC, consultants to the applicant conducted archival research, a pedestrian survey, architectural reconnaissance, and Native American consultation.

ARCHIVAL RESEARCH

The applicant's consultant conducted a records search at the Northeast Center of the California Historical Resources Information System (CHRIS). These searches are conducted to establish the extent of previous cultural resource surveys and the location of known resources within the project area. These background searches provide a basis from which to predict the archaeological potential of the project area and are also used to provide a context for the evaluation of the significance of known or previously unknown resources that may be affected by the project.

For the DEC, the record search included the Area of Potential Effect (APE) for project construction and operation and areas within one mile of the APE. The search determined that most of the APE had not been surveyed previously for cultural resources. However, 32 studies have been conducted within the APE and/or within a one-mile radius of the project area. Most of the surveys resulted in no findings. The studies found 12 cultural resources in the vicinity of the portions of the APE that relate to proposed project elements (five are near alternative transmission line routes). None of the resources are within the APE. The resources include three prehistoric resources in the vicinity of the proposed natural gas pipeline route, and one prehistoric resource and eight historic sites in the vicinity of the proposed electric transmission line route. Several of the historic sites, including the New York Landing Historic District in Pittsburg, are close to the proposed electric transmission line and indicate a high potential for buried historic resources along that section of the route (see **CULTURAL RESOURCES Figure 1**).

More specific information on a number of sites was filed with the Energy Commission under separate cover to maintain confidentiality of sensitive resource locations (DEC 1998c).

ARCHAEOLOGICAL FIELD SURVEYS

The consultants to the applicant conducted a pedestrian field survey of the proposed power plant site (and laydown area), the proposed natural gas pipeline route, and the proposed 230 kV electrical line route using 10-meter intervals between survey transects. The AFC states that the other routes associated with the project – the cooling water makeup and wastewater discharge lines, the water supply line, the electric transmission line to Dow, and the steam line to Dow -

CULTURAL RESOURCES Figure 1 - NOT AVAILABLE IN PDF VERSION

Historic District and Resources

traverse the DEC power plant site land or traverse already developed land such as Arcy Lane, railroad tracks, or already developed industrial sites such as the DDSW Wastewater Treatment Plant and the Dow Chemical plant, so they are not discussed or analyzed (DEC 1998a, p.8.3-4). A 150-foot-wide survey corridor (75 feet each side of the center line) was employed for the proposed natural gas line route and 230 kV electric transmission line route, where feasible. The linear facilities would be constructed in already developed industrial/commercial areas, therefore a full survey width was not always possible because of the presence of industrial/commercial back yards, drainage ditches, landscaped areas, wetland preserves, or ballasted railroad tracks which, in some instances, constrained the corridor to a narrower width (DEC 1998a, p.8.13-19).

Power Plant Site and Construction Laydown Area

Ground visibility at the proposed power plant site and construction laydown area (see **PROJECT DESCRIPTION Figure 2**) was generally very good as a result of recent disking and vegetation removal by the local fire department. Therefore, excavation using shovel probes to check for the presence of artifacts or anthropogenic soils was not necessary. No archaeological remains were detected during the surface survey.

The plant site has never been developed, but large areas near the northern portion have been quarried recently for fill material. The site contains dug depressions, a vertical cut bank, and various ramps and stockpiles produced by the borrowing operation. In general, there is about one foot of topsoil on the site and at a number of locations the topsoil has been tilled. Review of boring logs does not indicate that there is fill at the site, and review of the laboratory results confirms that there is no fill (DEC 1999d, Data Response CEC 11 (CR-2)).

Natural Gas Pipeline Route

The proposed natural gas pipeline route follows along one side of the BN&SF railroad tracks (see **PROJECT DESCRIPTION Figure 2**). The tracks run along open plowed or disked fields, vineyards and orchards, or the margins of industrial facilities where native sediments could be observed easily between the track ballast rock and the edge or fence line of private commercial/industrial properties that lie to either side of the tracks.

A small (10 x 15 meter) zone of anthropogenic soil was observed on the southern side of the tracks. This soil appeared to be a prehistoric Native American midden deposit because two small "mounds" of dark, ashy, friable anthropogenic soil had been brought to the surface by rodent burrowing. Surrounding soils are light tan and contrast sharply with the soils exposed at the mouth of the rodent burrows. Two shovel probes were excavated to determine the depth of the midden-like soil. The process revealed that this dark soil extends only about 20 cm below the surface. Careful examination of the burrow backdirt and soil exposed by shovel probing revealed a complete lack of shellfish remains, fire-cracked rock, calcined mammal or fish bone, or lithic artifacts in the midden-like soil. Only tiny nodules of baked clay were observed in this midden-like soil matrix. While the surveyors are reasonably sure that the soil is anthropogenic, no definitive chronological time-

marker artifacts or remains were found in it. The soil could be the result of either prehistoric or historic activity.

Farther to the west, an interior flake of white chert was found on the northern side of the tracks. No other cultural remains were found, and the chert flake was considered to be an "isolated find" and, as such, is considered insignificant and was left in place.

230 kV Electric Transmission Line Route

The proposed 230-kV electrical transmission line will exit the power plant site and follow along one side of the BN&SF railroad tracks. It will then be constructed below ground, first beneath Eighth Street in Pittsburg and then turning north to enter the PG&E Pittsburg Power Plant substation (see **PROJECT DESCRIPTION Figure 2**). The BN&SF tracks run through an industrial area where native sediments could be observed easily between track ballast rock and the edge or fence line of the commercial/industrial properties that lie on either side of the tracks.

A small tan-colored interior flake of translucent chalcedony was found on the ground in the transmission line corridor leading to the substation. No other cultural remains were found, therefore the chalcedony flake is considered to be an "isolated find" and, as such, is insignificant and was left in place.

ARCHITECTURAL RECONNAISSANCE

Structures older than about forty-five years are potentially significant historic resources in the project area. The survey team did not observe any potentially significant historic buildings within the power plant site/laydown area or along the proposed natural gas and 230 kV electrical transmission line routes or along the water line routes (DEC 1998a, p.8.3-21).

NATIVE AMERICAN CONSULTATION

The applicant's consultant contacted the state's Native American Heritage Commission (NAHC) requesting information regarding traditional cultural properties such as cemeteries and sacred places in the project area (DEC 1998_, Confidential Appendix 8.3.A). The NAHC maintains a list and maps of traditional resource sites located throughout the state. The Heritage Commission also can refer staff, applicants, consultants, and members of the public to registered Native American representatives who can assess the potential for a specific project to impact Native American sites or values in various parts of the state. The NAHC responded with a list of Native American contacts for the general project area. Ten persons or organizations of Miwok and/or Ohlone/Costanoan heritage were listed. Each of these individuals/groups was contacted by letter. The applicant has stated that a summary of the results of consultations with those on the contact list will be included in a future filing (DEC 1998a, p.8.3-21).

The NAHC search of the Sacred Lands file indicated that no known sacred properties were located within the immediate project area. The records search conducted at the Northwest Information Center of the California Historical

Resources Information System also failed to indicate the presence of Native American traditional cultural properties (DEC 1998a, p.8.3-24).

CATEGORIZATION OF IDENTIFIED RESOURCES

Various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize resources by determining whether they meet several sets of specified criteria. These categories then in turn influence the analysis of impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

Under federal law, only historic or prehistoric sites, objects or features, or architectural resources that are assessed by a qualified researcher as “important” or “significant” in accordance with federal guidelines typically need to be considered during the planning process. The significance of historic and prehistoric cultural resources is judged in accordance with the criteria for eligibility for nomination to the National Register of Historic Places as defined in 36 CFR 60.4 or to the California Register of Historic Resources. If such resources are determined to be significant, and therefore eligible for listing in either of these registers, they are afforded certain protection under the National Historic Preservation Act and/or CEQA. The Advisory Council on Historic Preservation, for example, must be given an opportunity to comment on any federally-funded or permitted undertaking that could adversely affect such resources.

The National Register criteria state that “eligible historic properties” are: districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or (d) that represent a significant distinguishable entity whose components may lack individual distinction; or (e) that have yielded or may be likely to yield, information important to history or prehistory. Isolated finds by definition do not meet these criteria.

A resource is considered to be “historically significant” and eligible for listing in the California Register of Historic Resources if it meets one of the following criteria:

- (1) It is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
- (2) It is associated with the lives of persons important in our past;
- (3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;

- (4) It has yielded, or may be likely to yield, information important in prehistory or history [California Code of Regulations, Title 14, Section 15064.5(a)(3)].

Under federal law, resources determined not to be significant, that is, not eligible for National Register listing, are subject to recording and documentation only, and are afforded no further protection. However, occasionally certain resources, although they may not be assessed as “significant”, may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Staff evaluates any known resources located within or adjacent to the project APE to determine whether they meet the eligibility criteria.

The CEQA guidelines require the lead agency (in this case, the Energy Commission), to make a determination of whether a proposed project will affect “historic resources” and sets forth a listing of criteria for making this determination. As used in CEQA, the term “historic resources” includes any resource, regardless of age, as long as it meets these criteria. If the criteria are met, the Energy Commission must evaluate whether the project will cause a substantial adverse change in the significance of that historic resource, which the regulations define as a significant effect on the environment. The mitigation for impacts to historic resources that meet these criteria are not subject to the limitations provided in PRC section 21083.2.

Using the above criteria, staff has determined that the cultural resource sites described in the AFC meet one or more of the criteria for being an historical resource. The isolates and anthropogenic soil do not meet the criteria.

CEQA establishes limitations on applicants’ costs of mitigation for and does not require discussion of archeological resources that are not unique (Public Resources Code, section 21083.2). The statute also provides a definition of unique archeological resources. However, the CEQA Guidelines state that this prohibition does not apply when an archeological resource also meets the definition of a historical resource (California Code of Regulations, Title 14, section 15064.5). Because staff has determined that the impacts for which it is recommending mitigation do meet the definition of historical resources, the prohibition does not apply to the mitigation discussed in this Staff Assessment.

IMPACTS

Impacts to cultural resources may result either directly or indirectly during the pre-construction, construction, and operation phases of a project. Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, or excavation. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and

disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources will not be encountered and that impacts will therefore not occur. In addition, the potential for discovery does not measure the significance of individual artifacts or other cultural resources present, since it is impossible to accurately predict what specific materials could be encountered. Furthermore, sometimes the full significance of discovered cultural resources can only be determined after they have been collected, prepared, and studied by professional archaeologists.

PROJECT-RELATED IMPACTS

Because project-related site development and construction would entail sub-surface disturbance of the ground, the proposed project has the potential to adversely affect previously unknown cultural resources. Seventeen archaeological sites, features, or objects are known to be located in the vicinity of the proposed project. These include historic-era buildings. This indicates a high potential for previously unknown historic and prehistoric resources to be encountered and affected during project construction.

The operation of the project is not expected to have any significant impacts on cultural resources.

PROJECT DESCRIPTION

All of the project elements described in the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment would cause ground disturbance and have the potential to cause significant impacts to cultural resources

Because project-related site development and construction would entail sub-surface disturbance of the ground, the proposed project has the potential to adversely affect previously unknown cultural resources. Seventeen archaeological sites, features, or objects are known to be located in the vicinity of the proposed project. These include historic-era buildings. This indicates a high potential for previously unknown historic and prehistoric resources to be encountered and affected during project construction.

The operation of the project is not expected to have any significant impacts on cultural resources.

POWER PLANT SITE AND LAYDOWN AREA

As previously discussed, no fill exists on the site. The final elevation of the facility site will be at approximately 17 feet. The site area will be stripped of organic matter to a depth that is suitable for backfill. Excavations for foundations are typically less than 5 feet deep, except for the deepest excavation which will be for the circulating water pump structure extending to approximately 18 feet below finished grade (DEC 1999d, Data Response CEC12 (CR-3)). The site contains no known cultural resources. However, because of the numerous known cultural resources in the vicinity, the potential for impacts to unknown cultural resources is high.

NATURAL GAS PIPELINE

The 5.2 mile natural gas pipeline would be entirely underground. The trench for the pipeline would be 3 to 4 feet wide (DEC 1999a, p.7-1). Given that the pipeline would be located in the BN&SF Railroad right-of-way, the railroad would determine the depth of excavation. The BN&SF policies provide two different depths at which the natural gas pipeline must be buried. The depths depend on where in the railroad right-of-way the pipeline is located. If the pipeline is under the railroad track (as it would be where it would cross the railroad tracks), a minimum depth of cover of 5.5 feet (66 inches) is required. With the 16 inch pipeline, this results in a maximum trench depth of 82 inches. In areas along the railroad right-of-way where the pipeline is within BN&SF property but not under the railroad tracks, a minimum depth of over of three feet (36 inches) is required. The minimum depth of cover of 36 inches is also applicable where the pipeline leaves the railroad right-of-way in Segment 4. With the 16 inch pipeline, this results in a maximum trench depth of 52 inches.

It is the applicant's intent to bury the pipeline to the trench depths specified above. However, there may be instances where the pipeline may exceed these depths. For example, if existing utilities or other obstructions are found within the right-of-way, it may be necessary to adjust the depth of the trench to pass underneath these utilities (DEC 1999d, Data Response CEC 15 (CR-6)).

Considerable surface disturbance may occur as trenches for this underground pipeline are dug. For boring under ditches, roads, and the railroad additional work space may be cleared at the points of entry and exit for the equipment.

No previously recorded cultural resource sites are within the corridor for the natural gas pipeline. As was previously discussed, one isolated artifact was found during the pedestrian survey of the corridor conducted for the proposed project. Isolates are not considered significant.

As was also previously discussed, a small deposit of apparently anthropogenic soil was discovered during the survey of this corridor. However, it lacked inclusion of typical midden indicators including material that can be measured for age, and seems to be shallow and limited in extent. Energy Commission staff agrees with the applicant's consultant (DEC 1998a, p.8.3-26) that it is unlikely that this deposit is culturally significant and it does not appear to meet the criteria of eligibility for listing

on the National Register of Historic Places and does not appear to qualify as a historic resource under CEQA.

230 kV ELECTRIC TRANSMISSION LINE

Approximately half of the proposed 3.3 mile 230 kV electric transmission line would be placed underground. The applicant intends to maintain a six-foot trench depth for installation of the cable system. However, upon interception of existing utilities or other obstructions, it may be necessary to adjust the depth of the trench to pass over or under these obstructions (DEC 1999d, Data Response CEC 14 (CR-5)). Larger and deeper excavations would be required for construction of the concrete access structures to house the pump stations for the transmission and cooling fluids. Transition towers and stations would be constructed where the transmission line goes from above ground to underground.

For the above ground portions of the route, construction of foundations for the transmission line power poles would require drilling or augering the soil to variable depths for each power pole. The depth of soil disturbance would depend on the height and diameter of the individual transmission poles designed for each portion of the route. The width and extent of surface soil disturbance would depend upon the size of equipment needed to set and erect the poles for the above ground portion of the transmission line.

The AFC indicates that the ground surface along the proposed 230 kV electric transmission line corridor has been subject to extensive, ongoing disturbance from industrial, commercial, and residential development. No known cultural resources with the potential to be significant exist within the APE for the transmission line. As was previously discussed, one isolated artifact was found during the pedestrian survey of the corridor conducted for the proposed project. Isolates are not considered significant. However, because of the numerous known cultural resources in the vicinity, including the structures in the Historic District and evidence of long time prehistoric presence in the Pittsburg area, the potential for impacts to unknown cultural resources is high.

The depth to undisturbed soils underlying the route is unknown, so the potential for impacts cannot be fully evaluated until the subsurface soils are exposed during trenching and augering for power pole foundation footings and examined for evidence of cultural resources. Where not previously disturbed by development, the underlying soils may provide evidence of ancient river or estuary shorelines or signs of previous human occupation.

OTHER LINEAR FACILITIES

As previously discussed, the project includes other linear facilities, consisting of the following:

- a 0.8 mile 13.8 kV electrical line to the Dow chemical plant;
- a 0.7 mile steam line to the Dow chemical plant;

- a 500 foot cooling tower makeup water supply line from the nearby Delta Diablo Sanitation District (DDSD) Wastewater Treatment Plant;
- a 500 foot wastewater discharge line to the DDSD plant; and
- a 500 foot water supply line to an existing Contra Costa Water District line.

Although development has previously occurred or currently exists on much of the land where these new facilities would be built, the new facilities may cause ground disturbance to areas (and cultural resources) that have not been previously disturbed. Therefore, the new facilities have the potential to cause impacts to cultural resources.

CUMULATIVE IMPACTS

The Energy Commission is reviewing an application for certification for another power plant proposed for construction in the City of Pittsburg, approximately 1.5 miles from the proposed DEC. The Pittsburg District Energy Facility (PDEF) site is 12 acres in size and the linear facilities would include a 2-mile electric transmission line, over a mile of which would be underground; a 2 mile water pipeline; and a 3.6-mile natural gas pipeline. The cultural resource literature search and record search for PDEF found that there are seven previously recorded sites in the vicinity (PDEF 1998a).

The total area affected by these two power plant projects appears small in comparison to the vastness of the entire bay region and the coastal mountain ranges in Northern California. However, given the extensive modern development throughout this region, any cultural resource materials or undisturbed sites found in the project area can provide valuable information on environmental conditions and human adaptations to earlier, environmental conditions. Proposed developments reaching wider and deeper into the coast range and river delta areas can accelerate the potential for loss of significant cultural resource information. The level of cumulative impact will increase as increasing development opens more undisturbed areas and eventually exposes highly sensitive cultural resource sites.

FACILITY CLOSURE IMPACTS

PLANNED CLOSURE

The anticipated lifetime of the PDEF project is expected to be at least twenty-five years. Upgrades or modifications made prior to the facility's closure might extend the life of the plant. Closure would be caused by either (1) a natural or manmade disaster or economic difficulty or (2) A planned, orderly closure that would occur at the end of the plant's useful mechanical life. At the time of closure, all then-applicable LORS will be identified and the closure plan will address compliance with these LORS.

Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification have been met, no impacts to cultural resources would be expected. However, actual potential impacts are more likely to depend upon the final location of project structures in relation to existing resources, and then upon the procedures used for the removal of project structures. Since the spatial relationship between the closure and removal of project structures and sensitive resources cannot be determined at this time, no final conclusion can be drawn at this time with respect to the impact of permanent facility closure on cultural resources.

UNEXPECTED TEMPORARY CLOSURE

A temporary unplanned closure would be likely to occur in response to an emergency. No impacts to cultural resources are expected from an unexpected temporary closure.

UNEXPECTED PERMANENT CLOSURE

If a site were abandoned, impacts to cultural resources would be unlikely because there would be no immediate soil disturbances. Over time, depending on possible soil disturbance, some impacts on cultural resources might result.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The AFC (p.8.3-28) notes that if cut and cover construction rather than directional drilling is used to construct the proposed natural gas line across the Los Medanos Wasteway, which is federal land administered by the Bureau of Reclamation, then such action would likely be subject to compliance with Section 106 of the National Historic Preservation Act and would require consultation with Reclamation's cultural resource staff. If a find were made, as a result of project work, in the Los Medanos Wasteway or on any other federal land, the project archaeologist and energy commission staff should consult with the federal agency with jurisdiction to begin Section 106 compliance.

Staff's proposed conditions of certification (see below) will ensure compliance with applicable LORS.

MITIGATION

For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often, however, avoidance cannot be achieved, and other measures such as surface collection, subsurface testing, and data recovery must be implemented. Mitigation measures are developed to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

APPLICANT'S PROPOSED MITIGATION

The AFC (p.8.3-26) states that “the best mitigation measure is to **avoid impact** to any cultural resource that may be located in the project area. Avoidance can be accomplished by having the archaeologist and project engineer mark cultural resource site boundaries on the ground to ensure that proposed project improvements do not impinge on the resource(s). Where a tower, road, or ancillary facility must be placed within 100 feet of a known archaeological site the site can be temporarily fenced or otherwise marked on the ground as an Environmentally Sensitive Area (ESA). Construction equipment can then be directed away from the ESA, and construction personnel can be directed to avoid entering the ESA. In some cases, additional archaeological work will be needed to better delineate ESA boundaries.”

The AFC also recommends construction monitoring “during all operations that involve mechanical excavation in designated archaeological high probability areas along the [proposed] natural gas line” and [along the proposed electric transmission line] “between the DEC plant site and the PG&E switchyard” (DEC 1998a, p.8.3-27). In response to an Energy Commission staff data request, the applicant agreed to also monitor ground-disturbance activities at the power plant site and construction laydown area (DEC 1999d, Data Response CEC 10 (CR-1)).

To ensure participation by interested members of the Native American community, the AFC (p.8.3-27) recommends that a Native American monitor be present during any needed archaeological site testing and/or data recovery operations triggered as a consequence of archaeological remains being discovered during construction.

Verification: The AFC (pp.8.3-27 through 8.3-30) recommends that a six-point cultural resource-monitoring and mitigation program be implemented. The steps in this program are listed here and are more fully represented in the proposed conditions of certification presented later in this analysis.

1. Preconstruction Assessment and Training,
2. Construction Monitoring,
3. Site Recording and Evaluation,
4. Mitigation Planning,
5. Curation, and
6. Report of Findings.

The applicant's consultant has also identified that emergency maintenance and repair could cause impacts to cultural resources.

In developing specific mitigation measures to address impacts for any site that cannot be avoided during construction, the potential for ongoing impacts to any resource that cannot be avoided through project redesign must be considered. Any mitigative data recovery should be properly scoped, in conjunction with the appropriate agencies, to address potential long-term ongoing impacts (DEC 1998a, p.8.3-30; DEC 1999d, Data Response CEC 13 (CR-4)).

STAFF'S PROPOSED MITIGATION MEASURES

Staff concurs with the mitigation measures proposed by the applicant. Staff, in its proposed conditions of certification, has included additional language to clarify and ensure the success of the measures presented by the applicant. The conditions would ensure that appropriate mitigation measures are implemented if previously unknown cultural resources are encountered during pre-construction site preparation or during project construction.

The proposed mitigation measures are derived from good professional practice and they are based on the US Secretary of Interior guidelines, the Commission staff recommendations, and incorporate the policies and guidelines of Contra Costa County, the cities of Pittsburg and Antioch. All of these mitigation measures have previously proven successful in protecting sensitive cultural resources from construction-related impacts, while allowing the timely completion of many projects throughout California. Proper implementation of these measures would lower any potential impacts to cultural resources below the threshold of significance.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

If the following proposed conditions of certification are properly implemented, the project will comply with applicable laws, ordinances, regulations, and standards; and no significant adverse impacts to cultural resources will occur.

RECOMMENDATIONS

Staff recommends that the Commission adopt the following proposed conditions of certification, which incorporate the mitigation measures discussed above.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of project-related construction activities (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation activities), the project owner shall provide the California Energy Commission (Commission) Compliance Project Manager (CPM) with the name and statement of qualifications for its designated cultural resource specialist who will be responsible for implementation of all cultural resources Conditions of Certification.

Protocol:

- a. The statement of qualifications for the designated cultural resource specialist shall include all information needed to demonstrate that the specialist meets the minimum qualifications specified in the US Secretary of Interior Guidelines, as published by the State Office of Historic Preservation (1983). The minimum qualifications include the following:

- 1) a graduate degree in anthropology, archaeology, California history, cultural resource management, or a comparable field;
 - 2) at least three years of archaeological resource mitigation and field experience in California; and
 - 3) at least one year's experience in each of the following areas:
 - 4) leading archaeological resource field surveys;
 - 5) leading site and artifact mapping, recording, and recovery operations;
 - 6) marshalling and use of equipment necessary for cultural resource recovery and testing;
 - 7) preparing recovered materials for analysis and identification;
 - 8) determining the need for appropriate sampling and/or testing in the field and in the lab;
 - 9) directing the analyses of mapped and recovered artifacts;
 - 10) completing the identification and inventory of recovered cultural resource materials; and
 - 11) preparing appropriate reports to be filed with the receiving curation repository, the SHPO, all appropriate regional archaeological information center(s).
- b. The statement of qualifications for the designated cultural resource specialist shall include:
- 1) a list of specific projects the specialist has previously worked on;
 - 2) the role and responsibilities of the specialist for each project listed; and
 - 3) the names and phone numbers of contacts familiar with the specialist's work on these referenced projects.

Verification: At least ninety (90) days prior to the start of project construction, the project owner shall submit the name and statement of qualifications of its designated cultural resource specialist to the CPM for review and written approval.

At least ten (10) days but no more than thirty (30) days prior to the start of construction, the project owner shall confirm in writing to the CPM that the approved designated cultural resource specialist will be available at the start of construction and is prepared to implement the cultural resource Conditions of Certification.

At least ten (10) days prior to the termination or release of a designated cultural resource specialist, the project owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new designated cultural resource specialist.

CUL-2 Prior to the start of project construction, the project owner shall provide the designated cultural resource specialist and the CPM with maps and drawings showing the final project design and site layout, and the final alignment of all linear facilities. The routes for the linear facilities shall be provided on 7.5 minute quad maps, showing:

- a. post mile markers (including “tic marks” for tenths of a mile);
- b. final center lines and right-of-way boundaries; and
- c. the location of all the various areas where surface disturbance may be associated with project-related access roads, storage yards, laydown sites, pull sites, pump or pressure stations, switchyards, electrical tower or pole footings, and any other project components.

Protocol: The designated cultural resource specialist may request, and the project owner shall provide, enlargements of portions of the 7.5 minute maps presented as a sequence of strip maps for the linear facility routes. The strip maps would include post mile and tenth of a mile markers and show the detailed locations of proposed access roads, storage or laydown sites, tower or pole footings, and any other areas of disturbance associated with the construction and maintenance of project-related linear facilities. The project owner shall also provide copies of any such enlargements to the CPM at the same time as they are provided to the specialist.

Verification: At least seventy-five (75) days prior to the start of construction on the project, the project owner shall provide the designated cultural resource specialist and the CPM with final drawings and site layouts for all project facilities and maps at appropriate scale(s) for all areas potentially affected by project construction. If the designated cultural resource specialist requests enlargements or strip maps for linear facility routes, the project owner shall also provide a set of these maps to the CPM at the same time that they are provided to the specialist.

CUL-3 Prior to the start of project construction, the designated cultural resources specialist shall prepare, and the project owner shall submit to the CPM for review and written approval, a Cultural Resources Monitoring and Mitigation

Plan, identifying general and specific measures to minimize potential impacts to sensitive cultural resources.

Protocol: The Cultural Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures:

- a. A proposed research design that includes a discussion of questions that may be answered by the mapping, data and artifact recovery conducted during monitoring and mitigation activities, and by the post-construction analysis of recovered data and materials.
- b. A discussion of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the pre-construction, construction, and post-construction analysis phases of the project.
- c. Identification of the person(s) expected to perform each of the tasks and description of the mitigation team organizational structure and the inter-relationship of team roles and responsibilities. Specification of the qualifications of any professional team members.
- d. A discussion of the need for Native American observers or monitors, the procedures to be used to select them, the areas or post-mile sections where they will be needed, and their role and responsibilities.
- e. A discussion of 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 discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.
- f. A discussion of where monitoring of project construction activities is deemed necessary by the designated cultural resource specialist. The specialist will determine the size or extent of the areas where monitoring is to occur and will establish the percentage of the time that the monitor(s) will be present. The areas to be monitored shall include the power plant site, the construction laydown area, the natural gas pipeline route, and the 230 kV electric transmission line route.
- g. A discussion of the requirement that all cultural resources encountered will be recorded and mapped (may include photos) and all significant or diagnostic resources will be collected for analysis and eventual curation into a retrievable storage collection in a public repository or museum that meets the US Secretary of Interior standards and requirements for the curation of cultural resources.

- h. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.
- i. Identification of the public institution that has agreed to receive any data and cultural resources recovered during project-related monitoring and mitigation work. Discussion of any requirements, specifications, or funding needed for the materials to be delivered for curation and how they will be met. Also include the name and phone number of the contact person at the institution.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall provide the Cultural Resources Monitoring and Mitigation Plan, prepared by the designated cultural resource specialist, to the CPM for review and written approval.

CUL-4 Prior to the start of project construction, the designated cultural resources specialist shall prepare an employee training program. The project owner shall submit the cultural resources training program to the CPM for review and written approval.

Protocol: The training program shall discuss the potential to encounter cultural resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training program shall also include the set of resource reporting procedures and work curtailment procedures that workers are to follow if previously unknown cultural resources are encountered during project activities. The training program shall be presented by the designated cultural resource specialist or qualified individual(s) approved by the CPM and may be combined with other training programs prepared for biological resources, paleontological resources, hazardous materials, or any other areas of interest or concern.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall submit to the CPM for review and written approval, the proposed employee training program, the set of reporting procedures, and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during construction. The project owner shall provide the name and resume of the individual(s) performing the training.

CUL-5 Prior to the start of construction and throughout the project construction period as needed for all new employees, the project owner shall ensure that the designated cultural resource trainer(s) provide(s) the CPM-approved cultural resources training to all project managers, construction supervisors, and workers. The project owner shall ensure that the designated trainer provides the workers with the CPM-approved set of procedures for reporting

any sensitive resources that may be discovered during project-related ground disturbance and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during construction.

Verification: Within seven (7) days after the start of construction the project owner shall provide the CPM with documentation that the designated cultural resources trainer(s) has/have provided to all project managers, construction supervisors, and workers hired before the start of construction the CEC-approved cultural resources training and the set of reporting and work curtailment procedures.

In each Monthly Compliance Report after the start of construction the project owner shall provide the CPM with documentation that the designated cultural resource trainer(s) has/have provided to all project managers hired in the month to which the report applies the CPM-approved cultural resources training and the set of reporting and work curtailment procedures.

CUL-6 The designated cultural resource specialist shall have the authority to halt or redirect construction if previously unknown cultural resource sites or materials are encountered during project-related grading, augering, excavation and/or trenching.

If such resources are found and the specialist determines that they are not significant, the specialist may allow construction to resume. The project owner shall notify the CPM of the find as set forth in the Verification.

If such resources are found and the specialist determines that they are or may be significant, the halting or redirection of construction shall remain in effect until:

- a. the designated cultural resources specialist has notified the CPM of the find and the work stoppage;
- b. the specialist, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed; and
- c. any necessary data recovery and mitigation has been completed.

The designated cultural resources specialist, the project owner, and the CPM shall confer within five working days of the notification of the CPM to determine what, if any, data recovery or other mitigation is needed.

If data recovery or other mitigation measures are required, the designated cultural resource specialist and team members shall monitor construction activities and implement data recovery and mitigation measures, as needed.

All required data recovery and mitigation shall be completed expeditiously unless all parties agree to additional time.

Verification: Thirty (30) days prior to the start of construction, the project owner shall provide the CPM with a letter confirming that the designated cultural resources specialist has the authority to halt construction activities in the vicinity of a cultural resource find.

For any cultural resource encountered that the specialist determines is or may be significant, the project owner shall notify the CPM as soon as possible.

For any cultural resource encountered that the specialist determines is not significant, the project owner shall notify the CPM within 72 hours after the find.

CUL-7 Throughout the project construction period, the project owner shall provide the designated cultural resource specialist and the CPM with a current schedule of anticipated monthly project activity (presented on a week-by-week basis) and a map indicating the area(s) where construction activities will occur. The designated cultural resources specialist shall consult daily with the project superintendent or construction field manager to confirm the area(s) to be worked on the next day(s).

Verification: The project owner shall provide the designated cultural resource specialist and the CPM with a week-by-week schedule of the upcoming construction activities, one month in advance, as well as maps showing where the construction activity is scheduled to take place. These advance schedules are to be provided to the CPM with the Monthly Compliance Report.

CUL-8 Throughout the pre-construction reconnaissance surveys and the construction monitoring and mitigation phases of the project, the designated cultural resources specialist shall keep a daily log of any resource finds and the progress or status of the resource monitoring, mitigation, preparation, identification, and analytical work being conducted for the project. The daily logs shall indicate by tenths of a post mile, where and when monitoring has taken place, where monitoring has been deemed unnecessary, and where cultural resources were found.

The designated specialist shall prepare a weekly summary report on the progress or status of cultural resource-related activities. The project owner shall provide the weekly summary reports to the CPM for review and approval.

The designated resource specialist may informally discuss the cultural resource monitoring and mitigation activities with Commission technical staff.

Verification: Throughout the project construction period, the project owner shall ensure that the daily log is available for periodic audit by the CPM.

Throughout the project construction period, within seven (7) days after the end of each work week, the project owner shall provide to the CPM the weekly summary report.

CUL-9 The designated cultural resource specialist shall be present at times the specialist deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in the vicinity of previously recorded archaeological sites and in areas where cultural resources have been identified.

Protocol: If the designated cultural resource specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner of the changes. The designated cultural resource specialist shall use milepost markers and boundary stakes placed by the project owner to identify areas where monitoring is being reduced or is no longer deemed necessary.

Verification: Throughout the project construction period the project owner shall include in the Monthly Compliance Reports to the CPM copies of the weekly summary reports prepared by the designated cultural resource specialist regarding project-related cultural resource monitoring.

CUL-10 The project owner shall ensure that the designated cultural resource specialist performs the recovery, preparation for analysis, analysis, preparation for curation, and delivery for curation of all cultural resource materials encountered and collected during pre-construction surveys and during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in its compliance files, copies of signed contracts or agreements with the museum(s), university(ies), or other appropriate research specialists which will ensure the necessary recovery, preparation for analysis, and analysis of cultural resource materials collected during data recovery and mitigation for the project. The project owner shall maintain these files for the life of the project and the files shall be kept available for periodic audit by the CPM. Information as to the specific location of sensitive cultural resource site shall be kept confidential and accessible only to qualified cultural resource specialists.

CUL-11 Following completion of data recovery and site mitigation work the project owner shall ensure that the designated cultural resources specialist prepares a proposed scope of work for the Cultural Resources Report. The project owner shall submit the proposed scope of work to the CPM for review and written approval.

Protocol: The proposed scope of work shall include (but not be limited to):

- a. discussion of any analysis to be conducted on recovered cultural resource materials;

- b. discussion of possible results and findings,
- c. proposed research questions which may be answered or raised by analysis of the data recovered from the project; and
- d. an estimate of the time needed to complete the analysis of recovered cultural resource materials and prepare the Cultural Resources Report.

Verification: The project owner shall ensure that the designated cultural resources specialist prepares the proposed scope of work within ninety (90) days following completion of the data recovery and site mitigation work. Within seven (7) days after completion of the proposed scope of work, the project owner shall submit it to the CPM for review and written approval.

CUL-12 The project owner shall ensure that the designated cultural resources specialist prepares a Cultural Resources Report. The project owner shall submit the report to the CPM for review and written approval.

Protocol: The Cultural Resources Report shall include (but not be limited to) the following:

- a. For all projects:
 - 1) description of pre-project literature search, surveys, and any testing activities;
 - 2) maps of showing areas surveyed or tested;
 - 3) description of any monitoring activities;
 - 4) maps of any areas monitored; and
 - 5) conclusions and recommendations.
- b. For projects in which cultural resources were encountered, include the items specified under "a" and also provide:
 - 1) site and isolate records and maps;
 - 2) description of testing for, and determinations of, significance and potential eligibility; and
 - 3) research questions answered or raised by the data from the project.

- c. For projects regarding which cultural resources were recovered, include the items specified under “a” and “b” and also provide:
- 1) descriptions (including drawings and/or photos) of recovered cultural materials;
 - 2) results and findings of any special analyses conducted on recovered cultural resource materials;
 - 3) an inventory list of recovered cultural resource materials; and
 - 4) the name and location of the public repository receiving the recovered cultural resources for curation.

Verification: The project owner shall ensure that the designated cultural resources specialist completes the Cultural Resources Report within ninety (90) days following completion of the analysis of the recovered cultural materials. Within seven (7) days after completion of the report, the project owner shall submit the Cultural Resources Report to the CPM for review and written approval.

CUL-13 The project owner shall submit an original, an original-quality copy, or a computer disc copy of the CPM-approved Cultural Resource Report to the public repository to receive the recovered data and materials for curation, to the SHPO, and to the appropriate regional archaeological information center(s). If the report is submitted to any of these entities on a computer disc, the disc files must meet SHPO requirements for format and content.

Protocol: The copies of the Cultural Resource Report to be sent to the curating repository, the SHPO, and the regional information center(s) shall include the following (based on the applicable scenario (a, b, or c) set forth in the previous condition):

- a. originals or original-quality copies of all text;
- b. originals of any topographic maps showing site and resource locations;
- c. originals or original-quality copies of drawings of significant or diagnostic cultural resource materials found during pre-construction surveys or during project-related monitoring, data recovery, or mitigation; and
- d. photographs of the site(s) and the various cultural resource materials recovered during project monitoring and mitigation and subjected to post-recovery analysis and evaluation. The project owner shall provide the curating repository with a set of negatives for all of the photographs.

Verification: Within thirty (30) days after receiving approval of the Cultural Resources Report, the project owner shall provide to the CPM documentation that the report has been sent to the public repository receiving the recovered data and materials for curation, the SHPO, and the appropriate archaeological information center(s).

For the life of the project the project owner shall maintain in its compliance files copies of all documentation related to the filing of the CPM-approved Cultural Resources Report with the public repository receiving the recovered data and materials for curation, the SHPO, and the appropriate archaeological information center(s).

CUL-14 Following the filing of the CPM-approved Cultural Resource Report with the appropriate entities, the project owner shall ensure that all cultural resource materials, maps and data collected during data recovery and mitigation for the project are delivered to a public repository that meets the US Secretary of Interior requirements for the curation of cultural resources. The project owner shall pay any fees for curation required by the repository.

Verification: The project owner shall ensure that all recovered cultural resource materials are delivered for curation within thirty (30) days after providing the CPM-approved Cultural Resource Report to the public repository receiving the recovered data and materials, to the SHPO, and to the appropriate archaeological information center(s).

For the life of the project the project owner shall maintain in its project history or compliance files, copies of signed contracts or agreements with the public repository to which the project owner has delivered for curation all cultural resource materials collected during data recovery and mitigation for the project.

CUL-15 If cut and cover construction rather than directional drilling is used to construct the natural gas pipeline across the Los Medanos Wasteway, the project owner shall consult with the U.S. Bureau of Reclamation and the CPM regarding compliance with Section 106 of the National Historic Preservation Act. The project owner shall implement any cultural resources mitigation measures required by the U.S. Bureau of Reclamation and the CPM as a result of such consultation.

Verification: At least sixty (60) days prior to any ground disturbing activity associated with construction of the portion of the natural gas line across the Los Medanos Wasteway, the project owner shall notify the U.S. Bureau of Reclamation and the CPM regarding the type of construction that will be used. If cut and cover construction rather than directional drilling is used, at least thirty (30) days prior to any ground disturbing activity associated with construction of the portion of the natural gas line across the Los Medanos Wasteway the project owner shall consult with the U.S. Bureau of Reclamation and the CPM. Within 30 days after completing construction of the portion of the natural gas pipeline across the Los Medanos Wasteway the project owner shall provide to the U.S. Bureau of Reclamation and

the CPM with written documentation that the project owner has complied with any mitigation measures required as a result of the consultation.

REFERENCES

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- DEC (Delta Energy Center). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.
- DEC (Delta Energy Center). 1998c. Confidential filing—Cultural Resources. Submitted to the California Energy Commission, December 18, 1998.
- DEC (Delta Energy Center). 1999d. Response to CEC data requests #1-61 submitted to the California Energy Commission on March 31, 1999.
- DEC (Delta Energy Center). 1999j. Supplemental filing--reduction in length of the gas pipeline and inclusion of an additional outfall for wastewater discharge, dated June 11, 1999 and docketed June 16, 1999.
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- DEC (Delta Energy Center). 1999l. Confidential Filing of Cultural Resource Information, dated January 25, 1999 and docketed January 25, 1999.
- Pittsburg. 1998. Pittsburg General Plan Update: Existing Conditions and Planning Issues. June 1998.

SOCIOECONOMIC RESOURCES

Amanda Stennick

INTRODUCTION

The technical area of socioeconomics encompasses several related areas of interest and concern. A typical socioeconomic impact analysis evaluates the effects of project-related population changes on local schools, medical and protective services, public utilities and other public services, the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population, and the issue of environmental justice. This analysis discusses the potential effects of the proposed Delta Energy Center (DEC) on local communities, community resources, and public services, pursuant to Title 14 California Code of Regulations, Section 15131.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

CALIFORNIA GOVERNMENT CODE, SECTION 65995-65997

As amended by SB 50 (Stats. 1998, ch. 407, sec. 23), states that public agencies may not impose fees, charges or other financial requirements to offset the cost for school facilities. The code includes provisions for levies against development projects near school districts. The administering agency for the above authority for this project is the Pittsburg Unified School District.

ENVIRONMENTAL JUSTICE

President Clinton's Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed on February 11, 1994. The order required the US Environmental Protection Agency (USEPA) and all other federal agencies to develop environmental justice strategies. The USEPA subsequently issued Guidelines that require all federal agencies and state agencies receiving federal funds, to develop strategies to address this problem. The agencies are required to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

SETTING

PROJECT LOCATION

The project site is located in the eastern industrialized portion of the city of Pittsburg. Pittsburg is located on the Delta coastline in north central Contra Costa County. The city of Antioch is about one mile to the east. For purposes of evaluating the availability of a local workforce, staff has defined the study area as a four-county area that includes Contra Costa, Solano, Alameda, and San Joaquin

Counties. As in the Pittsburg District Energy Facility (PDEF) project, staff expects the workforce to be drawn from counties within an hour's commuting distance of the project. While the study area comprises this four-county area, staff expects the cities of Pittsburg and Antioch will receive the majority of the socioeconomic impacts generated by the project, due to their proximity to each other and urban services provided. Therefore, staff will consider the cities of Pittsburg and Antioch as the impact area, and will expect that these cities will experience the majority of socioeconomic impacts generated by the project.

DEMOGRAPHY

Population figures and estimates for Pittsburg and Antioch are summarized in **SOCIOECONOMICS TABLE 1**. As shown in Table 3, the county's population is expected to increase by about 30 percent by the year 2020. This projected growth is higher than any other county in the nine-county Bay Area (ABAG 1998). Population growth is due to the availability of developable land for new housing and the affordability of housing relative to other Bay Area Counties (DEC 1998a).

SOCIOECONOMICS Table 1
Total Population in Project Area

City/County	1990	1998	2010	2020
Pittsburg	47,564	52,200	85,000	97,000
Antioch	62,195	79,300	106,000	119,000
Contra Costa County	803,732	900,700	1,049,600	1,139,600
Source: 1990 Census; ABAG 1998; SJCOG 1998				

EMPLOYMENT

California Employment Development Department (EDD) data provided in the Application for Certification (AFC) estimated the civilian labor force available in Pittsburg as 25,880, and Antioch as 34,960. Total labor force in the county is about 472,700. **SOCIOECONOMICS TABLES 2 AND 3** show the 1998 Average Annual Area Employment and 1998 Estimated Construction Employment, respectively.

The project is expected to employ a maximum of 575 construction workers during the peak construction period. Specific trades required for construction include carpenters, laborers, ironworkers, finishers, operators, pipefitters, electricians, millwrights, boilermakers, insulators, painters, teamsters, and others. Operation of the plant is expected to employ about 24 permanent employees, including operation and maintenance technicians, and supervisors (DEC 1998a). Based on employment information obtained from **SOCIOECONOMICS TABLES 2 and 3**, there appears to be a surplus of construction and utility workers available to staff the construction and operation of the project (for data on employed labor by craft please refer to **SOCIOECONOMICS TABLES 8 and 9**).

SOCIOECONOMICS TABLE 2
1998 Average Annual Area Employment

	Civilian Labor Force	Employed Labor Force	Unemployed Labor Force	Unemployment Rate
Pittsburg	25,880	24,360	1,520	5.9%
Antioch	34,960	33,030	1,930	5.5%
Contra Costa Co.	472,700	453,100	19,600	4.1%
Source: California Employment Development Department, Labor Market Information Division.				

SOCIOECONOMICS TABLE 3
1998 Estimated Construction Employment

	1998 Total Employment	Estimated Percent Construction	Estimated Construction Employment
Contra Costa/Alameda Counties	1,134,200	4.3%	48,400
Solano County	170,200	6.0%	10,200
San Joaquin County	217,500	3.12%	6,800
Source: California Employment Development Dept., Labor Market Information Division.			

HOUSING AVAILABILITY

Housing characteristics provided in the AFC indicate that in 1998 Pittsburg had 17,772 dwelling units, with 16,639 units occupied. Antioch had 28,701 dwelling units, with 26,738 units occupied. The vacancy rates for Pittsburg and Antioch are 6.38 percent and 6.84 percent, respectively. In addition to dwelling units, there are an estimated total of 519 motel/hotel units in the cities of Pittsburg and Antioch.

PUBLIC SERVICES

COMMUNITY PROTECTIVE SERVICES

The City of Pittsburg Police Department provides law enforcement service in the project area. The City of Pittsburg Police Department currently employs seventy-two sworn officers and maintains eighteen patrol cars, two vans, and seven unmarked vehicles. The department is located at 55 Civic Avenue in Pittsburg with satellite offices located throughout Pittsburg. The ratio of sworn personnel is 1:706 residents (White 1998). Average response time to the project site is about two minutes.

Ninety-seven sworn personnel and thirty-eight non-sworn personnel staff the City of Antioch Police Department. The department maintains thirty-six patrol vehicles, ten investigation vehicles, seven vehicles for managers, one communications vehicle, and one pick-up truck. The ration of sworn personnel is 1:789 residents (Privett 1998).

The Contra Costa Fire Department (30 fire stations) provides fire protection throughout the northern portion of Contra Costa County. Station 81 is closest to the project site and is located at 315 West 10th Street in Antioch. Station 81 is staffed

with one crew consisting of a fire captain, a fire engineer, and a firefighter. The station is equipped with a primary response engine, two wildland response engines, a foam engine, and a service engine (DEC 1998a). Response time to the site is about three minutes (Powell 1999). The Contra Costa County Department of Health Services provides hazardous materials teams to respond to a release of hazardous materials, and are located off State Highway 680 at the intersection of Pacheco Boulevard and Arthur Road. Average response time to the site is about twenty minutes, but can take over an hour or more if traffic is heavy (DEC 1998a). Fire Inspector Ryan stated that Station #10 in Concord has hazmat response capabilities and would respond to a hazardous materials incident at the site in about twenty minutes.

In addition, the proposed project will have a 270,000-gallon capacity fire service water storage tank onsite, with a minimum of 240,000 gallons of water dedicated to the fire protection system. The dedicated water supply is sized in accordance with the National Fire Protection Association to provide two hours of protection from on-site single fires (DEC 1999). Please refer to the section on **Worker Safety** for further discussion of hazardous response and on-site project safety features.

SCHOOLS

The Pittsburg and Antioch Unified School Districts provide educational services to students in the DEC area. All schools in the Antioch School District are currently operating at capacity; three are closed to 1998-1999 enrollment. One new elementary school was opened in 1998, and another new elementary school is planned for construction in 1999 (DEC 1999). The Pittsburg Unified School District operates ten school facilities including seven elementary grade levels, two middle schools, and one senior high school. Information provided by the Pittsburg Unified School District indicates that 1998 enrollments are over capacity at the elementary level and at capacity at the secondary level. All schools are currently using portable classrooms (Newell 1999). The Public Facilities, Institutions, and Utilities Element of the City of Pittsburg 1988 General Plan states that the District is currently operating near capacity and anticipates increased enrollment in the near future from residential development. To accommodate current and projected enrollments, the District is proposing to build five new schools and purchase portable classrooms. Energy Commission staff notes that General Plan information on the District's capacities and enrollments is out of date. The City of Pittsburg is updating their General Plan and expects the plan to be adopted in early 2000. Therefore it is possible that some new schools have been constructed to accommodate growth in the District. In addition, Guiding Policies from the Public Facilities, Institutions, and Utilities Element of the 1988 City of Pittsburg General Plan state the following:

Guiding Policies A. Prepare joint City/School District Master Plan for expansion.

Guiding Policies B. Reserve school sites and plan for school capacity in the planning area to accommodate current and projected enrollment.

Guiding Policies D. Ensure that sufficient school classrooms will be available before approving residential development projects.

As stated above, it is possible that the general plan update will contain current information regarding the status of the District's capacities and enrollments, the existence of newly constructed schools, and a joint City/School District Master Plan for expansion. Energy Commission staff notes that in the City of Pittsburg General Plan, the need for sufficient school facilities is related to residential, not industrial growth.

SOCIOECONOMICS Table 4
1998-1999 ENROLLMENTS AND CAPACITIES IN THE PITTSBURG UNIFIED SCHOOL DISTRICT

Pittsburg School District	Enrollment ¹	Capacity ²
Foothill	631	775
Heights	596	625
Highland	674	824
Los Medanos	671	650
Martin Luther King Center	NA	425
Parkside	671	650
Stoneman	696	725
Willow Cove	696	750
Riverside Continuation High	153	513
Central Junior High	1,078	1,134
Hillview Junior High	972	1,360
Pittsburg High School	1,901	2,457
Source: Pittsburg Unified School District 1999 1. Enrollments as of April 1999. 2. Capacities include the number of students housed in portable classrooms.		

Energy Commission staff called the Pittsburg District Unified School District to request data on recent enrollments and capacities for all schools in the district (Gamba, Zamora, Farris 1999). **SOCIOECONOMICS TABLE 4** provides enrollments as of April 1999, and capacities including the use of portable classrooms for the Pittsburg Unified School District.

COMMUNITY MEDICAL SERVICES

There are eight hospitals in Contra Costa County with emergency rooms. Each hospital has one to two emergency room physicians available 24 hours a day. Of the eight hospitals in Contra Costa County, the Sutter-Delta Medical Center located on 3901 Lonetree Way in Antioch is the nearest hospital to the proposed site. This facility has a staff of 750, including 200 doctors, and 109 beds; it does not have a trauma center. The nearest trauma center in Contra Costa County is the John Muir Medical Center, located on 1601 Ygnacio Valley Boulevard in Walnut Creek. The response time for a trauma-related injury is about five

minutes by air and about twenty minutes by ground transportation. This facility has about 256 beds (Gaub 1998).

UTILITIES

Utility services in the DEC area are provided by Pacific Gas and Electric (PG&E).

IMPACTS

PROJECT SCHEDULE

The applicant expects project construction to begin in mid 2000 and end in mid 2002 for a total of 24 months (DEC 1998a). **SOCIOECONOMICS TABLE 5** indicates the total number of worker-months of employment by month during project construction. The peak construction period is expected to last from approximately January 2001 through September 2001. Including construction of the gas pipeline and transmission line, there will be a maximum of 575 workers on-site and an average of 298 workers on-site during the peak construction period (DEC 1998a). The applicant states that operation of the power plant will employ about 24 full-time workers, consisting of engineers, equipment operators, maintenance, and security staff.

SOCIOECONOMICS TABLE 5 represents the total number of trades needed for construction, and **SOCIOECONOMICS TABLE 6** represents the availability of those trades in the DEC project area and other Bay Area counties. The difference in project peak workforce numbers identified in **SOCIOECONOMICS TABLE 5** (575 workers) and **SOCIOECONOMICS TABLE 6** (388 workers) is because **SOCIOECONOMICS TABLE 6** does not include workers for the gas pipeline and transmission line.

**SOCIOECONOMICS Table 5
Construction Requirements By Month**

Job Category	2000							2001												2002		
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
POWER PLANT																						
Insulation Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	14	20	21	21	16	8	0
Boilermakers	0	0	0	0	0	0	5	15	41	57	65	69	67	61	48	30	15	5	0	0	0	0
Bricklayers/Masons	0	0	0	2	2	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0
Carpenters	0	0	7	10	14	18	18	14	14	14	12	11	11	9	9	5	5	5	5	2	1	0
Electricians	0	0	0	3	5	7	10	28	52	75	76	79	76	69	42	21	10	6	4	4	4	4
Ironworkers	0	0	3	7	10	10	19	21	23	16	9	4	2	0	0	0	0	0	0	0	0	0
Laborers	2	2	5	9	16	19	19	19	20	16	9	6	6	6	5	5	5	10	5	5	3	3
Millwrights	0	0	0	0	0	0	0	4	10	17	24	28	29	26	19	11	4	0	0	0	0	0
Operating Engrs.	4	4	6	6	6	8	12	15	16	16	16	16	14	13	10	10	7	4	2	2	1	1
Painters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	3	3	2	0
Pipefitters	0	0	0	3	5	7	20	44	69	105	137	142	110	96	66	39	20	8	6	4	4	4
Sheetmetal Wrks.	0	0	0	0	0	0	0	0	0	2	4	6	4	2	0	0	0	0	0	0	0	0
Surveyors	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0
Teamsters	2	2	3	3	4	4	4	4	5	5	5	5	4	4	4	4	3	3	2	2	1	1
TOTAL MANUAL STAFF	10	10	26	45	64	77	111	168	254	327	361	370	327	286	217	141	94	62	53	38	26	13
TOTAL CONTRACTOR STAFF	4	10	14	19	22	27	30	31	34	35	35	35	35	34	33	29	26	19	13	9	8	6
TOTAL SITE STAFF	14	20	40	64	86	104	141	199	288	362	396	405	362	330	250	170	120	81	66	47	34	19
GAS PIPELINE																						
Foreman											6	6	5	2								
Welders											6	12	9	2								
Mechanics											3	3	2	1								
Equipment Operators											26	38	30	8								
Laborers											35	56	43	16								
Teamsters											12	12	10	6								
Flagmen											6	6	6	4								
Management/Office											7	7	7	2								
TOTAL SITE STAFF											103	140	112	41								
ELECTRIC TRANS. LINE																						
											22	30	24	16	6							
GRAND TOTAL SITE STAFF	14	20	40	64	86	104	141	199	288	362	521	575	498	387	256	170	120	81	66	47	34	19

Source: DEC 1999

SOCIOECONOMICS TABLE 9
Available Construction Workers by Craft

Trade	Project Peak Workforce Numbers	Total Workers 1994/1995	Total Workers 2001/2002	Contra Costa County		Alameda County		San Joaquin County		Solano County		Marin County	
				1995	2002	1995	2002	1995	2002	1995	2002	2002	2002
Carpenters	18	7840	8740	210	2420	3360	3790	830	880	830	860	710	790
Laborers	61	3990	4750	1190	1460	1780	2140	240	270	410	450	370	430
Ironworkers	38	1930	1760	260	300	1280	1140	160	170	190	110	40	40
Finishers	18	1970	2310	530	650	660	790	260	280	420	470	100	120
Operators	22	1170	1100	470	550	180	200	90	100	210	220	30	30
Pipefitters	65	2850	3160	820	980	1180	1280	340	370	600	340	170	190
Electricians	57	5080	5300	1680	1910	2050	2220	440	450	630	420	280	300
Millwrights	15	530	480	200	150	150	180	130	120	50	50	N/C	N/C
Boilermaker	25	120	100	120	100	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Insulators	48	660	770	110	150	280	370	70	80	200	170	N/C	N/C
Painters	12	3110	3450	770	960	1380	1470	290	310	300	290	370	420
Teamsters	9	13130	13510	2590	2700	5720	5580	3010	3220	1210	1370	600	640

Source: US Greiner Woodward Clyde; Employment Development Department, Labor Market Division

PROJECT SPECIFIC IMPACTS

ENVIRONMENTAL JUSTICE SCREENING ANALYSIS

For all siting cases, Energy Commission staff will follow the federal guidelines' two-step screening process. The process will assess:

- whether the potentially affected community includes minority and/or low-income populations; and
- whether the environmental impacts are likely to fall disproportionately on minority and/or low-income members of the community.

Depending on the outcome of the screening process, local community groups will be contacted to provide the Energy Commission with a fuller understanding of the community and the potential environmental justice issues. In addition, local community groups will be asked to help identify potential mitigation measures.

SOCIOECONOMICS TABLE 1 contains demographic information for census tracts within five miles of the project site. Data for this table were taken from the 1990 US Census Data, as specified in the USEPA Guidelines (guidelines) for use in an environmental justice analysis (USEPA 1996). Energy Commission staff is aware that data from the 1990 Census may not accurately represent the 1999 population. Census estimates and projections are done only on a countywide basis and the most recent data is for the year 1994 (Heim, Doche, Choi, Scheuermann 1998). There are inherent problems with using countywide population projections for 1994. Using countywide data could artificially inflate or dilute the presence of affected minority and/or low-income populations. For purposes of analyzing environmental justice issues, the DEC study area comprises certain census tracts within the City of Pittsburg. It is for this reason that Energy Commission staff is using demographic data from census tracts within five miles of the DEC to determine the presence of minority and/or low-income populations.

Energy Commission staff is aware that population shifts since the 1990 US Census may indicate the presence of affected minority and/or low-income populations in the DEC area. If members of the community believe there may be potential environmental justice issues, Energy Commission staff will work with the community using non-traditional data gathering techniques, including outreach to community-based organizations to identify distinct minority and/or low-income populations living within the DEC area.

According to the guidelines, a minority population exists if the minority population percentage of the affected area is fifty percent or greater than the affected area's general population. Based on the screening process for environmental justice, information in **SOCIOECONOMICS TABLE 1** indicates that the minority population of the affected area is not greater than fifty percent of the general population. Therefore, because the minority population is less than fifty percent, there appears

to be no potential minority population based environmental justice issues in the DEC area.

The poverty threshold for a family of four persons was \$12,674 per year (1990 US Census Data). To determine the number of persons below the poverty level, Energy Commission staff reviewed data from the 1990 US Census: Poverty Status By Age; Universe: Persons for whom poverty status is determined (the aggregate number of persons five years and under to seventy-five years and over).

SOCIOECONOMICS TABLE 2 indicates that the total number of people living below the poverty level is 8,734, which is about ten percent of the total population of the census tracts within five miles of the DEC site.

SOCIOECONOMICS Table 1
Demographic Profile for Census Tracts Within Five Miles of the DEC Site

Census Tract	Hispanic Origin	White	Black	American Indian	Asian Pacific Islander	Other Race	Total by Tract
3050	1,763	3,695	158	88	139	22	5,865
3072-01	558	2,141	168	14	158	6	2,487
3072-04	614	3,020	51	45	130	3	3,813
3072-02	802	2,565	287	27	135	26	3,842
3060-01	1,192	5,867	84	45	100	15	7,303
3071-01	515	3,592	53	52	141	17	4,370
3080-01	973	5,623	165	16	197	8	6,982
3071-02	873	3,603	51	25	129	5	4,686
3090	500	756	729	7	79	0	2,071
3100	1,837	1,244	696	27	145	10	3,959
3110	1,749	1,228	663	17	451	5	4,133
3120	93	555	1,324	0	241	16	2,229
3131-01	1,258	3,647	962	35	620	18	6,540
3131-03	816	3,254	500	23	463	4	5,060
3072-05	904	4,876	218	33	289	0	6,320
3551-01	1,408	8,891	308	42	937	7	11,593
3080-02	249	1,899	55	0	226	0	2,429
3060-02	304	1,197	80	4	126	0	2,511
Totals	16,408	57,653	6,552	500	4,706	162	86,193
% of Totals	19%	67%	8%	<1%	5%	<1%	100%
Source: 1990 US Census Data, Statistical Information on Population							

SOCIOECONOMICS Table 2

Percentage of Persons Living Below the Poverty Level Within Five Miles of the DEC Site

Census Tract	Number of Persons in Tract	Persons Below Poverty Level
3050	5,865	1,228
3072-01	2,487	331
3072-04	3,813	101
3072-02	3,842	877
3060-01	7,303	615
3071-01	4,370	337
3080-01	6,982	549
3071-02	4,686	527
3090	2,071	437
3100	3,959	806
3110	4,133	551
3120	2,229	445
3131-01	6,540	611
3131-03	5,060	203
3072-05	6,320	818
3551-01	11,593	201
3080-02	2,429	53
3060-02	2,511	44
Totals	86,193	8,734
Source: 1990 US Census Data, Statistical Information on Population		

As stated above, a minority population exists if the minority population percentage of the affected area is fifty percent or greater than the affected area's general population. Because the guidelines do not give a percentage of the population as a threshold to determine the existence of a low-income population, Energy Commission staff used the fifty-percent rule as required for minority populations. Because the low-income population is less than fifty percent, there appears to be no potential low-income population based environmental justice issues in the DEC area.

HOUSING

The applicant expects that hiring of construction workers will occur within the four-county project area. Therefore the potential demand for housing is expected to be minimal. Any weekly-commuting construction workers could affect temporary housing stock such as motels or weekly rentals. However, any demand for additional housing as a result of project construction or operation can be accommodated by the existing vacancy rates in Pittsburg and Antioch. Additional temporary housing is available in motels and hotels in the Pittsburg/Antioch area.

PUBLIC SERVICES

Potential impacts to public services during construction could result from on-site construction activities. These impacts could result from construction-related demands for police, fire, medical, and other emergency services. In addition to medical and emergency response services provided by Contra Costa County, the applicant states that on-site fire protection services will be provided. Please refer to the **Worker Safety** section of the Preliminary Staff Assessment for a discussion of applicant-proposed on-site fire protection services. The Contra Costa County Fire Protection District will receive a one-time fire facilities fee, which will be assessed after project construction. This fee is part of the building permit fees collected by the City of Pittsburg and is assessed at \$0.15 per square foot for each building on the site. Energy Commission staff has not identified project-related impacts to police or medical services. Project-related impacts to the Contra Costa County Fire Protection District are discussed below

Energy Commission staff received two letters from the Contra Costa County Fire Protection District (CCCFPD) dated June 7 and 11, 1999 requesting a 100 foot ladder truck and Type 1 fire engine. The CCCFPD is requesting that this equipment be provided by the PDEF and DEC projects, be constructed to the CCCFPD's standards, and be in service prior to construction of both facilities. With the provision of this equipment, the District will be able to provide the required level of fire protection to the service areas for Stations 81 and 84 (Ryan, Savell 1999). Energy Commission staff held a workshop on June 30, 1999 with the CCCFPD, PDEF, DEC, and the City of Pittsburg to determine the proportional cost of the requested equipment to the PDEF and DEC. At this time, the affected parties have not reached a conclusion regarding mitigation. Energy Commission staff will work to resolve the issue with respect to the cost of fire equipment to the DEC prior to the Final Staff Assessment.

UTILITIES, WASTE MANAGEMENT, HAZARDOUS WASTE, WATER DEMAND, WASTEWATER DISPOSAL

Please refer to the sections on **WATER RESOURCES** and **WASTE MANAGEMENT** for detailed discussions of water supply, water quality, wastewater disposal, and solid waste disposal.

SCHOOLS

The Pittsburg Unified School District assesses developer fees of \$0.31 per square foot for commercial or industrial development (DEC 1998a). The applicant states in the AFC that the project will total an estimated 19,000 square feet. Therefore, the DEC

will be assessed a one-time developer fee of \$5,890. Developer fees can be spent on both temporary and permanent construction and on offices, multipurpose rooms, bathrooms, and other facilities, and transportation as well as classrooms. There is no way to determine which schools within the Pittsburg Unified School District will receive these fees or how they will be spent. The Antioch Unified School District charges developer fees for commercial, industrial and residential construction. The fee is \$0.31 per square foot. No fees are charged for pipelines of utilities, thus the proposed DEC will not be required to pay developer fees to the Antioch Unified School District.

Construction and operation of energy projects can cause impacts to local school districts that are at or over capacity by adding to the enrollment of those districts. To adequately address increases in enrollment, those districts must incur additional costs for additional teachers and classrooms. The applicant expects to hire construction workers from within the three-county project area, and therefore does not expect construction workers and their families to relocate to Pittsburg or Antioch for the duration of the construction period. DEC expects to hire facility employees from the local workforce and from existing Calpine staff. Therefore, the plant operation workforce would currently reside in the county or commute from other Bay Area locations. Staff's independent analysis on worker availability concurs with the findings of the applicant's, and staff does not expect any project-related adverse effects to the Pittsburg Unified School District as a result of project construction or operation. In addition, Senate Bill 50, signed by Governor Wilson on August 27, 1998, amended section 17620 of the Education code, and restricts school funding to property taxes and statutory facility fees collected at the time the building permit is acquired. Public agencies may not impose fees, charges or other financial requirements to offset the cost for "school facilities". School facilities are defined as "any school-related consideration relating to a school district's ability to accommodate enrollment." Therefore, any project-related revenues to school districts can be imposed only through property taxes and statutory facility fees collected at the time the building permit is acquired.

IMPACT ON FISCAL RESOURCES AND THE LOCAL ECONOMY

PROPERTY TAX

In April 1999, the Board of Equalization Property Tax Committee formally adopted to assess only those companies that own generation facilities with a Certificate of Public Convenience and Necessity (CPCN). A CPCN is issued by the California Public Utilities Commission for non-merchant power plants. The property of all other companies owning generation facilities and selling electricity to the public would be county assessed. Therefore, the DEC as with all merchant plants, will be assessed by the county where sited. The applicant estimates the capitol cost of the project to be between \$350 and \$450 million dollars, therefore, based on the countywide property tax rate of 1.0 percent, the project is expected to generate between \$3.5 and \$4.5 million in property taxes in Contra Costa County each year (DEC 1998a). Property tax reflects the value of the completed facility and will not be realized by the county until after completion of construction. Total property tax revenues collected in Contra Costa County in 1997-1998 were about \$744 million. About 49 percent of revenues went to schools, 13 percent went to the county general fund, 9 percent went to fire

services, and the remainder was paid to other funds (DEC: State Board of Equalization 1998). Using the same percentages for calculating project property tax revenue flow, between about \$1.75 and \$2.25 million from annual property taxes paid by the DEC is expected to go to school districts in Contra Costa County.

LOCAL PURCHASING OF EQUIPMENT AND SUPPLIES

The DEC's annual operation payroll is expected to be about \$1.2 million. The annual operations budget is expected to be between \$2 and \$4 million, all of which would be spent locally (DEC 1998a). The annual maintenance budget is expected to be between \$10 and \$15 million. Staff does not know how much of the maintenance budget would go to local expenditures. The estimated total construction payroll is about \$36 million. The DEC estimates that local purchases of materials and supplies during construction would be between \$5 and \$10 million. The sales tax rate in Contra Costa County is 8.25 percent; of this, six percent goes to the state, 1.25 percent goes to local general operations and transportation, and 1.00 percent goes to local special districts. Therefore, local purchasing of equipment and supplies and local spending by construction workers and permanent employee households will generate moderate income for Contra Costa County and the cities of Pittsburg and Antioch in the form of sales tax revenues.

CUMULATIVE IMPACTS

Please refer to the **WATER RESOURCES** section for a discussion on water resources.

Construction of the DEC is expected to begin in mid 2000 and end in mid 2002 for a total of 24 months. The peak construction period for the DEC is expected to last from approximately January 2001 through September 2001, with an average of 298 workers on-site during the peak construction period. The PDEF is scheduled for construction and operation during the same time frame as the DEC. Construction of the PDEF is expected to begin in mid 1999 and end in early 2001. The peak construction period is expected to extend from March 2000 through September 2000, with an average of 277 workers on-site during that period. Although the construction schedules for both projects are tentative, based on current information it appears that construction overlap for the two projects will occur from mid 2000 through early 2001, for a period of about seven or eight months. Energy Commission staff notes that peak construction periods for the two projects will not overlap.

Because of the amount of continuing construction of oil refineries and other industrial facilities, Contra Costa and surrounding Bay Area Counties contain a large number of the type of craft workers required for power plant construction. In addition, Calpine/Bechtel has stated that the DEC's construction workforce will be drawn from craft unions in Contra Costa and surrounding Bay Area Counties (DEC 1998a). As shown in **SOCIOECONOMICS TABLE 9**, due to the availability of local labor, Energy Commission staff does not expect any adverse cumulative impacts to schools, housing, or public services.

As stated above, the CCCFPD's request for replacement fire equipment to adequately serve the areas within Stations 81 and 84 represents a cumulative impact involving

the DEC and PDEF projects. Energy Commission staff held a workshop on June 30, 1999 with the CCCFPD, PDEF, DEC, and the City of Pittsburg to determine the proportional cost of the requested equipment. Energy Commission staff will work to resolve the issue prior to the Final Staff Assessment.

FACILITY CLOSURE

Energy Commission staff does not know of any Socioeconomic LORS related to facility closure. Facility closure would have to comply with the Facility Closure conditions of certification contained in the **FACILITY CLOSURE** section of the PSA.

MITIGATION

Because the applicant has identified economic and fiscal benefits to the project area through sales tax and direct purchases of construction materials and services from local vendors (DEC 1998a), Energy Commission staff is proposing a condition of certification to ensure that some economic benefit occurs in the project area. In addition, Energy Commission staff is working towards appropriate mitigation with PDEF and DEC to establish a mechanism to fund the requested fire protection equipment.

CONCLUSION AND RECOMMENDATION

The applicant has proposed economic and fiscal benefits to the project area. To ensure that some economic benefit occurs in the project area, Energy Commission staff has proposed a condition of certification that requires the project owner and its contractors and subcontractors to recruit employees and procure materials and supplies locally. If the Energy Commission certifies the proposed project, staff recommends that it adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner and its contractors and subcontractors shall recruit employees and procure materials and supplies within Contra Costa County first, and Alameda, San Joaquin, and Solano Counties second unless:

- to do so will violate federal and/or state statutes;
- the materials and/or supplies are not available; or
- qualified employees for specific jobs or positions are not available; or
- there is a reasonable basis to hire someone for a specific position from outside the local area.

Verification: At least 60 days prior to the start of construction, the project owner shall submit to the Energy Commission Compliance Project Manager (CPM) copies of contractor, subcontractor, and vendor solicitations and guidelines stating hiring and procurement requirements and procedures. In addition, the project owner shall notify the Energy Commission CPM in each Monthly Compliance Report of the

reasons for any planned procurement of materials or hiring outside the local regional area that will occur during the next two months. The Energy Commission CPM shall review and comment on the submittal as needed.

SOCIO-2 The project owner shall pay the statutory school facility development fee as required at the time of filing for the “in-lieu” building permit with the City of Pittsburg Building Department.

Verification: The project owner shall provide proof of payment of the statutory development fee in the next Monthly Compliance Report following the payment.

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BIOLOGICAL RESOURCES

Marc Sazaki

INTRODUCTION

This section provides the California Energy Commission staff's analysis of potential impacts to biological resources from Calpine/Bechtel's proposal to construct and operate the Delta Energy Center (DEC). The focus of this analysis is directed toward impacts to state- and federally-listed species, fully protected species, species of special concern, wetlands, and other areas of critical biological concern. It describes the biological resources of the project site and ancillary facilities; determines the need for mitigation; determines the adequacy of mitigation proposed by the applicant and, where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels; determines compliance with applicable laws, ordinances, regulations, and standards; and recommends conditions of certification.

Threatened or endangered species are those formally recognized and listed by the state or federal government. Fully protected species receive special legal protection from the state in the form of prohibition against unpermitted take or possession. Species of special concern are candidate threatened or endangered species or unique species that are protected through state and local permitting processes by requiring mitigation to minimize potential adverse effects resulting from project development. This particular category also includes, but is not limited to, those rare and endangered plant species recognized by the California Native Plant Society. Though endangered plant species recognized by the California Native Plant Society may not be formally listed by state or federal governments, the same species may be considered endangered under the California Environmental Quality Act (CEQA) (Cal. Code Regs., tit. 14, §15380 (d)). Recreational species are generally ones that are harvested by the public for sport or utilized for nonconsumptive purposes.

Areas of critical concern are special or unique habitats or biological communities. This category includes, but is not limited to, wildlife refuges and wetlands. Both species of special concern and areas of critical concern may be identified by the California Natural Diversity Data Base (CNDDDB) and other state, federal, and local agencies with responsibility within the project area or by educational institutions, museums, biological societies and special interest groups that might have specific knowledge of resources within the project area.

Biological resource surveys conducted by consultants for the applicant provide information useful in determining the potential impacts related to the power plant and its ancillary facilities. (DEC 1998a, pages 8.2-21 thru 8.2-39.) The applicant has proposed measures to minimize potential impacts on biological resources. These proposed actions appear to be appropriate for the project being proposed considering the disturbed setting in which it will be constructed and operated

If the proposed Conditions of Certification for biological resources are required and subsequently implemented, staff concludes that there should be no significant biological resources impacts associated with the construction and operation of the proposed Delta Energy Center.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

- The Endangered Species Act of 1973 (16 U.S.C., §1531 et seq.), and implementing regulations, (50 C.F.R. §17.1 et seq.), designate and provide for protection of threatened and endangered plants and animals and their critical habitat.
-
- Migratory Bird Treaty Act (16 U.S.C. §701-718) and implementing regulations (50 C.F.R.) Subchapter B (§10.1-24.12) provides protection for migratory birds.

STATE

- California Native Species Conservation and Enhancement Act, (Fish & G. Code, §1750 et seq.), mandates as state policy, maintenance of sufficient populations of all species of wildlife and native plants and the habitat necessary to ensure their continued existence at optimum levels.
- California Endangered Species Act, (Fish & G. Code, §2050 et seq.), protects California's endangered and threatened species. The implementing regulations, (Cal. Code Regs., tit.14, §670.5), lists animals of California declared to be threatened or endangered.
- Native Plant Protection Act (Fish & G. Code, §1900 et seq.), establishes criteria for determining if a species, subspecies, or variety of native plant is endangered or rare and regulates the taking, possession, propagation, transportation, exportation, importation, or sale of endangered or rare native plants.
- Fish and Game Code, section 1603 requires that any person planning to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake designated by the department, or use any material from the streambeds, must notify the department prior to such activity so that the department can carry out its mandate by proposing measures necessary to protect the fish and wildlife.
- Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibit the taking of birds, mammals, reptiles and amphibians, and fish, respectively, listed as fully protected in California.

- Fish and Game Code, section 1900 et seq., gives CDFG authority to designate state endangered and rare plants and provides specific protection measures for identified populations.
- Fish and Game Code, section 3513 makes it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act except as provided for under federal rules and regulations.

SETTING

REGIONAL DESCRIPTION

Existing wetlands and undeveloped upland areas in the Bay-Delta region support many amphibians, reptiles, passerines, raptors, shore birds, waterfowl, and small to medium sized mammals. Several plant and animal species listed under state and/or federal Endangered Species Acts are likely to inhabit the region. They include, among others, the Antioch Dunes evening-primrose (*Oenothera deltoidea* ssp. *howellii*), palmate bird's-beak (*Cordylanthus palmatus*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), salt marsh harvest mouse (*Reithrodontomys raviventris*), California clapper rail (*Rallus longirostris obsoletus*), California least tern (*Sterna antillarum browni*), and black rail (*Laterallus jamaicensis coturniculus*). Other listed species that could possibly inhabit the region are included in the AFC with brief species accounts. They are the Lange's metalmark butterfly (*Apodemia mormo langei*), known only from Antioch Dunes, Mason's lilaeopsis (*Lilaeopsis masonii*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), and vernal pool fairy shrimp (*Branchinecta lynchi*) (DEC 1998a, AFC pages 8.2-14 through 8.2-19).

Additionally, listed aquatic species that inhabit the Sacramento-San Joaquin River Delta include winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley evolutionarily significant unit (ESU) steelhead (*Oncorhynchus mykiss*), Delta smelt (*Hypomesus transpacificus*), and Sacramento splittail (*Pogonichthys macrolepidotus*). Other species proposed for listing or of special concern to responsible resource management agencies include Chinook salmon-Central Valley fall and late fall-run ESU (*Oncorhynchus tshawytscha*), spring-run chinook salmon (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*), and longfin smelt (*Spirinchus thaleichthys*) (Jones & Stokes 1998).

The Bay-Delta complex continues to be an important segment of the Pacific Flyway. There are recreation areas, both publicly and privately managed, that provide opportunities for waterfowl hunting enthusiasts as well as nonconsumptive users. Sport and commercial fisheries are ongoing enterprises within the Bay-Delta ecosystem. The status of these regulated fisheries varies from year to year reflecting changes in environmental conditions and ongoing management of water resources in upstream drainages and within the Delta complex.

SITE AND VICINITY DESCRIPTION

Site-specific field surveys for biological resources were conducted at the project site, laydown area, and linear facilities by the applicant's biologists in March, May, July, October, and December 1998, (DEC 1998a, AFC page 8.2-22). Energy Commission staff visited the power plant site in September of 1998 as part of an alternatives evaluation for the Pittsburg District Energy Facility. During a subsequent site visit in April 1999, Energy Commission staff examined the gas line corridor with the applicant and representatives from the City of Antioch's Planning Department.

The (DEC) is proposed to be constructed on 20 acres of moderately disturbed vacant annual grassland adjacent to a portion of the Delta Diablo Sanitation District facility. An additional 16 acres of annual grass land acres just south of the power plant site will be used as a construction laydown area. The project will lie about two tenths of a mile north of the Pittsburg/Antioch Highway and a half mile south of New York Slough. Two transmission lines will be constructed. The first, a 13.8 kV line approximately 0.8 miles long and undergrounded through existing roadways, railroad rights-of-way, and annual grasslands, will be routed around sensitive species habitat and interconnect to the existing Dow Chemical Facility. The second, a 3.3 mile-long, 230 kV transmission line, will be strung on 105 foot steel poles proceeding in a westerly direction for approximately 1.3 miles before it will be undergrounded the remaining 2.0 miles where it will interconnect with Pacific Gas and Electric's (PG&E) substation near the Pittsburg Power Plant (DEC 1999b, page 1-4). This line will traverse densely urbanized areas within the city of Pittsburg with little or no valuable wildlife habitat.

Paralleling the 13.8 kV underground transmission line will be an above-ground 0.7 mile eight-inch diameter steam line terminating at the Dow Chemical Facility. In tandem with the steam line will be a condensate return line to the Delta Energy Center (DEC 1998a, AFC page 2-20 and 8.2-40).

Three 144-foot tall exhaust stacks will be associated with the heat recovery steam generators. A 60-foot tall 7x2-cell wet cooling tower structure will be installed.

A 5.2 mile, 20-inch diameter natural gas supply pipeline will be installed underground to the east, connecting to PG&E's Line 400 (DEC 1999j, pages 1-9).

Additionally, 500-foot reclaimed water supply and discharge pipelines will be installed for connection to the Delta Diablo Wastewater Treatment Facility (DDWTF) to serve the cooling water system needs of the power plant. The cooling tower condensate blowdown will be returned to the DDWTF and discharged to New York Slough under DDWTF's existing NPDES permit, or routed through a reactivated discharge pipe formerly operated by Dow Chemical Company and also discharging to New York Slough, but requiring a new NPDES permit (DEC 1999j, page 2). The pipe connecting the project to the Dow discharge line will be 1,000 feet long, and the old Dow diffuser will become known as the DEC outfall (DEC 1999c, page 26).

While there is fairly intense development (such as the Dow Chemical Facility) about 0.4 mile to the northwest, and immediately north and east of the project site, much of the area to the west for about 0.2 mile and directly north of that for about 0.5 mile is occupied by annual grasslands, freshwater marsh, and coastal brackish marsh up to New York Slough (DEC 1998a, AFC page 8.2-22). Much of the annual grassland has had some sort of surface disturbance, while the lower elevation wetlands remain somewhat undisturbed. Presently, the land at the proposed power plant and laydown area offers moderate to low quality habitat for various wildlife species, particularly small burrowing rodents. The vegetation consists of non-native herbaceous species and very few shrubs. Great Valley willow scrub occurs to the north of the project in portions of Dowest Slough and in the Dow Wetland Preserve (DEC 1998a, AFC page 8.2-24). A complete inventory of plant species observed by the project owner's consulting biologists at the power plant site and along linear facility corridors is presented in the AFC in relation to habitat type (DEC 1998a, AFC page 8.2-25 through 8.2-29). Two species found are considered important because of their designated legal status, or recognition by the California Native Plant Society. Mason's liaeopsis (*Liaeopsis masonii*) is a state listed rare plant. It was found growing amongst rocks forming the rip-rap near the Antioch Public Fishing Pier which is close to the proposed natural gas supply pipeline route. A group of about 100 Suisun Marsh aster (*Aster lentus*) plants was observed growing in the rip-rapped shoreline between the Antioch public fishing pier and Antioch's "A" Street (DEC 1999k, AFC Section: 8.2 Biological Resources).

Many wildlife species tolerant of moderately sized (50-100 acres) disturbed open spaces situated in the midst of highly developed urban surroundings such as those at and around the project site, have been observed during biological surveys conducted by project biologists (DEC 1998a, AFC pages 8.2-31 and 32). Examples include Pacific chorus frog (*Pseudacris regilla*), western fence lizard (*Sceloporus occidentalis*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), European starling (*Sturnus vulgaris*), mourning dove (*Zenaida macroura*), rock dove (*Columba livia*), Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), great blue heron (*Ardea herodias*), black-tailed hare (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), California vole (*Microtus californicus*) and Norway rat (*Rattus norvegicus*). In addition to these fairly common species, other notable animals included cliff swallow (*Hirundo pyrrhonota*), common snipe (*Gallinago gallinago*), Forster's tern (*Sterna forsteri*), sora (*Porzana carolina*), white-tailed kite (*Elanus caeruleus*), western pond turtle (*Clemmys marmorata*), and river otter (*Lutra canadensis*).

Dowest Slough is an ephemeral drainage on the west side of the project site and laydown area that runs northward to New York Slough. Within the general confines of the slough the habitat types include coastal and valley freshwater marsh, coastal brackish marsh, and great valley willow scrub (DEC 1998a, AFC page 8.2-22).

A wetland delineation done by DEC consultants identified one small (68 feet by 101 feet) seasonal wetland on the project site, and numerous other wetland habitats along the linear facilities including vernal pools, freshwater marsh, coastal brackish marsh, great valley willow scrub, and vernal marsh (DEC 1999b, pages 1-1 through

5-1). These habitat features have been clearly identified and mapped out by DEC consulting biologists. The Corps of Engineers confirmed the wetland delineation and determined the extent of its jurisdiction in a May 26, 1999 letter to Debra Crowe (USACE 1999). Consequently, DEC must file for a permit under Section 10 of the River and Harbors Act of 1899, and under Section 404 of the Clean Water Act.

In addition to the wetland delineation, a vernal pool survey for fairy shrimp and other crustaceans was conducted by DEC biologists at 20 locations including the seasonal wetland on the project site (DEC 1999m, pages 1-12). Sampling during both wet and dry season were accomplished. The species found most frequently was the versatile fairy shrimp (*Branchinecta lindahli*). During wet season sampling, a pool located between the north boundary of the project site and the BN&SF railroad tracks yielded California linderiella (*Linderiella occidentalis*) and the federally threatened vernal pool fairy shrimp (DEC 1999m, page 7). Dry season sampling indicated that cysts (fairy shrimp intermediate life stage that persists during dry periods of a vernal pool's seasonal wet-dry cycle) of vernal pool fairy shrimp exist in the seasonal wetland on the project site. California linderiella cysts were also found there.

The power plant will be south of New York Slough which flows from east to west. New York Slough is a relatively small waterway connecting the San Joaquin River to the Sacramento River downstream of their main confluence. This slough is about 1,000 feet wide due north of the power plant site and near the outfall of the DDWTF discharge pipe. The width of the San Joaquin River upstream of the point where the New York Slough branches off is about 3,900 feet.

Due north of the project site across New York Slough, lies Winter Island, and to the west of Winter Island is Browns Island. Winter Island is privately owned by Winter Island Farms. Browns Island has been designated as Browns Island Regional Shoreline, a component of the East Bay Regional Park District where high quality wildlife habitat for shorebirds, waterfowl, other animals and plants is protected by the district to the extent possible on a 695 acre delta island. Sensitive plant species occurrence on Browns Island include Delta tule pea (*Lathyrus jepsonii jepsonii*), Suisun Marsh aster, Mason's lilaepsis, Antioch dunes evening-primrose (*Oenothera deltoides howellii*), and Delta mudwort (*Limosella subulata*) (PDEF 1998, AFC Page 5.6-7&8). Recreational opportunities are available in the form of wildlife observation and fishing from canoes or kayaks. In addition, canoeing and kayaking as a recreational pastime can be enjoyed in a network of water ways only suitable for this form of watercraft. Jet skis can also make use of these waterways. On a centrally located 100-acre inholding owned by the Stockton Port District, hunting is allowed. (Fiala 1998.)

PROJECT SPECIFIC IMPACTS

The site and laydown areas are in moderately disturbed annual grasslands that include a small seasonal wetland. It was found to have cysts (an intermediate dry-period life stage) of the federally listed vernal pool fairy shrimp in it. This wetland and its inhabitants will be eliminated due to project construction. Except for white-

tailed kite, which is fully protected in California, resident wildlife are common species, none of which are listed or sensitive. Consequently, the loss of the seasonal wetland, the vernal pool fairy shrimp, and foraging habitat for the white-tailed kite, will be the impacts on biological resources that are likely to be significant.

The natural gas pipeline will be primarily routed along existing railroad rights-of-way and avoid sensitive wetland habitat and waterfront areas through the use of horizontal directional drilling, except for one segment that passes through coastal brackish marsh habitat between the Antioch Marina and the Antioch Public Fishing Pier (Strachen 1999). Here it will be buried in a trench about a quarter of a mile long. The pipeline will also parallel the southern boundary of the Antioch Dunes National Wildlife Refuge with the BN&SF railroad tracks between the refuge boundary and the new gas line. No Antioch Dunes evening primrose were observed during vegetation surveys along the pipeline route. However, there is a possibility that this sensitive plant species has established itself outside the refuge. If this is found to be true during preconstruction surveys, avoidance or other measures such as transplantation (DEC 1998a, AFC page 8.2-49) can be implemented to minimize this impact. Such measures will be incorporated into the Biological Resources Mitigation Implementation and Monitoring Plan.

Soil erosion related to construction activities can impact aquatic biological resources if allowed to enter local water ways, but potential erosion can be mitigated by applying appropriate site specific measures. An draft erosion control plan has been submitted to the Energy Commission for review and approval. Through implementation of an approved erosion control plan, as required in the Soil Resources Conditions of Certification for this project, it is anticipated that aquatic biological resources will not be significantly impacted.

The potential for bird collisions with the project turbine stacks is identified in the AFC as unlikely for special-status avian species (DEC 1998a, AFC page 8.2-43). While this may be a reasonable conclusion, CEC staff has concerns about potential impacts on other bird species that may migrate through the area in flocks, such as shore birds or passerines. These concerns are heightened because of the fairly large area of only moderately disturbed annual grasslands and various types of wetland habitats that exist between the project site and New York Slough to the north, coupled with the relatively low number of structures as tall as the 144-foot heat recovery steam generator (HRSG) stacks. There is literature documenting that bird mortalities appear to be associated with relatively tall stacks ranging from 500 to 650 feet high (Goodwin 1975; Maehr et al. 1983; Weir 1974; Zimmerman 1975). However, studies of avian collisions have focused on taller stacks. Monitoring should be done for a period of time after construction to determine if this is a significant problem related to the relatively short stacks associated with this project. The apparent paucity of literature documenting collision impacts with shorter stacks and other structures further supports the need for monitoring the HRSG stacks.

Bird collisions with local electric distribution poles and lines is expected to be very unlikely because of the relative low height of the poles, typically 105 feet, (DEC 1998a, AFC page 6-10) and, for the most part, because of their close proximity to

buildings and other structures. About 60 per cent of the western portion of the line will be buried, eliminating this concern. Where the line crosses open habitat, the risks are probably a little higher, but likely remain low because there are not many sets of transmission lines running parallel to each other along the transmission line route. The 13.8 kV line will be buried, thus eliminating any collision or electrocution concern for this feature of the project.

With respect to bird electrocution, Energy Commission staff believes that raptors and other birds likely to be in the area and possibly use transmission towers for perching have wing spans smaller than the distance between conductors, eight feet or greater (DEC 1998a, AFC page 6-10.) If a problem of this nature becomes apparent after the lines are energized and further monitoring indicates chronic mortalities persist, Energy Commission staff will coordinate with appropriate biological resource agencies to determine if protective measures should be retrofitted to the towers. The monitoring plan will be addressed in the BRMIMP.

Where transmission lines and the natural gas supply pipeline traverse habitat with riparian vegetation and/or wetland areas, transmission tower placement and gas line installation will be done to avoid these important habitats, thus limiting direct impacts to the extent possible. (DEC 1998a, AFC page 8.2-46.) Where avoidance is impossible, the applicant will confer with the appropriate resource agencies to develop adequate mitigation to protect important habitats. Mitigation measures required pursuant to Fish and Game Code Section 1603 (Streambed Alteration Agreement) are expected to be adequate for minimizing potential impacts to riparian habitat during construction. The applicant must file an application for the streambed alteration agreement and implement the terms of the agreement in order to minimize potential impacts to a level of insignificance.

Cooling tower blow-down will be delivered via pipeline to the DDWTF, commingled with other wastewater, pretreated, and subsequently discharged to New York Slough under the existing DDWTF NPDES permit (DEC 1998a, pages 8.14-6 & 11-12). With compliance of the discharge limitations established in the NPDES permit, impacts on aquatic species in the slough are not expected to be significant because discharge limits are established based on the levels necessary to protect aquatic organisms and the discharge outlet is located at the bottom of mid-channel allowing for good mixing and dilution, as described in the DEC Application for an NPDES permit (DEC 1999c). Impacts on fish and other aquatic species in New York Slough are not expected to be significant. See the **Water Resources** Section for a discussion of the applicable NPDES permitting process and water quality assessment for this project.

Cooling tower drift impacts on vegetation near the project site are not expected to be significant. The Applicant presented an assessment of this potential project related effect in response to a data request and concluded that non-criteria pollutant concentration in the cooling tower drift within the maximum drift radius. Seventy per cent of the drift is projected to deposit within 500 feet downwind of the cooling towers. Both direct foliar disposition and soil uptake were evaluated. All constituents in the drift were projected to occur in concentrations well below the

maximum annual impact values (MAIVs) against which the likelihood of detrimental effects were compared (DEC 1999d, data response # 9).

CUMULATIVE IMPACTS

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.

Considering the existing level of industrial development in close proximity to the site including the Dow Chemical Facility, as well as the DDWTF, Energy Commission staff does not regard the potential incremental biological resources impacts of the proposed project as significant except for potential emission effects. The one-hour average NO₂ emission level will exceed standards and is considered significant as an individual constituent, but not on a cumulative basis (DEC 1998a, page 8.1-50). Similarly, Enron's proposed Pittsburg District Energy Facility, a 500 MW power plant approximately 1.5 miles to the west, will exceed the one-hour average NO₂ emission standard. It is uncertain whether both exceedences being in relatively close proximity to each other, coupled with the prevailing winds in the region will have negative cumulative effects on biological resources, particularly vegetation in sensitive areas to the east. One of the more important wildlife areas close to the site of the power plant is the Dow Wetland Preserve. See the cumulative impact analysis in the **Air Quality** section for pertinent information regarding air emissions and plume dispersion that could relate to this issue. Energy Commission staff is unaware of any monitoring data that would indicate an air quality impact on vegetation providing wildlife habitat in the vicinity of the project exists.

FACILITY CLOSURE

Except for revegetation or alternative stabilization measures of any area where structures are removed so that surface soil erosion can be minimized, there is no anticipated need for other measures to address biological resource needs. If the facility is closed after a 30 plus year operational period, the surrounding community may be more highly industrialized and densely populated. In this case, restoration to natural habitat would probably not be practical, in part because the project is not on waterfront property. If the exhaust stacks or other tall structures prove to be a significant source of bird mortality, the "problem" structures should be removed when the project is closed.

MITIGATION

The applicant proposes to mitigate potential impacts identified in their AFC by implementing various mitigation measures (DEC 1998a, AFC pages 8.2-48 & 49, DEC 1999o, page 5-4).

The applicant's mitigation measures include:

1. Avoiding sensitive habitats and species during construction by developing construction exclusion zones and silt fencing in sensitive areas;

2. Avoiding Dow Wetland Preserve habitats with modifications to project design that include horizontal directional drilling of the gas pipeline under the preserve;
3. Preconstruction surveys for sensitive species in impact areas, especially near the Antioch Dunes NWR and sloughs;
4. Providing mitigation construction monitoring by a qualified Designated Biologist during construction activities near sensitive habitats;
5. Providing safety lighting that points downward on the HRSG stacks to reduce avian collisions;
6. Designing "raptor-friendly" electric transmission lines as described in the "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (APLIC 1996);
7. Implementing erosion control in the temporary impact areas, especially waterways;
8. Revegetating temporary disturbance areas with annual grassland species;
9. Providing worker environmental awareness training for all construction personnel that identifies the sensitive biological resources and measures required to minimize project impacts during construction and operation;
10. Preparing a Biological Resources Mitigation and Monitoring Implementation Plan (BRMIMP) that outlines how Calpine/Bechtel will implement the mitigation measures developed to assure any action authorized, funded, or carried out by state or federal lead agencies is not likely to jeopardize the continued existence of endangered or threatened species;
11. Preparing construction monitoring and compliance reports that analyzes the effectiveness of the mitigation measures;
12. Salvaging and replanting the cattail marsh vegetation at the stormwater discharge structure in the Dowest Slough wetland; and
13. Providing for habitat compensation of 0.48 acres of wetlands from a USFWS approved mitigation bank for the vernal pool fairy shrimp that inhabit the seasonal wetland on the DEC site.

Energy Commission staff proposes to incorporate, in part, the applicants mitigation measures above into those described below, in order to minimize potential project related impacts.

Measures to mitigate runoff of eroded soils from all construction sites where soil disturbance will occur are addressed by Energy Commission staff in the **Soil Resources** and **Water Resources** sections of the PSA respectively. The conditions of certification developed in these two technical disciplines are expected to adequately protect biological resources from the potential impacts related to site erosion and water quality.

CEC Staff Recommended Mitigation Measures

1. To ensure the likelihood of successful completion of required mitigation, the project owner should designate a qualified biologist to advise the project owner or its project manager on the implementation of these Conditions of Certification, and to supervise or conduct mitigation, monitoring, and other biology compliance efforts.
2. To promote project personnel's general understanding of environmental concerns associated with the project and enhance the likelihood of their compliance with conditions of certification, the owner should institute an employee environmental awareness program in which each of its own employees, as well as employees of contractors and subcontractors who work on the project site during construction and operation are informed about biological resource sensitivities associated with the project.
3. In order to prevent animals from becoming trapped in any trenches excavated while installing natural gas pipelines or underground transmission lines, the project owner, at the end of the work day, should have any open portions of the trench covered if left unattended.
4. The project owner should develop and implement a plan to monitor bird mortality due to collision with the HRSG stacks on the project.
5. The project owner should provide 1.0 acre of upland habitat in addition to the 0.48 acres of wetland habitat to compensate for the loss of foraging habitat of white-tailed kite.

COMPLIANCE WITH LORS

The applicant has completed a wetland delineation and received a confirmation letter from the U.S. Army Corps of Engineers which describes the extent of the Corps' jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. The applicant is in the process of filing applications with the Corps to acquire permits under both laws. To comply with the federal Endangered Species Act requirements pertaining to the anticipated take of the vernal pool fairy shrimp, the applicant is preparing a Biological Assessment for

the Corps Section 7 consultation with the U.S. Fish and Wildlife Service. A Notice of Streambed Alteration is being prepared for filing with the California Department of Fish and Game in compliance with Section 1603 of the Fish and Game Code.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

This analysis has identified potentially significant impacts related to surface disturbance of wetland areas and bird collisions with project features. These potential impacts are associated with project related construction and operation, but are not expected to be significant with the implementation of proposed mitigation and any terms and conditions included in a federal take authorization under the Endangered Species Act or Section 10 and 404 permits, as well as a state Section 1603 streambed alteration agreement.

RECOMMENDATIONS

From a biological resources perspective, the project should be approved with the staff proposed conditions of certification. These conditions of certification encompass those recommended by the project applicant.

CONDITIONS OF CERTIFICATION

Implementation of the mitigation measures described herein, and as proposed in the following conditions of certification, will reduce the potential for significant biological impacts of the proposed project.

BIO-1 Construction-site and/or ancillary facilities preparation (described as any ground disturbing activity other than allowed geotechnical work) shall not begin until an Energy Commission Compliance Project Manager (CPM) approved designated biologist is available to be on site.

Protocol: The designated biologist must meet the following minimum qualifications:

- 1) a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field,
- 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,
- 3) one year of field experience with resources found in or near the project area, and

4) ability to demonstrate to the satisfaction of the CPM the appropriate education and experience for the biological resource tasks that must be addressed during project construction and operation.

If the CPM determines the proposed designated biologist to be unacceptable, the project owner shall submit another individual's name and qualifications for consideration.

If the approved designated biologist needs to be replaced, the project owner shall obtain approval of a new designated biologist by submitting to the CPM the name, qualifications, address, and telephone number of the proposed replacement.

Verification: No disturbance will be allowed in any designated sensitive area(s) until the CPM approves a new designated biologist and that designated biologist is on-site. At least 30 days prior to the start of surface disturbing activities at the project site and/or at ancillary facilities, the project owner shall submit to the CPM for approval, the name, qualifications, address, and telephone number of the individual selected by the project owner as the designated biologist. If a designated biologist is replaced, the information on the proposed replacement as specified in the condition must be submitted in writing to the CPM.

If the project owner is not in compliance with any aspect of this condition, the CPM will notify the project owner of making this determination within 14 days of becoming aware of the existence of any noncompliance. Until the project owner corrects any identified problem, construction activities will be halted in areas specifically identified by the CPM or designee as appropriate to assure the potential for significant biological impacts is avoided.

For any necessary corrective action taken by the project owner, a determination of success or failure of such action will be made by the CPM 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.

BIO-2 The CPM approved designated biologist shall perform the following duties:

1) advise the project owner's supervising construction or operations engineer on the implementation of the biological resource conditions of certification,

2) supervise or conduct mitigation, monitoring, and other biological resource compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as, wetlands and special status species, and

3) notify the project owner and the CPM of any non-compliance with any condition.

Verification: The designated biologist shall maintain written records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM.

BIO-3 The project owner's supervising construction and operating engineer shall act on the advice of the designated biologist to ensure conformance with the biological resource conditions of certification.

Protocol: The project owner's supervising construction and operating engineer shall halt, if needed, all construction activities in areas specifically identified by the designated biologist as sensitive to ensure that potential significant biological resource impacts are avoided.

Protocol: The designated biologist shall:

- 1) advise the project owner and the supervising construction and operating engineer when to resume construction, and
- 2) advise the CPM if any corrective actions are needed or have been instituted.

Verification: Within two working days of a designated biologist notification of non-compliance with a Biological Resources condition or a halt of construction, the project owner shall notify the CPM by telephone of the circumstances and actions being taken to resolve the problem or the non-compliance with a condition.

For any necessary corrective action 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.

BIO-4 The project owner shall develop and implement a Worker Environmental Awareness Program in which each of its own employees, as well as employees of contractors and subcontractors who work on the project site or related facilities (including any access roads, storage areas, transmission lines, water and gas lines) during construction and operation, are informed about biological resource sensitivities associated with the project.

Protocol: The Worker Environmental Awareness Program:

- a) shall be developed by the designated biologist and consist of an on-site or classroom presentation in which supporting written material is made available to all participants;
- b) must discuss the locations and types of sensitive biological resources on the project site and adjacent areas;

- c) must present the reasons for protecting these resources;
- d) must present the meaning of various temporary and permanent habitat protection measures;
- e) must identify who to contact if there are further comments and questions about the material discussed in the program; and,
- f) shall inform workers of the potential biological resource impact risk associated with all construction and operational activities as is appropriate and emphasize protection of sensitive resources such as the coastal brackish marsh where trenching in the wetland will take place.

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

Each participant in the on-site Worker Environmental Awareness Program shall sign a statement declaring that the individual understands and shall abide by the guidelines set forth in the program material. Each statement shall also be signed by the person administering the Worker Environmental Awareness Program.

The signed statements for the construction phase shall be kept on file by the project owner and made available for examination by the CPM for a period of at least six (6) months after the start of commercial operation. Signed statements for active operational personnel shall be kept on file by the project owner for the duration of their employment and for six months after their termination.

Verification: At least 30 days prior to the start of surface disturbing activities at the project site and/or at ancillary facilities, the project owner shall provide copies of the Worker Environmental Awareness Program and all supporting written materials prepared by the designated biologist and the name and qualifications of the person(s) administering the program to the CPM for approval. The project owner shall state 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.

BIO-5 The project owner shall submit to the CPM for review and approval a copy of the Biological Resources Mitigation Implementation and Monitoring Plan for this project.

Protocol: The Biological Resources Mitigation Implementation and Monitoring Plan shall:

- identify all sensitive biological resources to be impacted and avoided by project construction and operation;
- identify all mitigation, monitoring and compliance conditions included in the Commission's Final Decision;

- identify all conditions agreed to in any CDFG Streambed Alteration Agreement;
- indicate the placement of transmission line towers so that wetland resources will be avoided, or if not avoided, constructed in such a way that impacts will be minimized to the extent practicable.
- design new above-ground transmission lines to reduce the risk of electrocution for large birds;
- clearly delineate construction area boundaries with stakes, flagging, and/or rope to minimize inadvertent degradation or loss of wetland habitat during construction activities associated with pipelines and transmission lines;
- show all locations requiring temporary protection/signs during construction on a map of suitable scale;
- indicate duration for each type of monitoring established for mitigation actions and include a description of the monitoring methodologies and frequency;
- describe performance standards to be used to help decide if/when proposed mitigation is or is not successful;
- identify all remedial measures to be implemented if performance standards are not met;
- reduce potential bird collisions with boiler stacks, cooling towers, turbine stacks and other structures by reducing exterior lighting on all structures to the minimum except for those required for aviation warning, while all other required exterior lighting on structures will be shielded to direct light downward;
- reduce soil erosion during construction and operation by applying measures identified in the proposed Soil Resources and Water Resources conditions of certification of the Energy Commission Decision for the project and comply with State Water Resources Control Board/Regional Water Quality Control Board standards;
- to the extent practicable, minimize construction activities or access within wetlands or designated buffer areas and span wetland areas by locating towers at least 100 feet from the existing edges of the wetlands;
- provide for having a mitigation monitor who will ensure that the sensitive wetland areas are properly staked or flagged to avoid direct project impacts during construction activities, and have a qualified wetlands biologist monitor all project construction activities that could adversely impact the wetland areas and have corrective measures implemented where appropriate;

- provide for habitat compensation of 0.48 acres of wetlands from a USFWS approved mitigation bank for the vernal pool fairy shrimp that inhabit the seasonal wetland on the DEC site;
- provide 1.0 acre of upland habitat suitable for white-tailed kite foraging; and
- reduce the potential for animals falling into trenches or other excavated sites by covering them at the end of the work day if left unattended.

Verification: At least 60 days prior to the start of surface disturbing activities at the project site and/or at ancillary facilities, the project owner shall provide the CPM with the final version of the Biological Resources Mitigation Implementation and Monitoring Plan for this project, and the CPM will determine the plans acceptability within 15 days of receipt of the final plan. After the plan is approved, the project owner shall notify the CPM five working days before implementing any agreed to modifications to the Biological Resource Mitigation Implementation and Monitoring Plan.

Within 30 days after completion of construction, the project owner shall provide to the CPM for review and approval, a written report identifying which items of the Biological Resources Mitigation Implementation and Monitoring Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which condition items are still outstanding.

BIO-6 Site disturbance and project construction shall not commence until the project owner has developed a protocol for inclusion in a Biological Resources Mitigation Implementation and Monitoring Plan to monitor for bird mortality due to collision with the stacks on the project site as well as the transmission lines. Mortalities associated with transmission lines shall, to the extent possible, be identified as to whether the cause is electrocution or collision with towers or conductors. The protocol shall include a thorough description of methods for collecting and recording this data.

As part of this protocol, a report describing the results after each year of monitoring shall be submitted to the CPM on the next closest annual report date established for the project in this decision. If the CPM determines that the report content or format requires changes, the project owner shall modify the report based on the CPM's comments.

If bird mortalities are documented as a result of the monitoring, the project owner shall recommend and, if deemed necessary and acceptable by the CPM, implement mitigation measures to reduce the mortalities.

Verification: The CPM will review the Biological Resources Mitigation Implementation and Monitoring Plan submitted under condition of certification **BIO-5**. If the Biological Resources Mitigation Implementation and Monitoring Plan does not include the monitoring protocol listed above, the CPM will return the plan within

14 days to the project owner for revision. During operation of the project, the CPM or designee will determine via telephone or through visits to the project site, as deemed necessary, whether or not the project owner has complied with this condition.

The CPM will review each monitoring report and, as deemed necessary, ask the project owner to modify and/or clarify the report content and/or format.

If the project owner has not complied with any aspect of this condition, the CPM will notify the project owner of making this determination. If the project owner fails to correct any identified problem within a reasonable time, as determined by the CPM, the CPM will initiate the Energy Commission's complaint filing process.

For any necessary corrective action taken by the project owner, a determination of success or failure of such action will be made by the CPM 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.

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SOIL & WATER RESOURCES

Joseph O'Hagan and Nancy Monsen

INTRODUCTION

In this testimony, staff addresses the water and soil resource aspects of the proposed DEC, specifically focusing on the potential for the project to induce erosion and sedimentation, adversely affect water supplies, and degrade water quality. Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impact and recommends conditions of certification to ensure mitigation implementation. Also addressed by staff in this testimony is the project's ability to comply with all applicable federal, state and local laws, ordinances and standards.

Staff addresses potential drainage and flooding problem in the **Facility Design** section. Plant releases in the form of hazardous and non-hazardous wastes are described in the **Waste Management** section.

APPLICABLE LAWS, ORDINANCES, POLICIES AND STANDARDS

FEDERAL

CLEAN WATER ACT

The Clean Water Act (33 USC §1257 et seq.) requires states to set standards to protect water quality. Point source discharges to surface water are regulated by this act through requirements set forth in specific or general National Pollutant Discharge Elimination System (NPDES) Permits. Stormwater discharges during construction and operation of a facility and incidental non-stormwater discharges associated with transmission and pipeline construction also fall under this act and are addressed through a general NPDES permit. Section 307 of the Act and Code of Federal Regulations 403, requires that all non-domestic discharges to wastewater treatment plants must receive a pretreatment permit. This permit is to ensure that the discharge will not interfere with the treatment processes at the plant nor make the facility violate its own discharge permit limitations.

In California, the requirements of the Clean Water Act are administered by the nine Regional Water Quality Control Boards (RWQCBs). Section 404 of the act regulates the discharge of dredged or fill material into waters of the United States, including rivers, streams and wetlands. Site specific or general (nationwide) permits for such discharges are issued by the Army Corp of Engineers (ACOE).

STATE

PORTER-COLOGNE WATER QUALITY CONTROL ACT

The Porter-Cologne Water Quality Control Act of 1967, Water Code section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. The criteria for the project area are contained in the San Francisco Bay Regional Water Quality Control Board's (SFBRWQCB) San Francisco Bay Basin Water Quality Control Plan (Basin Plan) ([SFBRWQCB] 1995). In addition to the requirements of the Basin Plan, the SWRCB (1971) adopted the Plan for the Control of Temperature in Coastal and Interstate Waters and Enclosed Bays and Estuaries. This plan sets numerical and narrative water quality standards controlling the discharge of wastes with elevated temperature to the state's waters.

Under provisions of the Clean Water Act, the SWRCB adopted two general National Pollutant Discharge Elimination System (NPDES) Permits for control of stormwater runoff during construction and operation of industrial facilities, such as a power plant and associated facilities.

Ground disturbance activities affecting greater than five acres are required, under the General Construction Activity Storm Water Permit, to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). This plan identifies best management practices to reduce sediment, oil and other contaminants in stormwater discharges from the site. The general NPDES permit for Industrial Activities also requires industrial facilities, such as power plants, to prepare and implement a SWPPP that identifies best management practices to reduce the discharge of contaminants from facility operation in stormwater discharge.

The SWRCB has also adopted a number of policies that provide guidelines for water quality protection. The principle policy of the SWRCB which addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted by SWRCB on June 19, 1976 by Resolution 75-58). This policy states that use of fresh inland waters should only be used for powerplant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy requires that power plant cooling water should, in order of priority come from wastewater being discharged to the ocean, ocean water, brackish water from natural sources or irrigation return flow, inland waste waters of low total dissolved solids, and other inland waters. This policy goes on to address cooling water discharge prohibitions.

Section 13551 of the Water Code prohibits the use of "...water from any source of quality suitable for potable domestic use for nonpotable uses, including ...industrial... uses, if suitable recycled water is available..." given conditions set forth in section 13550. These conditions take into account the quality and cost of the

water, the potential for public health impacts and the effects on downstream water rights, beneficial uses and biological resources.

Section 13552.6 of the Water Code states that the use of potable domestic water for cooling towers, if suitable recycled water is available, is an unreasonable use of water. The availability of recycled water is based upon a number of criteria, which must be taken into account by the SWRCB. These criteria are that: the quality and quantity of the reclaimed water are suitable for the use; the cost is reasonable; the use is not detrimental to public health, will not impact downstream users or biological resources and will not degrade water quality.

Section 13552.8 of the Water Code states that any public agency may require the use of recycled water in cooling towers if certain criteria are met. These criteria include that recycled water is available and meets the requirements set forth in section 13550; the use does not adversely affect any existing water right; and if there is public exposure to cooling tower mist using recycled water, appropriate mitigation or control is necessary.

LOCAL

DELTA-DIABLO SANITATION DISTRICT

Chapter 2.28 of the Subregional Sewer System Use Rules and Regulations sets forth the pretreatment requirements for non-domestic discharges to the sewer and wastewater treatment system.

CITY OF PITTSBURG GRADING ORDINANCE (1984)

The City of Pittsburg relies upon the Uniform Building Code, Chapter 33 for grading and erosion control, pursuant to Pittsburg Municipal Code Chapter 15.88 Grading, Erosion, and Sediment Control.

CITY OF ANTIOCH STORMWATER MANAGEMENT AND DISCHARGE CONTROL ORDINANCE (1995)

The Antioch Municipal Code Title 6, Chapter 9, § 6-9.01 et seq. controls non-stormwater discharges to the city's storm water system.

ENVIRONMENTAL SETTING

TOPOGRAPHY AND SOILS

The proposed DEC power plant and associated facilities are located on low-lying alluvial fan and terrace deposits on the southern side of New York Slough, a branch of the San Joaquin River. The proposed site is topographically flat and at a sea level elevation. The topography and native soils present at the site have not been extensively altered. The project area has been mowed, burned, and/or disked on an annual basis by the local fire department. The Dow Wetlands Preserve

consisting of 150 acres is located approximately 0.25 miles northeast of the proposed project's site.

The 20 acre site is reported to have a slight erosion hazard potential which requires erosion control. While considered prime agricultural land, the site is not currently under cultivation.

HYDROLOGY

Surface water bodies in the project vicinity are shown in Figure 1. New York Slough, located north of the power plant site, is a three-mile long natural channel connected to the San Joaquin River on the east and Suisun Bay on the west. The Slough is maintained for navigation and periodically dredged by the ACOE. The Slough is estimated to carry from one third to half the flow of the San Joaquin River. Other surface water bodies in the project vicinity include Kirker Creek and Dowest Slough (Kirker Creek Remnant Channel). Kirker Creek is a channelized, ephemeral stream located south of the power plant site and runs parallel to the Pittsburg-Antioch Highway. Kirker Creek now discharges into the Los Medanos Wasteway (an overflow spillway for the Contra Costa Canal operated by the Bureau of Reclamation) that flows finally into the eastern end of New York Slough ([PDEF] 1998). There are constraints to the volume of Kirker Creek discharge that is allowed by the Bureau of Reclamation. As part of development conditions that allowed rerouting of Kirker Creek, Dow Chemical constructed and operates a detention basin which accommodates storm flows in excess of that allowed for discharge into the Los Medanos Wasteway. A portion of waters detained in the Dow Chemicals basin drains into Dowest Slough. The City of Pittsburg has begun engineering and design projects to increase the capacity of Kirker Creek and detention facilities. Kirker Creek regularly floods the Antioch Pittsburg Highway (Reinders 1999). Dowest Slough is the remnant of the former Kirker Creek channel before Kirker Creek was realigned for flood control. Dowest Slough contains open water areas supporting wetland vegetation and is tidally influenced. Dowest Slough runs north-south on the Dow Chemical property. Former Kirker Creek areas are currently under investigation by the SFBRWQCB for inorganic and organic contaminants (Christian 1999).

In the project vicinity, groundwater is found in both shallow and deeper aquifers within the Pittsburg Plain groundwater basin. Groundwater typically flows from south to north discharging to New York Slough in the area of DEC. The deeper, confined aquifer is found from approximately 90 feet to 140 feet below ground surface (DEC 1998a).

Groundwater contamination has occurred as a result of industrial uses which began in the 1920's. Contamination associated with the intrusion of brackish water resulted when the groundwater was intensively used by industrial operations located in the area of DEC. However, the normal groundwater flow was reestablished when groundwater pumping was reduced in the 1950's. Contamination of the shallow aquifer with industrially used chemicals such as carbon tetrachloride has also been reported. Currently, the only local user of groundwater is the City of Pittsburg which derives approximately one-fifth of its

drinking water supply from the lower aquifer. Based upon information from two City of Pittsburg production wells, the groundwater quality of the deeper aquifer meets most drinking water standards (DEC 1998a).

ENVIRONMENTAL IMPACTS

PROJECT SPECIFIC

WATER SUPPLY

Water for the proposed DEC project will be supplied by the Delta-Diablo Sanitation District (DDSD) from the DDWTF, the Contra Costa Water District (CCWD) from the Contra Costa Canal and the City of Pittsburg from the city's potable water system. Reclaimed water from the wastewater treatment facility will be used for cooling water. Fresh water from the canal will be used for heat recovery steam generator and evaporative cooler makeup as well as for general plant service water needs. City of Pittsburg water will be used for domestic purposes (Buchanan 1999).

RECYCLED WATER

Cooling water makeup demands for the proposed project will be met with effluent from the DDWTF. The dry weather capacity of the wastewater treatment facility is 16.5 million gallons per day (mgd). During 1998, the average flow at DDWTF was approximately 13.2 mgd (Baatrup 1999). Prior to discharge, effluent at the wastewater treatment plant prior to discharge is treated to a secondary level, where most settleable solids and organic compounds are removed. Currently, all of the treated effluent is then discharged to New York Slough.

In general, cooling water demand for the proposed project varies with the number of cycles water can be circulated through the cooling process and ambient temperatures. DEC (1998a) proposes to circulate the effluent up to five cycles of concentration, but because of wastewater quality limitations, may have to circulate the water through only three cycles. For three cycles of concentration, under average operating conditions, the proposed project will require approximately 5.07 mgd of secondary treated effluent from the DDWTF. Under maximum operating conditions, the demand for effluent will rise to 8.02 mgd (DEC 1999g, data response number 76). In the industrial pretreatment application (DEC 1999o), 8.5 mgd is indicated. For five cycles of concentration, under average operating conditions, the proposed project will require approximately 4.22 mgd of effluent while peak conditions will require approximately 6.68 mgd. Maximum conditions are anticipated to occur when ambient temperature equals or exceeds 90° F.

The California Department of Health Services (DHS) is currently promulgating regulations under Title 22 of the California Code of Regulations that require recycled water used in systems with cooling towers to be disinfected tertiary recycled water. Tertiary treatment consists of the removal of additional organic compounds and settleable solids. DEC (1998a) intends to treat effluent from the

DDWTF to meet tertiary criteria at the power plant site. This treatment process is discussed further in the **Public Health** section.

To provide recycled water to the proposed project, DDSO must receive a General Water Reuse Permit from the SFBRWQCB. This permit is in lieu of a Master Recycling Permit required by section 13523 et seq. of the California Water Code. This permit allows the sanitation district to establish and enforce requirements for recycled water users such as the proposed project. DDSO has not yet filed a notice of intent (application) to the SFBRWQCB (Condit 1999).

The backup cooling water makeup supply is water from the Contra Costa Canal. Since the quality of this water is superior to that of the recycled water from the wastewater treatment facility, it could be cycled more often through the cooling process and, thus a smaller amount, compared to recycled water would be required.

As noted above, during 1998, the average flow at the DDWTF was approximately 13.2 mgd (Baatrup 1999). Allowing for the 3.4 mgd of effluent that will be provided the proposed Pittsburg District Energy Facility (PDEF), sufficient effluent is available to supply the proposed project.

CONTRA COSTA CANAL WATER

Water for heat recovery steam generator (HRSG), auxiliary boiler and evaporative cooler makeup and other plant service water demands will be supplied from the Contra Costa Water District through an existing Dow Chemical connection with the Contra Costa Canal. Untreated water in the 48-mile long canal is diverted by the Contra Costa Water District from the San Joaquin River Delta. This is done under a contract with the U.S. Bureau of Reclamation for up to 195,000-acre feet per year. Other water contracts allow the water district to divert approximately an additional 50,000-acre feet of water per year. The water agency diverts on average 100,000 to 120,000-acre feet of water per year (Nolan 1999). Canal water represents approximately 80 percent of the City of Pittsburg's water supply and approximately 40 percent of the City of Antioch's supply.

Under average operating conditions, this demand represents approximately 0.22 mgd, under peak operating conditions, the demand raises to 0.80 mgd (DEC 1999g, data response number 76). Peak conditions are anticipated to occur when ambient temperature equals or exceeds 90° F. Over a year, given that peak operating conditions only occur during the summer months, the project will likely require approximately 400 acre feet of canal water.

DEC (1998a) has identified Contra Costa Canal water as the backup cooling water for the power plant if effluent from the wastewater treatment plant is not available. In a worse case situation, DEC estimates that, lacking effluent from the DDWTF, 5,000 acre feet of water from the Contra Costa Water District would be required over the course of a year (Buchanan 1999). As noted above, the Water District's current diversions are well below contractual limits. Furthermore, even under likely drought conditions, diversions would likely be sufficient to provide the project with water (East County Water Management Association 1996). An interruption in effluent

from the wastewater treatment plant being available is, however, likely to be of short duration.

POTABLE WATER

Potable water for the proposed project will be supplied by the City of Pittsburg. The city supply is mainly Contra Costa Canal water augmented with groundwater. Supply is more than adequate to meet the approximately 2 gpm of the project (DEC 1999o).

WATER QUALITY

The proposed project could adversely affect surface and groundwater through inadvertent spills and discharges during construction and operation. Wastewater discharges to the DDWTF may adversely affect treatment processes or cause the facility to exceed its own discharge limitations.

WASTEWATER

Wastewater from the proposed project will include cooling tower, evaporative cooler, heat recovery steam generator (HRSG) blowdown, filtration and reverse osmosis backwash and water from the oil/water separator (DEC 1998a). Cooling tower blowdown represents the majority of the wastewater generated by the project, approximately 72 percent. Therefore, the volume of wastewater will vary with the number of cycles cooling water is circulated through the cooling towers. With three cycles of concentration, average and peak operating conditions will generate 1.79 mgd and 2.97 mgd, respectively. With five cycles of concentration, average and peak operating conditions will generate 0.94 mgd and 1.62 mgd, respectively. These values are based upon revised water balance diagrams in data response 80 (DEC 1999g). Elsewhere, DEC (1999o, pages 5 and 8) suggests an average annual daily wastewater flow of 2.09 mgd and 3.39 mgd.

Estimated water quality based upon five cycles of concentration is shown in Soil and Water Table 1. Constituents of concern in the wastewater generally reflect a concentration of those conservative, inorganic constituents already present in the source water supply-the wastewater effluent. Although a significant portion of the wastewater is lost as it cycles through the cooling tower, it is assumed that none of the inorganic constituents are lost. Instead they are concentrated in the cooling water blowdown.

DEC has proposed that wastewater discharge flows from the project will either be discharged to New York Slough through the DDWTF's outfall or through an existing, currently unused Dow Chemical outfall (DEC 1998a; 1999c). DEC has recently reported that efforts to obtain NPDES permitting of wastewater discharges using the existing Dow Chemical outfall will be abandoned. DEC's use of the Dow Chemical outfall is considered as a new source under NPDES regulations and the SFBRWQCB has indicated that the use of a 10:1 dilution credit would be disallowed, reflective of the designation of Suisun Bay as an impaired water body (Moghbel 1999b).

As shown in Soil & Water Figure 1, New York Slough, located north of the power plant site, is a three-mile long natural channel connected to the San Joaquin River on the east and Suisun Bay on the west. The slough is estimated to carry from one third to half the flow of the San Joaquin River. The SFBRWQCB considers New York Slough as part of Suisun Bay. A number of beneficial uses for the slough has been identified by the SFBRWQCB, include municipal and agricultural supply. Other discharges to New York Slough in the project vicinity include Dow Chemical, USS Posco and the DDSD.

The location of the water intake for the City of Antioch, approximately two miles upstream of the DDWTF outfall, is also shown in Soil & Water Resources Figure 1. The City takes up to 16 mgd of water from this uptake, representing approximately 60 percent of the city's water supply.

Suisun Bay has been identified by the United States Environmental Protection Agency ([EPA] 1999) and the SWRCB as an impaired water body for selenium, nickel, copper and mercury. This designation reflects that ambient levels of these constituents are too high to protect beneficial uses.

The Dow Chemical and the DDSD outfalls are shown in Soil and Water Figure 1. The DDWTF outfall extends approximately 710 feet into the channel and terminates at a depth of about 22 feet below mean sea level (DEC 1999). The Dow Chemical outfall extends approximately 360 feet into the channel and terminates at a depth of 36 feet below mean sea level (DEC1999c).

The proposed discharge of wastewater either through the DDWTF's outfall or through the Dow Chemical outfall (DEC 1998a; 1999c) will require a NPDES permit issued by the SFBRWQCB. On April 19, 1999, DEC filed an application for an NPDES permit for use of either of the two outfalls. It is anticipated that a draft permit may be available this October (Moghbel 1999a). DEC has recently reported that efforts to obtain NPDES permitting of wastewater discharges using the existing Dow Chemical outfall will be abandoned. DEC's use of the Dow Chemical outfall is considered as a new source under NPDES regulations and the SFBRWQCB has indicated that the use of a 10:1 dilution credit would be disallowed, reflective of the designation of Suisun Bay as an impaired water body (Moghbel 1999b).

The DEC discharge will not cause an increase in the total mass pollutant loading to New York Slough, compared to the existing DDWTF discharge. Although the volume of the discharge will be reduced, the pounds per day of the inorganic constituents discharge will not change. This discharge merely represents a redirection of a portion of the existing wastewater treatment plant's discharge. The concentration of the new discharge, however, is elevated compared to that of the DDWTF's. This is because a significant portion of the source water is lost as evaporation from the cooling process. Conservative inorganic constituents (such as metals) in the source water, however, are not lost through the cooling process and become concentrated in the cooling water blowdown. Other processes, such as the reverse osmosis water treatment also concentrate most of these constituents from the canal water into the wastewater stream. Based upon a mass balance of individual flows and constituent levels that will contribute to the waste stream, DEC

RESERVED FOR FIGURE 1

estimates that constituents in the source water, with five cycles of concentration will increase by a factor of 3.5 (1998a; 1999c, data response number 81). Values shown in Soil and Water Table 1, therefore, reflect a 3.5 increase over source water levels.

Allowing for a 10:1 dilution credit, wastewater levels for certain constituents will meet the surface water quality objectives set by the SFBRWQCB (1995). The Basin Plan allows for a 10:1 dilution credit for deep water outfalls such as the Dow Chemical or the DDWTF outfalls. Given the impaired designation for Suisun Bay for certain constituents, it is uncertain at this point what the effluent limitations for the project will be and if a dilution credit will be granted.

DEC is also considering discharging wastewater from the proposed project to the wastewater treatment plant itself. An NPDES permit from the SFBRWQCB would not be required to discharge to the DDWTF. Instead, a pretreatment permit, referred to as an industrial discharge permit, would be required from the DDS. DEC (1999o) filed an application for an industrial discharge permit on June 25, 1999.

To discharge to the DDWTF, the project must meet the pretreatment limits identified in Soil and Water Resources Table 1. In addition, the project has to meet average chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), oil and grease, and temperature limitations as well.

**SOIL & WATER RESOURCES Table 1
Industrial Discharge Limitations (mg/L)**

Constituents	Estimated Discharge	Pretreatment Limits
Arsenic	0.088	0.53
Cadmium	0.099	0.10
Chromium	0.015	0.50
Copper	0.029	0.50
Lead	0.083	0.50
Mercury	0.003	0.01
Selenium	ND	2.0
Silver	0.018	0.20
Zinc	0.189	1.0

Sources: DEC 1999o

Discharge of wastewater from DEC to the DDWTF raises capacity problems. As noted above, the dry weather capacity of the wastewater treatment facility is 16.5 mgd. In 1998, average flow was 13.2 mgd (Baatrup 1999). Flows to the wastewater treatment plant increase approximately 0.2 mgd per year.

Routing anywhere from 0.94 mgd to 2.97 mgd of wastewater from DEC to the DDWTF will substantially reduce the remaining capacity of the facility. Since the proposed PDEF will also be discharging approximately 0.9 mgd of wastewater to the wastewater treatment plant, the additive effect of the two projects will account for most of the remaining capacity. The DDS is currently evaluating the potential for wastewater from both power plants to be brought into the treatment facility, not at the headwall of treatment plant, but late within the treatment process. Since the

wastewater treatment processes are oriented at removing organic waste, not a concern with the power plant's wastewater, only minimum treatment is necessary before discharge. The evaluation is tied to the DDSD's efforts to renew their existing NPDES permit that would reflect the effects of wastewater from the two projects on the facility and its discharge. This topic will be discussed further in the **Final Staff Assessment**.

Providing approximately 8.4 mgd of effluent to the two power plants as well as receiving wastewater from one or both of the power plants will increase the concentration of the DDWTF's discharge to New York Slough. This topic and the behavior of the discharge plume are discussed further in the **Cumulative Impact** section.

EROSION CONTROL AND STORMWATER MANAGEMENT

Accelerated wind and water induced erosion may result from earth moving activities associated with construction of the proposed project. Removal of the vegetative cover and alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water. Although many of the native soils that will be affected by the project have low or moderate wind and water erosion potential, once disturbed, all of these soils are vulnerable to erosion. Rainfall may be intense, which greatly enhances the potential for water erosion. Grading activities may redirect runoff into areas more vulnerable to erosion. Areas where linear facilities cross drainages are especially vulnerable to erosion. During project operation, wind and water action can continue to erode unprotected surfaces. An increase in the amount of impervious surfaces can increase runoff, leading to the erosion of unprotected surfaces.

Discharge of stormwater contaminated with sediment or other pollutants resulting from construction and operation may lead to the degradation of surface and groundwater and soils. Diversion of stormwater runoff to unprotected areas may also cause erosion.

The proposed power plant site is approximately 20 acres in size. In addition, a 10-acre temporary laydown area will be used. Soils at the power plant site belong to the Capay clay and Rincon clay loam soil series with slow to moderate runoff potential and slight erosion hazard. The precipitation in the Pittsburg area averages from 17.5 inches to 12.5 inches annually depending on elevation. Precipitation occurs primarily during the months of November through April. The site's drains to Dowest Slough within the Kirker Creek watershed. Construction of the proposed DEC facility will pave over 70% of the site's surface, adding approximately 520,000 square feet of impervious ground to the area increasing runoff rates and volumes (DEC 1999g, data response number 85). The total area drained, as estimated in the NPDES Permit Application (DEC 1999c), comprises approximately 800,000 square feet. Stormwater using a system of underground drains and discharge this water via a 36 inch diameter pipe to Dowest Slough.

Linear facilities associated with the project include a stormwater, natural gas, reclaimed water and wastewater pipelines and a transmission line. The

transmission line, the natural gas pipeline and the stormwater discharge pipeline will potentially affect natural water ways and sensitive biological habitats. The natural gas pipeline, for example, will disturb coastal marsh areas and require slant drilling under a tidal slough and a wetland preserve. For further discussion of these habitats, see the **Biological Resources** section. To address the potential for accelerated erosion and contamination from earth moving activities and stormwater runoff, DEC has prepared a draft Erosion Control, Revegetation and Stormwater Management Plan (DEC 1999g, data response number 85). This plan will be discussed further under the **Mitigation** section.

This plan identifies potential best management practices to ensure sediment and other pollutants are not carried off-site by stormwater runoff. Stormwater will be discharged to Dowest Slough. Contaminated sediment has been identified in this tidally influenced water body. Staff is evaluating the potential that this discharge is resuspending contaminated sediment. This analysis will be presented in the **Final Staff Assessment**.

Since greater than five acres are to be disturbed during construction of the proposed project, the applicant will have to file a notice of intent with the SWRCB to comply with the provisions of the General Construction Activity Stormwater Permit. During operation, DEC will be required to operate under the General Industrial Activity Stormwater Permit. These general permits require the identification and implementation of best management practices to control runoff.

CUMULATIVE IMPACTS

WATER QUALITY

As discussed above, DEC will utilize anywhere from 5.07 to 8.5 mgd of effluent from the DDWTF. In addition, the wastewater treatment plant will supply from 3.4 mgd to 3.7 mgd of tertiary treated effluent to the 500 MW combined cycle PDEF ([PDEF] 98-AFC-1). Combined, the two power plants represent a substantial diversion of the wastewater treatment plant's discharge, potentially over 90 percent of the facility's 1998 average flows.

The volume of wastewater that DEC could potentially discharge directly to New York Slough through the wastewater treatment facility outfall or the Dow Chemical outfall or to the wastewater treatment plant, range from 0.94 mgd to 2.97 mgd. Wastewater discharges from PDEF will range from 0.97 mgd to 1.09 mgd (CEC 1999). PDEF will use tertiary treated effluent for both the cooling and steam cycles. The effluent will be circulated through the cooling process approximately three times and the resulting inorganic concentrations in the wastewater quality is estimated to be three times that of the source water.

To determine the effect of this diversion and the return of the concentrated wastewater from the two power plants to the DDWTF or to the treatment plant's outfall, a mass balance analysis was performed. The purpose of the mass balance analysis is to analyze the two power plants' potential effect on DDSD's ability to complying with its existing NPDES permit limitations. DDSD's permit expired in

November of 1998 and has been administratively extended by the Regional Board until a new permit can be issued. DDSD anticipates that a revised permit renewal application that reflects providing effluent to the two power plants will be submitted shortly (Baatrup 1999). Assumptions used in this mass balance analysis are discussed below.

Given the likely increase in wastewater discharges to the wastewater treatment facility before the two proposed projects are operating, staff used a total effluent flow of 13.5 mgd. Given the range of potential levels of effluent demand and wastewater discharge for DEC, staff assumes a 5.0 mgd effluent demand. For PDEF, a 3.7 mgd effluent demand is assumed. Based upon these project designs, therefore, approximately 8.7 mgd of a total effluent flow of 13.5 mgd at the wastewater treatment plant will be diverted to the two power plants. For DEC, wastewater flows are assumed to be 2.1 mgd and, for PDEF, 1.1 mgd. As a worst case cumulative impact analysis, the mass balance assumed both projects would discharge directly to the DDWTF's outfall. Assuming discharge of the DEC wastewater to the wastewater treatment plant outfall, approximately 7.45 mgd of wastewater will be discharged.

SOIL & WATER RESOURCES FIGURE 2 provides a schematic of the assumed flows. Since New York Slough, as part of Suisun Bay is considered impaired for copper, mercury, nickel and selenium, these four metals are addressed in the mass balance. In addition, because chromium is a constituent of concern for the Suisun Bay area, it is also included in the mass balance analysis.

To properly characterize effluent from the wastewater treatment plant, staff evaluated monitoring data for 1996, 1997 and 1998. Since significant variation in concentration levels for the five metals exists, effluent concentrations were characterized by the 95 percentile. This is the value of the constituent that will only be exceeded five percent of the time. In addition, the effluent limitations contained within the wastewater treatment plant's NPDES permit are based upon a 10:1 dilution credit. The Basin Plan ([SFBRWQCB] 1995) allows a 10:1 dilution credit for deep water outfalls, such as the sanitation district's, even if actual dilution is significantly greater.

As shown in **SOIL & WATER RESOURCES Table 2**, the results of this analysis show that the combined discharges will not exceed the wastewater treatment plant's existing NPDES permit limitation. As noted above, DDSD is in the process of renewing its permit. Although the proposed projects will not cause DDSD to exceed the existing limitations, the new permit limitations could be more severe. The SFBRWQCB has indicated in the 1995 Basin Plan that some of the criteria contained in the plan may not protect ambient water quality. Furthermore, the U.S. Environmental Protection Agency is proposing the California Toxics Rule which could cause permit limitations to also be revised downward. Staff does not want to speculate what the new discharge limitations will be for DDSD. Generally, processing NPDES permits takes about six months; it is likely that the DDSD permit will take substantially longer (Baatrup 1999). A further consideration is that DDSD, in dealing with revised permit limitations, has a large number of options in meeting the new standards. For example, if necessary, DDSD can revise pretreatment

RESERVED FOR FIGURE 2 - NOT AVAILABLE IN PDF VERSION

standards for PDEF and other industrial dischargers to the wastewater treatment plant or treat effluent prior to discharge to New York Slough.

**SOIL & WATER RESOURCES Table 2
Delta Diablo Sanitation District Mass Balance Analysis**

	Current Daily Average Effluent Limitations ¹ (ug/L)	1996-1998 Effluent Concentration 95th Percentile ² (ug/L)	Total Daily Discharge to New York Slough (ug/L)
Copper	78	22.35	40.51
Mercury	24	1.08	1.96
Nickel	71	9.25	16.77
Selenium	50	5.4	9.79

Sources:

1. DDSN NPDES Permit (1993)
2. DDSN December Monthly Self-Monitoring Reports summarizing annual data (1996-1998)

Staff recognizes that given the range in DEC’s possible effluent demand and wastewater discharge, the mass analysis may have to be revised. Clarification of the project’s wastewater discharge options will help resolve this issue.

As part of the NPDES permit application for DEC, dilution and dispersion modeling was conducted to estimate the behavior of the wastewater discharge plume. The dilution and dispersion modeling for the DEC application is subdivided into three separate modeling efforts. Staff has conducted an evaluation of this modeling. Attached to this testimony is the complete staff analysis of the modeling effort. Also discussed is dispersion experiments and field studies conducted prior to the construction of the wastewater treatment plant’s outfall (Brown and Caldwell, 1980).

To address initial, transition and far field dispersion of the wastewater plume, the NPDES application involves three separate modeling efforts to address the different regions of influence. Both outfalls are essentially submerged pipes with a number of ports to discharge the wastewater. The Initial dilution of the discharge depicts the movement of the wastewater as it exits the outfall and begins to mix with ambient water. The initial dilution rate of the wastewater discharge is due to the velocity of the discharge (jet velocity) and buoyancy. As the wastewater flow (jet) exits the diffuser and enters the receiving water, a shear layer is formed between the jet and the water. Waves within the shear zone entrain ambient water into the jet and mix the two fluids, diluting the concentration of the discharge.

The initial dilution modeling was conducted using the United States Environmental Protection Agency (EPA) model UDKHDEN. Factors taken into account include effluent flow variation and density, ambient water density and currents and diffuser orientation and port configuration. A number of model runs were conducted for a range of discharge flows, current speeds and ambient densities (DEC 1999). Important factors in identifying a worse case for initial dilution include shallow water conditions due to low tide conditions, stratification within the water column due to high water densities and low current velocities. Stratification was found in the modeling runs to be the most critical condition.

The initial dilution modeling efforts using UDKHDEN explored a wide range of critical scenarios. A reasonable range of factors for currents, densities, and stratification were evaluated. Modeling results indicated that initial dilution ranged from 48:1 to 281:1 for the DEC outfall. For the DDSO outfall, dilution factors ranged from 34.4:1 to 656:1. For comparison, the range for the current DDSO configuration for these scenarios was 39:1 to 181:1.

The subsequent transition-mixing region used the modified Brooks Method. Within the transition-mixing region, the discharge plume is still somewhat coherent and mixing is not as rapid as that of the initial phase. This modeling indicated that the plume from the DDSO discharge hit the southern shoreline of New York Slough approximately 2,500 to 5,000 feet downstream of the discharge under average conditions. The Delta Simulation Model 2 (DSM2) gave acceptable results for background dilutions to apply to the transition zone modeling. The analysis done with the Modified Brooks approach appeared only to have accounted for the ebb scenario, that is, when flows are to the bay. A similar study for the flood scenario, that is when water is moving upstream due to tidal action was not done. From the 1980 study, it appears that the plume would likely stay on the south bank near Antioch during flood.

Because the estuary system that the DEC facility would be releasing to is very complex, the DSM2 which is used by the California Department of Water Resources was used to define the hydrodynamics of the region. In addition, the subprogram, QUAL was used to estimate the background dilution in the immediate area of the discharge. Because the DSM2 model is a one-dimensional representation of flow, the model consists of a series of channels and nodes representing junctions. At each junction all the water entering from the main channel and any tributary water during a timestep is mixed completely. The DEC facility is located very close to (3,700 feet downstream) the confluence of New York Slough and Broad Slough. During flood tide, water flows from New York Slough into Broad Slough. With the model representation, any concentration in New York Slough (~940 feet wide) is mixed with the Broad Slough (~3,000 feet wide) when the node is reached. This effectively mixes the concentration across the entire span of Broad Slough and increases the dilution. In reality, the flow in this region is very two dimensional in nature. It would not be expected that the concentration would be immediately mixed across the channel. Modeling results indicate that approximately 25,000 feet downstream, dilution reaches 96:1, assuming an initial effective dilution of 48:1. Factoring in vertical mixing, this number reaches 263:1. Therefore, results of this model may not be adequate to predict exact concentration levels at the City of Antioch intake. However, based on the dye study done in 1980, the dilution at Antioch is about 400:1 to 3,000:1 which is a much higher dilution than the predicted background concentration of 323:1.

Based upon information provided in the modeling results and the 1980 studies, it is clear that sufficient dilution would occur to ensure that a wastewater plume from the DDSO outfall and the Dow Chemical outfall would not adversely affect the City of Antioch's water intake. The City of Antioch, as part of the PDEF proceedings also evaluated these modeling efforts and came to the same conclusion (CEC 1999b).

FACILITY CLOSURE

A planned, unexpected temporary or permanent closure of the proposed DEC should not be a significant concern if site drainage and erosion are properly dealt with for any potential closure. Proper closure of the cooling tower basin is also required. Unexpected permanent closure may raise the potential for drainage and erosion problems due to a lack of maintenance of the facilities. Staff will require DEC to address this concern in their closure plan.

MITIGATION

DEC PROPOSED MITIGATION

The following mitigation measures are those actions that have been identified to reduce the level of significance of specific impacts. Compliance with applicable laws, ordinances and standards are discussed in this section.

WATER SUPPLY

No mitigation measures identified.

WATER QUALITY

No mitigation measures are identified beyond those to comply with discharge permits.

EROSION CONTROL AND STORMWATER MANAGEMENT

This information will be provided in the **Final Staff Assessment**.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, POLICIES AND STANDARDS

Evaluation of the proposed project's NPDES permit application is continuing at the SFBRWQCB. Project use of recycled water is consistent with SWRCB's Resolution 75-58 regarding the use of inland water for cooling. Staff is still evaluating the project's compliance with Water Code sections 13550 and 13551 related to the use of recycled water. That analysis will be provided in the **Final Staff Assessment**.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the proposed DEC will not contribute to any significant project specific impacts to soil resources. Use of recycled wastewater from the DDWTF for project cool water demand is a beneficial use of this water source. Staff is still evaluating issues regarding water quality. This information will be submitted in the supplemental information to be filed in the **Final Staff Assessment**.

CONDITIONS OF CERTIFICATION

SOILS&WATER 1: Prior to beginning any clearing, grading or excavation activities associated with project construction, the project owner will develop and implement a Storm Water Pollution Prevention Plan.

Verification: Thirty days prior to the start of construction, the project owner will submit to the Energy Commission Compliance Project Manager (CPM) a copy of the Storm Water Pollution Prevention Plan.

SOILS&WATER 2: Prior to the initiation of any earth moving activities, the project owner shall submit an erosion control and stormwater management plan for City of Pittsburg Community Development Department review and Energy Commission staff approval. The final plan shall contain all the elements of the draft plan with changes made to address the final design of the project.

Verification: The final erosion control plan shall address all comments of the City of Pittsburg Community Development Department and be submitted to the Energy Commission CPM for approval 30 days prior to the initiation of any earth moving activities.

SOIL&WATER 3: Sixty days prior to commercial operation, the project owner must submit a notice of intent to the State Water Resources Control Board to indicate that the project will operate under provisions of the General Industrial Activity Storm Water Permit. As required by the general permit, the project owner will develop and implement a Storm Water Pollution Prevention Plan.

Verification: Thirty days prior to the start of construction, the project owner will submit to the Energy Commission CPM a copy of the Storm Water Pollution Prevention Plan.

SIOL&WATER-4: The project owner shall operate the project using only tertiary treated effluent for cooling and steam cycle processes with the following exception. Backup water from the Contra Costa Water District should only be used for these processes when there is an interruption in the delivery of effluent. Operation of the facility on the backup water supply longer than 14 consecutive days requires notification of the Energy Commission CPM.

Verification: The project owner shall notify the Energy Commission CPM by phone and in writing if the backup water supply is used for more than 14 consecutive days. Notification should explain the cause of the interruption and the anticipated time when treated effluent is again available.

SOIL&WATER-5: The project owner shall obtain an Industrial Discharge Permit prior to the discharge of the project's wastewater to the Delta Diablo Wastewater Treatment Facility.

Verification: No fewer than 45 days prior to commercial operation, the project owner shall provide the Energy Commission CPM a copy of a valid Industrial Discharge Permit including any pretreatment requirements and/or limitations. The project owner shall notify the Energy Commission CPM in writing of any changes to and/or renewal of the permit.

SOIL&WATER-6: As an alternative to receiving an Industrial Discharge Permit, the project owner shall, prior to commercial operation, obtain a National Pollutant Discharge Elimination System Permit from the San Francisco Bay Regional Water Quality Control Board governing the discharge of the project's wastewater to New York Slough. The project owner shall comply with all provisions of the National Pollutant Discharge Elimination System Permit. The project owner shall notify the Energy Commission CPM of any proposed changes to the permit, including any application for permit renewal.

Verification: At least 60 days prior to commercial operation, the project owner shall submit to the Energy Commission CPM a copy of the San Francisco Bay Regional Water Quality Control Board's approved National Pollutant Discharge Elimination System Permit which allows discharges to New York Slough. The project owner shall submit to the Energy Commission CPM in the annual compliance report a copy of the annual monitoring report submitted to the San Francisco Bay Regional Water Quality Control Board. The project owner shall notify the Energy Commission CPM in writing of any changes to and/or renewal of the permit.

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APPENDIX A

HYDRODYNAMIC MODELING ANALYSIS BY NANCY MONSEN

INTRODUCTION

In order to evaluate the hydrodynamic modeling done for the proposed Delta Energy Center (DEC), both the NPDES application submitted by CH2M Hill and the Predischarge Receiving Water Monitoring (Brown and Caldwell, 1980) were reviewed.

The NPDES application involves three separate modeling efforts to address different regions of influence. The initial dilution of the outfall, where mixing caused by the diffuser is important, is modeled with UDKHDEN. The transition zone, where the flow has developed into a plume but has not fully mixed across the channel, is modeled by the Modified Brooks approach. Finally, the far field mixing which determines background dilutions, is modeled with the Delta Simulation Model 2 (DSM2). Each of these modeling efforts will be evaluated separately.

The 1980 Predischarge Receiving Water Monitoring documentation contains the results of several field experiments and an experiment done in the Corps of Engineers Physical Model of the Delta. The field experiments include measurements of temperature, salinity, and velocity profiles near the discharge site. In addition, current drogue experiments and a field dye dispersion study were conducted.

BACKGROUND TERMS

DILUTION

Throughout this discussion, we will be referring to a term called dilution. Dilution is defined as the ratio of initial concentration to the final concentration.

For instance, if we had an initial concentration of 100 g/l and the mixing process

$$Dilution = \frac{Initial _ concentration}{final _ concentration}$$

reduced the concentration to 25 g/l, then the dilution would be 4:1. For every 4 parts we had, 1 part remains after mixing.

Effective Dilution

The initial dilution modeling, which takes into account the mixing from the diffuser, assumes that the ambient (or receiving) water has no contaminants in it. However, over time, the receiving water will actually have a background concentration associated with it. Therefore, the initial dilution results will need to be adjusted for the background value using the following equation:

$$S_e = \frac{(S_n \times S_f + 1)}{(S_f + S_n)}$$

where S_e is the effective dilution, S_n is the initial dilution, and S_f is the background dilution.

For instance, in the modeling of the DEC outfall under critical conditions, the initial dilution calculated is 56:1. The background dilution, determined with a separate model (DSM2), is 323:1. Using the above equation, the adjusted (or effective) dilution is 48:1.

TRANSITION MIXING/SUBSEQUENT DILUTION

The period of time after a plume has initially mixed from the influence of the diffuser jet but before the plume has fully mixed across the channel is referred to as the transition period. When modeling this transition period, often modelers will assume an initial concentration at the start of the transition period and report a dilution value which only accounts for transition mixing. In order to come up with the absolute mixing of the system, the initial concentration must be multiplied by this dilution value.

For example, the initial effective dilution calculated for the DEC critical conditions was 48:1. In the subsequent mixing period, it was determined that the dilution was an additional 2:1 before the plume hit the south shoreline. Therefore the total dilution at the location where the plume hits the shoreline is 96:1.

1980 PREDISCHARGE RECEIVING WATER MONITORING

The studies done by Brown and Caldwell (1980) supply a background knowledge of hydrodynamics of the study site. This section summarizes the relevant findings of the study. Several of the values presented in this section will be referred to later in the evaluation of the NPDES application.

MAIN FINDINGS: FIELD STUDIES

One of the main concerns with the DEC outfall is the impact of this discharge upstream on the City of Antioch water intake and downstream on the Contra Costa Water District intake at Mallard Slough. This was also a concern during the initial design of the Delta Diablo Sanitary District (DDSD) wastewater outfall and diffuser. In order to determine how long it would take water from the outfall to reach the each of these inlets, current drogues were released and their trajectories recorded. In order to evaluate the impact on Antioch, the drogues were released on slack before flood. Drogues were released on slack before ebb to look at the impact on Mallard Slough.

From the flood experiments it was determined that:

Most of the drogues remained close to the south shore; however two crossed to the north side and one passed north of West Island. (p. II-6-4)

Drogues released at peak flood reached the raw water intake at Antioch or beyond before turning around with the change of tide. All the drogues remained in the main channel on the south side and returned on essentially the same path. With one

exception, all the drogues returning with the ebb reentered New York Slough. (p. II-6-5)

The study also found that the drogues that were released on slack before ebb reached the Sacramento River. Also, not all of the drogues hugged the south shore. (fig. II-9) Very few of the drogues made it to Mallard Slough. This would indicate that the impact to the Mallard Slough facility is minimal.

In addition, two dye studies were performed in June, 1978, and February, 1979. The dye was released on flood to determine the dilution of the effluent at the Antioch intake. In the June study, an apparent dilution of 3600:1 occurred with a travel time of 2 hours. It was suggested in the study that the dye patch center was farther offshore. When the dye patch returned to the intake on ebb 9-10 hours after release, the apparent dilution was 10000:1. (p. II-6-21). In contrast, in the February study, the apparent dilution after a travel time of 2-3 hours was 100:1. The return dilution after 10 hours was 305:1.

In another dye study in which the dye patch was released on ebb during these same time periods, the dilution at Mallard slough was estimated to be between 200:1 to 285:1.

In all of the dye studies, the dilution estimates are for the dilution after the initial mixing occurred in the near field.

MAIN FINDINGS: HYDRAULIC MODEL DYE TESTS

An approach to determine the background dilution is to simulate the dye release with a model. Because the engineers on the study did not believe that the current numerical model had adequate detail about the near field (within several miles), a simulation study using dye in a physical model was performed. (p. I-1-2)

In order to determine an estimate for the background dilution, dye release tests were conducted in the Corps of Engineers' physical model of the San Francisco Bay/Delta. For this study, they used a 19 year mean tide, because *"Dye dilutions resulting from a dynamic model run (one in which river inflows and water uses and the tide are constrained to follow a simulated natural cycle) would never reach equilibrium and would be always trying to catch up."* (p. II-6-28) From this study, the estimated minimum total dilution ratio for Lower Low Water (LLW) was 400:1.

FINAL CONCLUSIONS FROM 1980 STUDY

Based on drogue releases, field dye studies, and the hydraulic physical model tests, the total dilution at the City of Antioch raw water intake ranged from 400:1 to 3000:1 (product of 30:1 computed initial dilution and 100:1 field survey results). The total dilution at the CCWD Mallard Slough intake ranged from 400:1 to 6000:1 (product of 30:1 computed initial dilution and 200:1 estimated further dilution from survey results) (p.II-6-33).

NPDES: LONG-TERM BACKGROUND DILUTION WITH DSM2

INTRODUCTION/BASIC CONCLUSION

To get an accurate estimate of the near field mixing, the near field model needs to know the background dilution value. The DSM2 model which simulates the circulation in Suisun Bay and the Delta was applied.

In order to determine the background dilution, the model was run with the hydrologic conditions of a dry, low flow year with a 19 year mean tide boundary condition. A mass concentration was released at a node introduced at the discharge site. Monthly average dilutions were then determined with the model. The report concludes that *"In the worst case conditions, dilution at the water supply intakes will be greater than 350:1. Under more normal Delta outflow conditions, the dilution will be much greater."* (p. 22) For the subsequent modeling studies, a background dilution of 323:1 was used. This dilution estimate was consistent and more conservative than what was found in Brown and Caldwell (1980).

COMMENTS

Although I agree with the overall conclusion of the modeling, I have a few comments regarding the use of the DSM2 model in this application. DSM2 does not represent the bathymetric features adequately enough to make near field estimates of concentration in the domain. In the 1980 study, a dye study in a physical model was done in lieu of a numerical model because the numerical model was not detailed enough. DSM2 is a very similar model to the numerical model rejected for that study. Several features of the complex junction of the Sacramento and San Joaquin Rivers are oversimplified. For instance, Sherman Lake is modeled as a reservoir with an inlet on the Sacramento and one on the San Joaquin. All reservoirs in this model have the feature that any concentration entering a reservoir is instantaneously mixed with the entire reservoir. In a field study conducted by the U.S. Geological Survey in September 1998, it was found that this region acts more like a channel than a lake. (Oltmann, personal communication, 1999) Therefore, the dilution predicted by the DSM2 model may be much greater than what might be actually occurring. In addition, New York and Middle Slough are represented in the model as one channel. Because the discharge site is in New York Slough, it is essential that the bathymetry in that region be correct.

The second problem is that the flow of a very complex, multi-dimensional junction is being simulated with a one-dimensional model. Because the DSM2 model is a one-dimensional representation of flow, the model consists of a series of channels and nodes which represent junctions. At each junction, all the water entering from the main channel and any tributary water during a timestep is mixed completely. The DEC facility is located very close to (3700 feet downstream) the confluence of New York Slough and Broad Slough. During flood tide, water flows from New York Slough into Broad Slough. Any concentration in New York Slough (~940 feet wide) will be mixed with the Broad Slough (~3000 feet wide) when the node is reached. This effectively mixes the concentration across the entire span of Broad Slough and increases the dilution. This is a form of numerical dispersion. Jobson and Schoellhamer (1992), who developed the Branched Lagrangian Transport algorithm used in DSM2 state that *"Excessive use of interior junctions, may limit the ability of the model to accurately simulate dispersive fluxes. Dispersion occurs between parcels in a particular branch but not between branches. In other words, it is assumed that junctions represent points of zero dispersive flux. All mass passing through a junction, however, is mixed before entering the next branch so numerical dispersion may also occur at junctions."*

A third issue with the approach used in the modeling was the use of the 19 year mean tide. This tide is an average tide which is considered to be representative of the tides at Martinez. In reality, the spring/neap cycle plays a dominate role in the mixing of the system. The system is more dynamic on spring tides than on neap tides. As was stated in the discussion of the hydraulic model dye test, the 19 year mean tide can be used to come up with an equilibrium value. However, in reality the system never really comes to this steady state.

NPDES: INITIAL DILUTION WITH UDKHDEN

INTRODUCTION/BASIC CONCLUSION

This model was used to determine the initial mixing following the discharge through the diffuser. This is a region of intensive mixing caused by the momentum of the jet. The study of the initial dilution using UDKHDEN was very extensive, exploring a wide range of critical scenarios. The critical range of currents, densities, and stratification scenarios were reasonable. Dilution for their studies ranged from 48:1 to 281:1 for the DEC outfall. For comparison, the range for the current DDSD configuration for these scenarios was 39:1 to 181:1. A dilution value of 48:1 was used as the final value of dilution to be applied to subsequent modeling.

ASSUMPTIONS MADE IN UDKHDEN MODELING

In order to determine the conditions of the receiving water required for the initial dilution modeling, observed conditions from nearby monitoring stations and results from the DSM2 model were examined.

CURRENT VELOCITY, WATER SURFACE ELEVATIONS

The range of current velocities and water surface elevations near the discharge site were generated from DSM2 model runs. The DSM2 model run incorporated average monthly flows and the 19 year mean tide. The 19 year mean tide is considered by the California Department of Water Resources to be a representative of the tide stage at Martinez. This tide does not account for the spring-neap cycle. However, since this was used just as initial estimate of the current velocities, this is a reasonable approach.

The currents generated from the DSM2 runs varied from 0.19-3.14 ft/s. These values are in the range of what is generally observed in this system. In a tidal system, the currents generally do not fall to 0.0 ft/s because of frictional effects which cause shoal areas to turn with the tide before the main channel region. Therefore, the water body never reaches a stagnant state. From the DSM2 velocity information, the current was broken down into a percentile of ambient current speed for water year 1990. The 1-percentile current was 0.19 ft/s and the 10-percentile current was 0.47 ft/s. These currents were used in the evaluation of the critical dilution conditions.

For all runs the stage was set at Mean Lower Low Water (MLLW). During a 24 hour period of time, the system experiences two high tides and two low tides. The lowest low tide occurs after the highest high tide. Mean Lower Low Water is the average of

the lowest low water. This value is the benchmark used for NOAA maps and is considered the lowest stage that a water body will experience. Since a surfacing plume will get the minimal amount of dilution with the minimal depth, this stage was used in the evaluation of critical dilution conditions.

SURFACE TEMPERATURE AND CONDUCTIVITY DATA

Surface temperature and conductivity data was determined from a station directly downstream of the site from water year 1990 data. Minimum temperatures ranged from 47.3 F in Fall to 70.2 F in Summer.

The conductivity data from water year 1990 was used to determine a range of densities for ambient conditions for the initial screening runs. These values were not used in the critical case runs.

CRITICAL STRATIFICATION

Water column profiles for years 1988-1997 were examined to identify stratification worst case scenarios. The highest stratification occurred 10 Dec 1991. The second highest stratification was 26 Oct 1994. The worst case scenario, however, was third highest stratification (2 Nov 1988) because the density change is steepest in the vicinity of the discharge depth which limits mixing in that region. The selection of the critical case stratification, maximum density case (12 Dec 1989) and the minimum density case (14 Jun 1989) all seem reasonable.

SCREENING RUNS

The screening runs were initial tests used to determine the overall performance of the diffuser. Both DEC diffuser and the DDSD diffuser were analyzed.

For the DEC diffuser, the model simulated currents ranging from 0.00 ft/s to 3.14 ft/s, high and low ambient densities, and flows ranging from 1.2 mgd to 2.1 mgd which is the predicted operation range of the diffuser. The dilutions predicted for these initial runs ranged from 50:1 to over 3000:1. Therefore, the diffuser was shown to work well under the anticipated operating range.

For the DDSD diffuser, the conditions models were: a current of 0.0 ft/s and 7.5 ft/s, high and low ambient densities, and flow magnitudes of 13 mgd and 5.2-7.3 mgd. (The existing discharge of the DDSD diffuser is 13 mgd, this would be reduced to 7.3 mgd with the DEC facility.) The dilutions predicted for the DDSD facility ranged from 56:1 to 2124:1 for the 13 mgd flow which represents the current conditions. For the lower flow scenarios, the dilutions ranged from 51:1 to 5112:1. Therefore, this diffuser works well under the lower flow scenario.

CRITICAL CASE RUNS AND EFFECTIVE DILUTION

The critical case runs determined the worst case conditions and the lowest initial dilution. These runs were performed with the previously identified stratification configurations, MLLW stage, and 1-percentile and 10-percentile currents. The 1-percentile currents are extremely conservative (give lower dilutions than probably occur).

The DEC outfall results for the 1-percentile current (.19 ft/s) dilutions ranged from 48:1 to 156:1. With the 10-percentile current (.47 ft/s), dilutions ranged from 67:1 to 218:1.

The DDSD outfall values ranged from 29:1 to 181:1 for the existing discharge of 13 mgd. With the reduced discharge because of DEC operation, the dilutions ranged from 32:1 to 236:1.

These results would indicate there is a higher overall dilution with both facilities operating than with the DDSD operating alone.

IMPACT OF TEMPERATURE

Studies were also run to determine the effect of temperature on dilution. In order to look at the effect of temperature variations of the effluent, the effluent density was varied from 0.99905 to 0.99509 g/m³ (equivalent to a temperature range of 60 F to 90 F). Results found that dilution increased with increased temperature. At the lowest temperatures, the dilution ranged from approximately 28:1 to 43:1.

The increase in temperature of receiving water due to effluent mixing was also modeled. The predicted increase in water temperature was less than 1 F for almost every case. The worst case was an increase of 1.05 F when the effluent was 90 F during the spring. It is very unlikely that this scenario would occur due to the cool weather.

NPDES: SUBSEQUENT DILUTION WITH MODIFIED BROOKS

BACKGROUND/BASIC CONCLUSION

After a plume has gone through the initial mixing caused by the momentum of the diffuser jet, there is a transition zone where the plume is not fully mixed with the channel but is in equilibrium with the density and momentum of the surrounding water. This region is referred to as the transition zone. There are two main approaches to modeling this region. The first approach is using simplified solutions to model lateral spreading of the plume. The second approach is to apply a two or three-dimensional advective-diffusive numerical model to calculate this lateral spreading in the plume. Although the second approach gives a detailed view of what is happening in the system, it is very costly to develop this type of model. Models for this region are now only in research stages of development.

One of the simplified approaches often used to determine lateral diffusion of a plume is the Brooks Method. (Fischer, p. 409). The Modified Brooks Method incorporates an additional terms which incorporate vertical diffusion. In general, vertical diffusion does not have a significant influence on the dilution of the system. However, in cases where the plume is much wider than it is thick, vertical diffusion can be important. Because a tidal system can have both the extremes of a fully mixed system and a negligibly slow mixing process during different times of the tidal cycle, the modified version of the Brooks Method was applied.

The modeling done for this application only looked at the influence of the plume downstream from the discharge site. The modeling showed that both the DDSD discharge and the DEC discharge would hit the southern shoreline of New York Slough 2500-5000 feet downstream of the discharge under average conditions. The plume is not predicted to hit the north shore. For the DDSD discharge, the dilution at the point when the plume hits the shoreline is 96:1 if vertical mixing is not taken into account. If the vertical mixing is considered, the dilution is 263:1, which would not be discernable from long-term background levels.

COMMENTS

The dilution values that were obtained for the downstream case seem reasonable. The dilution value of 96:1 is an overly conservative value because vertical diffusion is probably important. Because of the curvature of the channel, it is logical that the plume would hit the southern shore. Based on the drogue studies that were done in 1980, it might be possible that the plume could reach the north shore as well.

The analysis done with the Modified Brooks approach appeared only to have accounted for the ebb scenario. The NPDS application does not mention a similar study for the flood scenario. From the 1980 study, it appears that the plume would likely stay on the south bank near Antioch during flood. Therefore, the flood period would have been a good scenario to investigate. However, based on the dye study done in 1980, the dilution at Antioch is about 400:1 to 3000:1 which is a much higher dilution than the predicted background concentration of 323:1. Therefore, this scenario might not have been modeled because the impact at Antioch was assumed to be minimal based on previous studies.

CONCLUSION

I agree with the overall dilution values that were produced for the modeling. The background dilution for the system is in the range of 323:1. The initial dilution from the DEC diffuser will range from 48:1 to 281:1 for the critical scenarios. For comparison, the range for the current DDSD configuration for these scenarios ranged from 39:1 to 181:1. Looking at the transition zone, the plume will likely hit the south shore during ebb 2500-5000 ft downstream of the discharge with a dilution between 96:1 to 263:1 under average conditions. The overall model results indicate that impact of the discharge on the Antioch and Mallard Slough intakes will be minimal.

The study of the initial dilution using UDKHDEN was very extensive exploring a wide range of critical scenarios. The range of currents, densities, and stratification were reasonable. The subsequent dilution with Modified Brooks approach gave reasonable conclusions in the downstream scenario. However, the Modified Brooks approach should have been applied in the flood direction as well to complete the analysis. The DSM2 model gave acceptable results for background dilutions. However, DSM2 does not represent the bathymetry features adequately enough to make near field estimates of concentration in the domain of interest because the complex, multi-dimensional junction is represented by a one-dimensional model.

REFERENCES

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GEOLOGY

Robert Anderson

INTRODUCTION

The geology section discusses the project's potential impacts regarding geological hazards, geological and paleontological resources, and surface water hydrology. The purpose of the geology analysis is to verify that the applicable laws, ordinances, regulations, and standards (LORS) have been identified and that the project can be designed and constructed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public health and safety. The objective of staff is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources, and surface water hydrology during project construction, operation and closure. The section concludes with the staff's proposed monitoring and mitigation measures with respect to geological hazards, geological and paleontological resources, and surface water hydrology, with the inclusion of nine conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The applicable LORS are listed in the AFC, in Sections 8.14.8, 8.15.4 and 8.16.5 DEC 1998a). A brief description of the LORS for geological hazards and resources, paleontological resources, and drainage and erosion control follows:

FEDERAL

There are no federal LORS for geological hazards and resources, or grading and erosion control. The United States Bureau of Land Management (BLM) requires an excavation permit for excavations and grading on land under their jurisdiction. The DEC project is not located on lands under the jurisdiction of the BLM. Therefore, there are no federal LORS with respect to geological hazards or resources, or paleontological resources, that are applicable to this project.

STATE AND LOCAL

The California Building Code (CBC) 1998 edition is based upon the Uniform Building Code (UBC), 1997 edition, which was published by the International Conference of Building Officials. The CBC is a series of standards that are used in the investigation, design (Chapters 16 and 18) and construction (including grading and erosion control as found in Appendix Chapter 33) that were based upon the UBC that includes supplemental standards specific to California. The CBC has been adopted by the City of Pittsburg and Contra Costa County and supplements their grading and construction ordinances.

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 are focused on whether or not the project would expose persons or structures to geological hazards.

Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

The Standard Procedures, Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources (Society of Vertebrate Paleontology) are a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. They were adopted in October 1994 by a national organization of vertebrate paleontologists (the Society of Vertebrate Paleontologists).

SETTING

The site is located along the eastern periphery of the City of Pittsburg, in Contra Costa County. Geology at the site is made up of alluvium, fluvium (stream derived deposits) and minor amounts of fill. The soil overlying most of the power plant footprint area has been disturbed. The site slope gradient is very shallow, so the potential for slope stability problems is remote. Ground water at the site was encountered at a depth of from 5 to 16 feet below ground surface in the footprint of the proposed power plant.

FAULTING AND SEISMICITY

No active faults are known to cross the proposed power plant footprint or the linear facilities. The project is located within seismic zone 4 as delineated on Figure 16-2 of the 1998 edition of the California Building Code. The fault closest to the site is the Antioch Fault, located approximately 2 miles southeast of the site. A linear feature following the alignment of the Antioch Fault crosses the proposed natural gas supply pipeline near the contact between segments two and three of the gas line. This feature is not necessarily the northern section of the Antioch Fault. The closest definite expression of the Antioch Fault is found approximately 1.5 miles south of the proposed natural gas supply pipeline. The Antioch Fault is not considered to be an active fault. The closest faults of concern are the Pittsburg-Kirby Hills Fault, located approximately 3.5 miles to the northwest, and the Mt. Diablo Thrust Fault, which is approximately nine miles to the southwest. The estimated peak horizontal ground acceleration for the Pittsburg-Kirby Hills Fault is 0.48g. Other faults of note in the area are the Concord-Green Valley Fault and the Greenville Fault. These faults are approximately 8 and 10 miles west of the site respectively and are considered active faults.

LIQUEFACTION, HYDROCOMPACTION, EXPANSIVE SOILS

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. A soil layer at the site has been identified as being potentially liquefiable. A follow up geotechnical study will help define the lateral and vertical extent of the potentially liquefiable soils and provide criteria for design of the project foundation. Even though areas of the proposed

project may be prone to liquefaction, the condition may be mitigated by the use of pile foundations.

Hydrocompaction is the process of the loss of soil volume upon the application of water. The soils at the project site are partially saturated to saturated and are not considered to be prone to hydrocompaction.

Soils that contain a high percentage of expansive clay minerals are prone to expansion, if subjected to an increase in water content. Expansive soils are usually measured with an index test such as the expansive index potential. In order for a soil to be a candidate for testing, the soil must have a high clay content. Near surface soils reported in the AFC, Appendix 9G (DEC1998a) are not considered to have a high enough clay content to be of concern with respect to expansion.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

In section 8.15.1.5 of the AFC (DEC 1998a) the applicant indicates that sand, gravel, coal and natural gas are present in the region selected for the project site. No sand and gravel quarrying, coal mining, or natural gas extraction is known to have occurred at the site in the past. The local coal field is not likely to be brought back into production due to the high cost of production and the low quality of the coal. Should natural gas be discovered at the site in the future, directional drilling methods would allow the resource to be developed without adversely affecting the project operations.

Several geological formations in the vicinity of the project are known to contain either vertebrate or invertebrate fossils or both, but none of these formations are likely to be encountered during construction of the proposed project and linear facilities. No paleontological resources were identified by the applicant at the project site or along the proposed linear facilities alignments (DEC 1998b). No paleontological resources are known to exist within the footprint of the plant site or along the alignments of the linear facilities. A fossilized fish head and part of a horse's tooth were reported by the applicant to have been noted in a review of paleontological literature for the project area. These fossils in and by themselves are considered insignificant by Energy Commission staff. However, fluvium east and west of the site near Antioch and Martinez respectively has yielded elephant, bison and camel fossil pieces (DEC 1998a, page 8.16-4). Therefore Energy Commission staff consider the paleontological resource in the fluvium to be highly significant but the probability of a find on the project site to be low. Energy Commission staff have proposed conditions of certification 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.

SURFACE WATER HYDROLOGY

The project is not located in a 100-year flood zone. The principal surface water flow direction is to the northwest toward Dowest Slough, which in turn empties into New York slough. Minimum grade for the power plant area will be 1% and all drainage will be directed away from buildings within the footprint. Spill containment features

are described by the applicant to have a minimum of one foot of freeboard. The surface water drainage from the power plant area is to be channeled into a 36-inch diameter storm drain and discharged into Dowest Slough. Run-off during a 100-year 24-hour storm event should not overwhelm the capacity of the proposed surface water drainage system or the sloughs.

ANALYSIS AND POTENTIAL IMPACTS

SITE SPECIFIC IMPACTS

The project is not likely to have any impact on geological or paleontological resources. There will be a minor, insignificant increase in the surface water drainage off-site.

CUMULATIVE IMPACTS

It is staff's opinion that the potential for a significant adverse cumulative impact on paleontological resources, geological resources, or surface water hydrology is unlikely, if the Delta Energy Center is constructed according to the proposed conditions of certification. This opinion is based on the fact that the site is not known to have significant paleontological or geological resources.

MITIGATION

Based upon the literature and archives search, field surveys and the preliminary geotechnical investigation for the project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the power plant, related natural gas supply line, electrical transmission line, and water pipelines (DEC 1998a, §8.16.4). Energy Commission staff agree with the applicant that there is a low probability that vertebrate fossils will be encountered during construction of the power plant and related features.

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 LORS applicable to geological hazards, geological and paleontological resources, and surface water hydrology for the project are complied with.

FACILITY CLOSURE

There are three kinds of facility closure. A definition and general approach to closure is presented in the General Conditions section of this document. Facility closure activities are not anticipated to impact geological or paleontological resources. This is due to the fact that no paleontological or geological resources are known to exist at the power plant location. In addition, decommissioning and closure of the power plant should not negatively affect geological or paleontological resources since the majority of the ground disturbed in plant decommissioning and

closure would have been disturbed in the construction of the plant. Surface water hydrology impacts will depend upon the closure activities proposed.

CONCLUSION AND RECOMMENDATIONS

Staff analysis indicates that even though areas of the proposed project may be prone to liquefaction, the condition may be mitigated by the use of pile foundations or avoiding areas of the site that have high liquefaction potential.

The applicant will likely be able to comply with applicable LORS. The project should have no adverse impact with respect to geological and paleontological resources and surface water hydrology. Staff propose to ensure compliance with applicable LORS for geological hazards, geological and paleontological resources and surface water hydrology with the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

GEO-1 Prior to the start of construction, the project owner shall assign to the project an engineering geologist(s), certified by the State of California, to carry out the duties required by the 1998 edition of the California Building Code (CBC) Appendix Chapter 33, Section 3309.4. The certified engineering geologist(s) assigned must be approved by the CPM (the functions of the engineering geologist can be performed by the responsible geotechnical engineer, if that person has the appropriate California license).

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 construction, the project owner shall submit to the CPM for approval the name(s) and license number(s) of the certified engineering geologist(s) assigned to the project. The submittal should include a statement that CPM approval is needed. The CPM will approve or disapprove of the engineering geologist(s) and will notify the project owner of its findings within 15 days of receipt of the submittal. If the engineering geologist(s) is subsequently replaced, the project owner shall submit for approval the name(s) and license number(s) of the newly assigned individual(s) to the CPM. The CPM will approve or disapprove of the engineering geologist(s) and will notify the project owner of the findings within 15 days of receipt of the notice of personnel change.

GEO-2 The assigned engineering geologist(s) shall carry out the duties required by the 1998 CBC, Appendix Chapter 33, Section 3309.4 Engineered Grading Requirement, and Section 3318.1 – Final Reports. Those duties are:

1. Prepare the Engineering Geology Report. This report shall accompany the Plans and Specifications when applying to the CBO for the grading permit.
2. Monitor geologic conditions during construction.
3. Prepare the Final Engineering Geology Report.

Protocol: The Engineering Geology Report required by the 1998 CBC Appendix Chapter 33, Section 3309.3 Grading Designation, shall include an adequate description of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and an opinion on the adequacy, for the intended use, of the site as affected by geologic factors.

The Final Engineering Geology Report to be completed after completion of grading, as required by the 1998 CBC Appendix Chapter 33, Section 3318.1, shall contain the following: A final description of the geology of the site and any new information disclosed during grading; and the effect of same on recommendations incorporated in the approved grading plan. The engineering geologist shall submit a statement that, to the best of his or her knowledge, the work within their area of responsibility is in accordance with the approved Engineering Geology Report and applicable provisions of this chapter.

Verification: (1) Within 15 days after submittal of the application(s) for grading permit(s) to the CBO, the project owner shall submit a signed statement to the CPM stating that the Engineering Geology Report has been submitted to the CBO as a supplement to the plans and specifications and that the recommendations contained in the report are incorporated into the plans and specifications. (2) Within 90 days following completion of the final grading, the project owner shall submit copies of the Final Engineering Geology Report required by the 1998 CBC Appendix Chapter 33, Section 3318 Completion of Work, to the CPM and the CBO.

PAL-1 Prior to the start of any project-related construction activities (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation activities), the project owner shall ensure that the designated paleontological resource specialist approved by the CPM is available for field activities and prepared to implement the conditions of certification.

The designated paleontological resources specialist shall be responsible for implementing all the paleontological conditions of certification and for using qualified personnel to assist in this work.

Protocol: The project owner shall provide the CPM with the name and statement of qualifications for the designated paleontological resource specialist.

Protocol:

Protocol: The statement of qualifications for the designated paleontological resources specialist shall demonstrate that the specialist meets the following minimum qualifications: a degree in paleontology or geology or paleontological resource management; and at least three years of paleontological resource mitigation and field experience in California, including at least one year's experience leading paleontological resource mitigation and field activities.

The statement of qualifications shall include a list of specific projects the specialist has previously worked on; the role and responsibilities of the specialist for each project listed; and the names and phone numbers of contacts familiar with the specialist's work on these referenced projects.

If the CPM determines that the qualifications of the proposed paleontological resource specialist are not in concert with the above requirements, the project owner shall submit another individual's name and qualifications for consideration.

Protocol: If the approved, designated paleontological resource specialist is replaced prior to completion of project mitigation, the project owner shall obtain CPM approval of the new designated paleontological resource specialist by submitting the name and qualifications of the proposed replacement to the CPM, at least ten (10) days prior to the termination or release of the preceding designated paleontological resource specialist.

Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

Verification: At least ninety (90) days prior to the start of construction, the project owner shall submit the name and resume and the availability for its designated paleontological resource specialist, to the CPM for review and approval. The CPM shall provide written approval or disapproval of the proposed paleontological resource specialist.

At least ten (10) days prior to the termination or release of a designated paleontological resource specialist, the project owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new designated paleontological resource specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

PAL-2 Prior to the start of project construction, the designated paleontological resource specialist shall prepare a Paleontological Resources Monitoring and Mitigation Plan to identify general and specific measures to minimize potential impacts to sensitive paleontological resources, and submit this plan to the CPM for review and approval. After CPM approval, the project owner's designated paleontological resource specialist shall be available to implement the Monitoring and Mitigation Plan, as needed, throughout project construction.

Protocol:

Protocol: In addition to the project owner's adoption of the guidelines of the Society of Vertebrate Paleontologists, as modified in the Application for Certification for the DEC, dated December 1998, the Paleontological

Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures:

- A discussion of the sequence of project-related tasks, such as any pre-construction surveys, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation;
- Identification of the person(s) expected to assist with each of the tasks identified within this condition for certification, and a discussion of the mitigation team leadership and organizational structure, and the inter-relationship of tasks and responsibilities;
- Where monitoring of project construction activities is deemed necessary, the extent of the areas where monitoring is to occur and a schedule for the monitoring;
- An explanation that the designated paleontological resource specialist shall have the authority to halt or redirect construction in the immediate vicinity of a vertebrate fossil find until the significance of the find can be determined;
- A discussion of equipment and supplies necessary for recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
- Inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontologists standards and requirements for the curation of paleontological resources; and
- Identification of the institution that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work, discussion of any 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.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall provide the CPM with a copy of the Monitoring and Mitigation Plan prepared by the designated paleontological resource specialist for review and approval. If the plan is not approved, the project owner, the designated paleontological resource specialist, and the CPM shall meet to discuss comments and negotiate necessary changes.

PAL-3 Prior to the start of construction, and throughout the project construction period as needed for all new employees, the project owner and the

designated paleontological resource specialist shall prepare and conduct CPM-approved training to all project managers, construction supervisors, and workers who operate ground disturbing equipment. The project owner and construction manager shall provide the workers with the CPM-approved set of procedures for reporting any sensitive paleontological resources or deposits that may be discovered during project-related ground disturbance.

Protocol: The paleontological training program shall discuss 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.

Protocol: The training shall also include the set of reporting procedures that workers are to follow if paleontological resources are encountered during project activities. The training program shall be presented by the designated paleontological resource specialist and may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

Verification: At least (30) thirty days prior to the start of project construction, the project owner shall submit to the CPM for review, comment, and written approval, the proposed employee training program and the set of reporting procedures the workers are to follow if paleontological resources are encountered during project construction.

If the employee training program and set of procedures are not approved, the project owner, the designated paleontological resource specialist, and the CPM shall meet to discuss comments and negotiate necessary changes, before the beginning of construction.

Documentation for training of additional new employees shall be provided in subsequent Monthly Compliance Reports, as appropriate.

PAL-4 The designated paleontological resource specialist shall be present at all times he or she deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in areas where potentially fossil-bearing sediments have been identified. If the designated paleontological resource specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner.

Verification: The project owner shall include in the Monthly Compliance Reports a summary of paleontological activities conducted by the designated paleontological resource specialist.

PAL-5 The project owner, through the designated paleontological resource specialist, shall ensure recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and

collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in its compliance files copies of signed contracts or agreements with the designated paleontological resource specialist and other qualified research specialists who will ensure the necessary data and fossil recovery, mapping, preparation for analysis, analysis, identification and inventory, and preparation for and delivery of all significant paleontological resource materials collected during data recovery and mitigation for the project. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resources Report and shall keep these files available for periodic audit by the CPM.

PAL-6 The project owner shall ensure preparation of a Paleontological Resources Report by the designated paleontological resource specialist. The Paleontological Resources Report shall be completed following completion of the analysis of the recovered fossil materials and related information. The project owner shall submit the paleontological report to the CPM for approval.

Protocol: The report shall include (but not be limited to) a description and inventory list of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the paleontological resource specialist that project impacts to paleontological resources have been mitigated.

Verification: The project owner shall submit a copy of the Paleontological Resources Report to the CPM for review and approval under a cover letter stating that it is a confidential document. The report is to be prepared by the designated paleontological resource specialist within 90 days following completion of the analysis of the recovered fossil materials.

PAL-7 The project owner shall include in the facility closure plan a description regarding facility closure activity's potential to impact paleontological resources. The conditions for closure will be determined when a facility closure plan is submitted to the CPM twelve months prior to closure of the facility. If no activities are proposed that would potentially impact paleontological resources, then no mitigation measures for paleontological resource management are required in the facility closure plan.

Protocol: The closure requirements for paleontological resources are to be based upon the Paleontological Resources Report and the proposed grading activities for facility closure.

Verification: The project owner shall include a description of closure activities described above in the facility closure plan.

REFERENCES

- DEC (Delta Energy Center). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.
- DEC (Delta Energy Center). 1998b. Paleontological Resources confidential filing. Submitted to the California Energy Commission, December 21, 1998.
- SVP (Society of Vertebrate Paleontologists). 1994. *Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures*. October 1994.

FACILITY DESIGN

Steve Baker, Kisabuli and Al McCuen

INTRODUCTION

The purpose of the Facility Design analysis is to verify that applicable laws, ordinances, regulations and standards (LORS) have been identified and that the project and ancillary facilities have been described in sufficient detail, including design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public health and safety.

This analysis also examines 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, environmental protection or the operational reliability of the project. This analysis further establishes conditions of certification to ensure that a design review and construction inspection process will be employed that carries out the intent of the LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the commission to "prepare a written decision . . . which includes . . . (a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety [and] (d)(1) Findings regarding the conformity of the proposed site and related facilities . . . with public safety standards . . . and with other relevant local, regional, state and federal standards, ordinances, or laws. . . (Pub. Resources Code, §25523).

SUBJECTS DISCUSSED

Subjects covered in this analysis include:

- identification of the LORS applicable to facility design;
- evaluation of the applicant's proposed design criteria, including the identification of those which are essential to ensuring protection of the environment and/or public health and safety;
- proposed modifications and additions to comply with applicable LORS; and
- conditions of certification proposed by staff to ensure that the project will be designed and constructed to comply with all applicable LORS, and protect environmental quality and assure public health and safety.

SETTING

The applicant proposes to construct and operate the Delta Energy Center (DEC), an 880 megawatt (MW) power plant in Pittsburg, California. The DEC is located on a 20-acre site, in seismic zone 4, as delineated on Figure 16-2 of the 1998 California Building Code (CBC). Additional engineering details of the proposed project are contained in the Application for Certification (AFC), in Appendices 9A through 9G (DEC 1998a).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS are contained in the AFC, in Section 9 and Appendices 9A through 9G (DEC 1998a). A summary of these LORS include: Title 24, California Code of Regulations, which adopts the current edition of the CBC as minimum legal building standards; the 1998 CBC for design of structures; the 1996 Structural Engineers Association of California's Recommended Lateral Force Requirements, for seismic design; ASME-American Society of Mechanical Engineers Boiler and Pressure Vessel Code; and NEMA-National Electrical Manufacturers Association.

ANALYSIS

The basis of this analysis is the applicant's proposed design and construction methods and a list of applicable LORS and design criteria, set forth in the AFC (98-AFC-3). Applicable engineering sections include:

- Section 1.2 Project Schedule
- Section 1.3 Project Ownership
- Section 2 Project Description
- Section 4 Facility Closure
- Section 6 Electric Transmission
- Section 7 Natural Gas Supply
- Appendices
 - 1. Appendix 9A Civil Engineering Design Criteria
 - 2. Appendix 9B Structural Engineering Design Criteria
 - 3. Appendix 9C Mechanical Engineering Design Criteria
 - 4. Appendix 9D Electrical Engineering Design Criteria
 - 5. Appendix 9E Control Systems Engineering Design Criteria
 - 6. Appendix 9F Chemical Engineering Design Criteria

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 a natural gas pipeline and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendix 9A for a list of the applicable industry standards), design practices, and construction methods in preparing and developing the site. The applicant's proposed methods follow industry standard practices. Staff concludes that the project, including its linear facilities, is likely to comply with the

applicable site preparation LORS, and proposes conditions of certification (below) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace; or that require a long lead time to repair or replace; or those used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment are listed in the conditions of certification (below).

The AFC contains a list of the civil, structural, mechanical and electrical design criteria which demonstrate the likelihood of compliance with applicable LORS, and which staff believes are essential to ensuring that the project is designed in a manner which protects the environment and/or public health and safety.

The AFC (DEC 1998a, Appendices 9A and 9B) identifies applicable LORS, which include the 1997 UBC. The project should be designed and constructed to the 1998 edition of the CBC (and other applicable codes and standards) in effect at the time design and construction of the project actually commence. In the event the design of the DEC is submitted to the Chief Building Official (CBO)¹ for review when the successor to the 1998 CBC is in effect, the 1998 CBC provisions identified herein shall be replaced with the applicable successor provisions.

NATURAL GAS PIPELINE

The natural gas pipeline is approximately 5.2 miles long (DEC 1999h), extending from the DEC site to PG&E's Line 400. Line 400 is a backbone pipeline to the PG&E system and has an operating pressure of 900 psi. The DEC pipeline will be protected against external corrosion by a pipe coating system and a cathodic protection system. The pipeline will be designed to adhere to all applicable LORS.

These LORS include:

1. Federal Department of Transportation (DOT) regulations, including Title 49, Code of Federal Regulations, Part 191 (which prescribes requirements for reporting incidents, safety-related conditions, and annual pipeline summary data) and Part 192 (which prescribes minimum safety requirements for pipeline facilities).
2. California Health and Safety Code (H&SC) section 13107.5 (which requires the State Fire Marshal to investigate explosions and fires relating to pipelines) and H&SC section 25504 (which requires the pipeline operator to prepare a Business Plan, including an emergency response plan).

¹CBO is the City or County Chief Building Official, his or her representative or the California Energy Commission's duly appointed representative.

3. California Public Utilities Commission (CPUC) General Order 112-E (GO 112-E) (which establishes rules governing the design, construction, testing, maintenance and operation of gas pipeline systems).

Staff can conclude that the gas pipeline will, in fact, be designed and constructed to the applicable facility design LORS. In order to provide assurance that this will occur as intended, staff proposes a condition of certification (**GEN 1**, below) to monitor compliance.

CODE DESIGN CRITERIA

The procedures and limitations for the design of structures by the 1998 CBC are determined considering zoning, site characteristics, occupancy, structural configuration, structural system and height. Two of the major parameters in the selection of design criteria are occupancy and structural configuration.

Four categories of occupancy are defined in Table 16-K of the 1998 CBC: Essential, Hazardous, Special and Standard. The CBC defines two categories of structural irregularities in Tables 16-L (Vertical Structural Irregularities) and 16-M (Plan Structural Irregularities). Regular structures are defined as having no significant physical discontinuities in plan or vertical configuration or in their lateral force-resisting systems such as those identified for irregular structures.

Two different design and analysis procedures are recognized in the 1998 CBC for determining seismic effects on structures. Dynamic Analysis Procedures of Section 1631 is always acceptable for design. The Static Force Procedure of Section 1630 is allowed only under certain conditions of regularity, occupancy and height.

STATIC ANALYSIS

In seismic Zones 3 and 4, the static lateral force procedure of Section 1630 may be used for the following:

1. Regular structures under 240 feet in height with lateral force resistance provided by systems listed in Table 16-N, except where Section 1629.8.4, Item 4, applies. (Structures, regular or irregular, located on Soil Profile Type S_F , that have a period greater than 0.7 second require dynamic analysis.)
2. Irregular structures not more than five stories or 65 feet in height.

DYNAMIC ANALYSIS

In seismic zones 3 and 4, the dynamic lateral-force procedure of Section 1631 shall be used for all other structures, including the following:

1. Structures having a stiffness, weight or geometric vertical irregularity of Type 1, 2 or 3, as defined in Table 16-L, or structures having irregular features not described in Table 16-L or 16-M, except as permitted by Section 1630.4.2 (Where a combination of structural systems is included in the same structure, the structure can be analyzed as two independent structures for purposes of determining regularity.)

2. Structures over five stories or 65 feet, not having the same structural system throughout their height except as permitted by Section 1631.2. (An elastic design response spectrum constructed in accordance with Figure 16-3 of the 1998 CBC, using the values of C_a and C_v consistent with the specific site can be used.)
3. Structures, regular or irregular, located on Soil Profile Type S_F , that have a period greater than 0.7 seconds.

STRUCTURES REQUIRING DYNAMIC ANALYSIS

Because of structural irregularity, the following major structures, equipment and components may be subjected to dynamic analysis requirements of Section 631 of the 1998 CBC: Combustion turbine generator (CTG) pedestal and foundation, steam turbine generator (STG) pedestal and foundation, heat recovery steam generator (HRSG) structure and foundation, exhaust stack and foundation, and cooling tower. Other structures and components may also be candidates for dynamic analysis; see the list of major structures and equipment included in Proposed Condition of Certification **GEN-2** below.

In order to ensure that those structures, components and pieces of equipment requiring dynamic analysis to comply with the code actually receive this treatment, staff proposes that the applicant and staff agree to a list of such items before design progresses. This requirement is incorporated in Proposed Condition of Certification **STRUC-1** below.

MECHANICAL SYSTEMS

Mechanical features of the project include a combined cycle design consisting of three combustion turbine generators (CTGs), three heat recovery steam generators (HRSGs) with duct burners and a steam turbine generator (STG). Each CTG will produce approximately 200 MW of electricity. The CTG's exhaust gases will be used to generate steam in the HRSGs. The HRSGs will be reheat design with duct firing. Steam from the HRSGs will be admitted to a condensing steam turbine for an additional 300 MWs of electrical power generation. Natural gas will be the fuel for both the CTGs and HRSG duct burners.

The CTGs will be equipped with dry-low NO_x combustors used to control NO_x . Other features of the project include a cooling water system; a wet cooling tower; turbine inlet air cooling system (optional); two natural gas-fired auxiliary boilers to provide steam to the Dow facility; water and waste water treatment equipment; pressure vessels, piping systems and pumps; anhydrous ammonia storage, handling and piping system; air compressors; fire protection systems; and heating, ventilation, air conditioning (HVAC), portable water, plumbing and sanitary sewage systems.

MECHANICAL LORS AND DESIGN CRITERIA

The application (DEC 1998a, Appendix 9C) lists and describes the mechanical codes, standards and design criteria that will be employed in project design documents, procurement specifications and contracts. Design work will be performed in accordance with the appropriate LORS. This list indicates that the applicant is aware of the codes, standards, and design criteria appropriate for such a project. This approach will likely assure the project's mechanical systems are designed to the appropriate codes and standards. Staff has proposed conditions of certification (**MECH-1** through **MECH-4**, below) to monitor compliance with this requirement.

ELECTRICAL SYSTEMS

The proposed transmission interconnection connects the DEC to the PG&E power grid at the 230-kV substation at the Pittsburg Power Plant, approximately 3.2 miles west of the proposed DEC site. Other major electrical features of the project include the generators, power control wiring, protective relaying, grounding system, cathodic protection system and site lighting.

1. Power and Control Wiring. In general, conductors will be insulated on the basis of a normal maximum conductor temperature of 90°C in 40°C ambient air with a maximum emergency overload temperature of 130°C and a short circuit temperature of 250°C. In areas with higher ambient temperatures, larger conductors will be used or higher temperature rated insulation will be selected.
2. Protective Relaying. These relays protect equipment in the auxiliary power supply system, generator terminal systems, 230 kV system, 66 kV systems, turbine-generator system, and the electrical loads powered from these systems. The protective relaying scheme will be designed to remove or alarm any of the abnormal occurrences.
3. Classification of Hazardous Areas. Areas where flammable and combustible liquids, gases, and dusts are handled and stored will be classified for determining the minimum criteria for design and installation of electrical equipment to minimize the possibility of ignition. The criteria for determining the appropriate classification are specified in Article 500 of the National Electrical Code (NFPA/ANSI C1).
4. Grounding. The station grounding system will be an interconnected network of bare copper conductors and copper clad ground rods. The system will be provided to protect plant personnel and equipment from hazard, which can occur during power system faults and lightning strikes. The station-grounding grid will be designed for adequate capacity to dissipate heat from ground current under the most severe conditions in areas of high ground fault current concentrations.
5. Site Lighting. The site lighting system will provide personnel with illumination for the performance of general yard tasks, safety, and plant security. Power used to supply outdoor roadway and area lighting, will be 208 or 480 volts.

6. Freeze Protection. A freeze protection system will be provided for selected outdoor piping as required. Parallel circuit type heating cable will be utilized where possible.
7. Cathodic Protection System. Cathodic protection and other corrosion control measures for all plant structures, including the exterior surface of underground piping and bottoms of surface mounted steel tanks will be provided.

The AFC (DEC 1998a, Appendix 9D) lists and describes the electrical codes, standards and design criteria that will be employed in project design documents, procurement specifications and contracts. Design work will be performed in accordance with the appropriate LORS. This list indicates that the applicant is aware of the codes, standards, and design criteria appropriate for such a project. This approach will likely assure the project's electrical systems are designed to the appropriate codes and standards.

Staff concludes that the applicant can design the electrical systems in accordance with all LORS and in a manner which protects the environment and public health and safety by complying with the applicable LORS and electrical design criteria (DEC 1998a, Appendix 9D). Staff has proposed conditions of certification (**ELEC-1** and **ELEC-2**, below) to monitor this compliance.

ANCILLARY FACILITIES

ELECTRIC TRANSMISSION LINE

A new 3.3-mile, 230 kilovolt (kV) electric transmission line is proposed. This line will interconnect to the electric transmission system at the existing PG&E substation near the Pittsburg Power Plant. The line will be above ground as it runs in front of USS POSCO, then will transition to underground along 8th street. An 0.8-mile underground 13.8 kV line will be built to supply electricity to Dow Chemical.

NATURAL GAS FUEL LINE

A new 5.2-mile natural gas pipeline will be constructed to provide fuel for the project. The 20- inch gas pipeline will be placed in the existing Dow Chemical right-of-way along the Burlington Northern Santa Fe Railroad and will connect to PG&E's Line 400.

EMISSION CONTROLS

Selective Catalytic Reduction (SCR) will be used to control Nitrogen Oxide (NO_x) emissions to 2.5 parts per million by volume dry (ppmvd) at 15 percent oxygen from the gas turbines and 9 ppmvd at 3% oxygen from the auxiliary boilers. The SCR will use anhydrous ammonia and a precious metal catalyst to convert NO_x molecules into nitrogen and water. Each HRSG's exhaust to the atmosphere will be through 144-foot tall exhaust stacks.

WATER SUPPLY

Secondary-treated wastewater from Delta Diablo Sanitation District will be used in the cooling towers. A new pipeline, about 500 feet long, will be built for this purpose. Water for steam production and domestic uses will be supplied by the Contra Costa Water District and transported in Dow's existing 20-inch diameter pipeline.

WASTE WATER DISCHARGE

All plant discharges will be sent back to Delta Diablo Sanitation District for discharge into their existing discharge pipe. An additional wastewater discharge outfall may be used by the DEC (referred to as the old Dow outfall) is located on Dow Chemical property. Exact routing of a line to connect to the Dow out fall has not yet been determined but is expected to follow surface streets within the Dow facility.

PROJECT QUALITY PROCEDURES

The AFC describes a Project Quality Program that will be used on the project to maximize 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 powerplant (DEC 1998a, §2.4.5). 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 will likely ensure that the project is designed, procured, fabricated and installed in accordance with LORS.

COMPLIANCE MONITORING

Staff has developed conditions of certification (see section below titled "Proposed Conditions of Certification") to ensure that the design measures and LORS requirements are carried out in a manner that results in the protection of the environment and of public health and safety. Some of these facility design conditions address the roles, responsibilities and qualifications of engineers responsible for the design and construction of the project (proposed conditions of certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical, and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that no element of construction proceeds without approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

CUMULATIVE IMPACTS

The subject area of Facility Design is concerned with compliance with applicable engineering LORS governing the design and construction of the physical facilities of the project. These include buildings and other structures, and related linear facilities such as pipelines and power transmission lines. The actual environmental impacts posed by these project features are dealt with elsewhere (e.g., under subject areas such as Biological Resources and Noise). Compliance with these engineering

LORS creates no environmental impacts that could extend offsite and accumulate with those of other, nearby projects. The area of Facility Design thus does not exhibit the potential to produce Cumulative Impacts.

FACILITY CLOSURE

A facility closure was evaluated under three scenarios. Planned Closure, Unexpected Temporary Closure and Unexpected Permanent Closure.

PLANNED CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching its useful life, may range from “mothballing” to removal of all equipment and appurtenant facilities. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe, and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission and the City of Pittsburg for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of the following items:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the 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.

UNEXPECTED TEMPORARY CLOSURE

Under this scenario, it is expected that the facility is closed unexpectedly, on a short-term basis. Natural disasters, such as an earthquake or severe storm, can cause an unexpected temporary closure of the facility. If damage to the facilities is too great, the temporary closure may become permanent.

If the facility is closed on a temporary basis, the applicant shall secure the site in order to protect public health and safety. If temporary closure becomes permanent, the applicant shall follow the “Planned Closure” procedures outlined in the Planned Closure.

UNEXPECTED PERMANENT CLOSURE

Under this scenario, the project owner closes the facility unexpectedly on a permanent basis. In this case, the project owner shall implement the closure procedures outlined above for "Planned Closure".

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. To ensure that these measures are included in the Facility Closure Plan, staff has proposed a Condition of Certification (**GEN-9**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents, are those applicable to the project.
2. Staff has evaluated the AFC, and the project LORS and design criteria in the record. Staff concludes that the design, construction and eventual closure of the project are likely to comply with applicable LORS. If properly implemented, design criteria, including staff proposed modifications, will ensure that LORS are met during the project design and construction phases.
3. The conditions of certification proposed will ensure that the proposed facilities are designed, constructed, operated and eventually closed in accordance with applicable LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the local CBO or other commission delegate agent. Staff will audit the CBO or delegate agent to ensure satisfactory performance.
4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan required by **GEN-9** prior to the commencement of decommissioning, that the decommissioning procedure is likely to result in satisfactory decommissioning performance.

RECOMMENDATIONS

If the Energy Commission certifies the project, staff recommends that:

1. the conditions of certification proposed herein be adopted to ensure that the project is designed and constructed to comply with applicable LORS and also to protect environmental quality, assure public health and safety;
2. the project be designed and built to the 1998 CBC (or successor standard, if such is in effect); and

- the CBO review the final designs, conduct plan checking and perform field inspections during construction; and staff 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 1998 California Building Code (CBC)² and all other applicable LORS in effect at the time initial design plans are submitted to the CBO for review and approval.

In the event that the DEC is designed to a successor edition to the 1998 CBC, the 1998 CBC provisions identified herein 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.

Verification: Within 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) after 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 for facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy.]

GEN-2 The project owner shall furnish to the Energy Commission CPM and to the CBO a schedule of facility design submittals, a Master Drawing List, and a Master Specifications List. 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 structures and equipment below). To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Major Structures

- Combustion Turbine Generator (CTG) Pedestal and Foundation
- Steam Turbine Generator (STG) Pedestal and Foundation
- CTG Enclosure Structure
- STG Enclosure Structure
- Air Inlet Filtration with Evaporative Cooler Structure (as applicable)
- Cooling Tower
- Heat Recovery Steam Generator (HRSG) Structure and Foundation
- Exhaust Stack and Foundation

²All the Sections, Chapters, Appendices and Tables, unless otherwise stated, refer to Sections, Chapters, Appendices and Tables of the 1998 California Building Code (CBC).

Field-Fabricated Tanks and Foundations
Shop-Fabricated Tanks and Foundations
Condenser Support Structure and Foundations
Equipment Foundations (compressors, pumps, transformers)
Switchyard
Control/Administration Building
Pipe Rack Structures
Transformer-Dead End Structure
Main Transformer Foundations
Transmission Tower Structure and Foundations
Boiler Feed Pump Foundations
Electrical Control Building

Major Equipment

CTG
STG
Fired HRSG
Shop-Fabricated Pressure Vessels
STG Condenser
Main Step-up Transformers
Boiler Feed Pumps
Condensate Pumps
Switchgear
Cycle Waste Chemical Storage
Circulating Water Pump

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 rough grading, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The project owner shall provide schedule updates in the Monthly Compliance Report.

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection, equivalent to the fees listed in the 1998 CBC, Chapter 1, Section 107 and Table 1-A – Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A – Grading Plan Review Fees; and Table A-33-B – Grading Permit Fees. If Contra Costa County or the City of Pittsburg has adjusted the CBC fees for design review, plan check and construction inspection, the project owner shall pay the adjusted fees.

Verification: The project owner shall make the required payments to the CBO at the time of submittal of the plans, design calculations, specifications, or soil reports. 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 the applicable fee has 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 a resident engineer (RE), to be in general responsible charge of the project. [Building Standards Administrative Code (Cal. Code of Regs., Tit. 24, § 4-209 – Designation of Responsibilities).]

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 each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

Protocol: The RE shall:

1. monitor construction progress to ensure compliance with LORS;
2. ensure that construction of all the facilities conforms in every material respect to the applicable LORS, these conditions of certification, approved plans, and specifications;
3. prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) 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 as not conforming to the 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 conform to applicable 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 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 name, qualifications 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) are 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.

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) 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 who is fully competent and proficient in the design of power plant structures and equipment supports; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code Section 6704 et seq., and Section 6730 and 6736. Requires 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 project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. [1998 CBC, Section 104.2 – Powers and Duties of Building Official.]

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.

Protocol: A: The civil engineer shall:

1. design (or be responsible for design), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities. 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
2. 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 in the construction procedures.

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

1. review all the engineering geology reports, and prepare final soils grading report;
2. prepare the soils engineering reports required by the 1998 CBC, Appendix Chapter 33, Section 3309.5 – Soils Engineering Report, and Section 3309.6 – Engineering Geology Report;
3. be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33, Section 3317 – Grading Inspections;
4. recommend field changes to the civil engineer and RE;
5. review the geotechnical report, field exploration report, laboratory tests, and engineering analyses detailing the nature and extent of the site soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load; and
6. prepare reports on foundation investigation to comply with the 1998 CBC, Chapter 18, Section 1804 – Foundation Investigations.

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. [1998 CBC, Section 104.2.4 – Stop orders.]

Protocol: C: 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 LORS;
4. evaluate and recommend necessary changes in design; and
5. prepare and sign all major building plans, specifications and calculations.

Protocol: D: 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 with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

Protocol: E: 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 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.

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 1998 CBC, Chapter 17, Section 1701 – Special Inspections and Section – 1701.5 Type of Work (requiring special inspection), Section 106.3.5 – Inspection and observation program.

Protocol: 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; 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 and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector [certified 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).

Verification: At least 15 days 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-7The project shall keep the CBO informed regarding the status of engineering and construction. If any discrepancy in design and/or construction is discovered, the project owner shall document the discrepancy and recommend the corrective action required. The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall submit monthly construction progress reports to the CBO and CPM. The project owner shall transmit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy 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.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. When the work and the "as-built" and "as graded" plans conform to the approved final plans, the project owner shall notify the CPM regarding the CBO's final approval. The marked up "as-built" drawings for the construction of structural and architectural work shall be submitted to the CBO. Changes approved by the CBO shall be identified on the "as-built" drawings. [1998 CBC, Section 108 – Inspections.]

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, (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.

GEN-9 The project owner shall file a closure/decommissioning plan with the City of Pittsburg, Contra Costa County and the CPM for review and approval at least 12 months (or other mutually agreed to time) prior to commencing the closure activities. If the project is abandoned before construction is completed, the project owner shall return the site to its original condition.

Protocol: The closure plan shall include a discussion of the following:

1. the proposed closure/decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
2. all applicable LORS, all local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
3. activities necessary to restore the site if the decommissioning plan requires removal of all equipment and appurtenant facilities; and
4. closure/decommissioning alternatives, other than complete restoration of the site.

Verification: At least 12 months prior to closure or decommissioning activities, the project owner shall file a copy of the closure/decommissioning plan with the City of Pittsburg, Contra Costa County and the CPM for review and approval. Prior to the submittal of the closure plan, a meeting shall be held between the project owner and the CPM for discussing the specific contents of the plan.

CIVIL-1 Prior to the start of site grading, 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 report as required by the 1998 CBC, Appendix Chapter 33, Section 3309.5 – Soils Engineering Report and Section 3309.6 – Engineering Geology Report.

Verification: At least 15 days prior to the start of site grading, the project owner shall submit the documents described above to the CBO for 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 geotechnical engineer or 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. [1998 CBC, Section 104.2.4 – Stop orders.]

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

CIVIL-3 The project owner shall perform inspections in accordance with the 1998 CBC, Section 108 – Inspections, Chapter 17, Section 1701.6 – Continuous and periodic special inspection and Appendix Chapter 33, Section 3317 – Grading inspection. All plant site-grading operations shall be subject to inspection by the CBO and the CPM.

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

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. 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 facilities, the project owner shall obtain the CBO's approval of the final "as-graded" grading plans, and final "as-built" plans for the erosion and sedimentation control facilities. [1998 CBC, Section 109 – Certificate of Occupancy.]

Verification: Within 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO 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. The project owner shall submit a copy of this report to the CPM in the next Monthly Compliance Report.

STRUC-1 Prior to the start of any increment of construction, the project owner shall submit to the CBO for review and approval the applicable designs, plans and drawings, and a list of those project structures, components and major equipment items that will undergo dynamic structural analysis. Designs, plans and drawings shall be those for:

1. major project structures;
2. major foundations, equipment supports and anchorage;
3. large field fabricated tanks;
4. turbine/generator pedestal; and
5. switchyard structures.

Protocol: The project owner shall:

1. obtain agreement with the CBO on the list of those structures, components and major equipment items to undergo dynamic structural analysis;
2. meet the pile design requirements of the 1998 CBC. Specifically, Section 1807 – General Requirements, Section 1808 – Specific Pile Requirements, and Section 1809 – Foundation Construction (in seismic zones 3 and 4);

3. 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 (i.e., 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, [1998 CBC, Section 108.4 – Approval Required];
4. submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures at least 90 days prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation, [1998 CBC, Section 106.4.2 – Retention of plans and Section 106.3.2 – Submittal documents.]; and
5. 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. [1998 CBC, Section 106.3.4 – Architect or engineer of record.]

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 any increment of construction, the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the nonconforming submittal with a copy of the transmittal letter to the CPM.

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

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following:

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 structure activities requiring special inspections shall be in accordance with the 1998 CBC, Chapter 17, Section 1701 – Special Inspections, Section 1701.5 – Type of Work (requiring special inspection), Section 1702 – Structural Observation and Section 1703 – Nondestructive Testing.

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 to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and 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 1998 CBC, Chapter 1, Section 106.3.2 – Submittal documents, and Section 106.3.3 – Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give the CBO prior notice of the intended filing.

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

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 CBC shall, at a minimum, be designed to comply with Occupancy Category 2 of the 1998 CBC. Chapter 16, Table 16–K of the 1998 CBC requires use of the following seismic design criteria: $I = 1.25$, $I_p = 1.5$ and $I_w = 1.15$.

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 installation of the tanks or vessels containing the above specified quantities of highly toxic or explosive substances that would be hazardous to the safety of the general public if released, the project owner shall submit to the CBO for 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 Prior to the start of any increment of piping construction, the project owner shall submit, for CBO review and approval, the proposed final design drawings, specifications and calculations for each plant piping system (exclude: domestic water, refrigeration systems, and small bore piping, i.e., piping and tubing with a diameter equal to or less than two and one-half inches). The submittal shall also include the applicable QA/QC procedures. The project owner shall design and install all piping, other than domestic water, refrigeration, and small bore piping to the applicable edition of the CBC. Upon completion of construction of any piping system, the project owner shall request the CBO's inspection approval of said construction. [1998 CBC, Section 106.3.2 – Submittal documents, Section 108.3 – Inspection Requests.]

Protocol: The responsible mechanical engineer shall submit a signed and stamped statement to the CBO when:

1. the proposed final design plans, specifications and calculations conform with all of the piping requirements set forth in the Energy Commission's Decision; and
2. all of the other piping systems, except domestic water, refrigeration systems and small bore piping have been designed, fabricated and installed in accordance with all applicable ordinances, regulations, laws and industry standards, including, as applicable:
 - 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);
 - and
 - Specific City/County code.

The CBO may require the project owner, as necessary, to employ special inspectors to report directly to the CBO to monitor shop fabrication or equipment installation. [1998 CBC, Section 104.2.2 – Deputies.]

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 any increment of piping construction, the project owner shall submit to the CBO for approval, with a copy of the transmittal letter to the CPM, the proposed final design plans, specifications, calculations and quality control procedures for that increment of construction of piping systems, including a copy of the signed and stamped engineer's certification of conformance with the Energy Commission's Decision. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

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 the 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 said installation. [1998 CBC, Section 108.3 – 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 a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for review and approval, final design plans, specifications and calculations, 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 send copies of the CBO plan check approvals to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's and/or Cal-OSHA inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

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

Verification: The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the applicable edition of the CBC. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said 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. [1998 CBC, Section 108.7 Other Inspections; Section 106.3.4 – Architect or engineer of record.]

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 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 applicable edition of the CBC, with a copy of the transmittal letter to the CPM.

The project owner shall send copies of CBO comments and approvals to the CPM in the next Monthly Compliance Report. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-4 Prior to the start of each increment of plumbing construction, the project owner shall submit for CBO's approval the final design plans, specifications, calculations, and QA/QC procedures for all plumbing systems, potable water systems, drainage systems (including sanitary drain and waste), toilet rooms, building energy conservation systems, and temperature control and ventilation systems, including water and sewer connection permits issued by the local agency. Upon completion of any increment of construction, the project owner shall request the CBO's inspection approval of said construction. [1998 CBC, Section 108.3 – Inspection Requests, Section 108.4 – Approval Required.]

Protocol: The project owner shall design, fabricate and install:

1. plumbing, potable water, all drainage systems, and toilet rooms in accordance with Title 24, California Code of Regulations, Division 5, Part 5 and the California Plumbing Code (or other relevant section(s) of the currently adopted California Plumbing Code and Title 24, California Code of Regulations); and
2. building energy conservation systems and temperature control and ventilation systems in accordance with Title 24, California Code of Regulations, Division 5, Chapter 2-53, Part 2.

The final plans, specifications and calculations shall clearly reflect the inclusion of approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall stamp and sign all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

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 construction of any of the above systems, the project owner shall submit to the CBO the final design plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable edition of the CBC, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the next Monthly Compliance Report following completion of that increment of construction.

MECH-5 Prior to construction of the natural gas pipeline, the project owner shall provide a plan to the CPM, for approval, detailing the measures that will be taken to ensure safety during installation and operation of the pipeline, particularly that portion passing near residences. The plan shall address any design features, such as increased depth, a protective cap, and special construction techniques that will be incorporated in installation of the pipeline.

Protocol: The LORS applicable to the natural gas pipeline include the following:

1. Title 49 Code of Federal Regulations, Parts 191 and 192
2. California Health and Safety Code Sections 13107.5 and 25504
3. California Public Utilities Commission General Order 112-E

Verification: At least thirty days prior to the beginning of construction of the natural gas pipeline, the project owner shall provide to the CPM the plan described herein for approval. Any actual construction deviations from this plan shall be reported and dealt with per the requirements of Condition of Certification **GEN-7** above.

ELEC-1 For the 13.8 kV and lower systems, the project owner shall not begin any increment of electrical 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. [1998 CBC, Section 108.4 – Approval Required, and Section 108.3 – Inspection Requests.]

Protocol: The following activities shall be reported in the Monthly Compliance Report:

1. receipt or delay of major electrical equipment;
2. testing or energization of major electrical equipment; and
3. 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 electrical construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

ELEC-2 The project owner shall submit to the CBO the required number of copies of items A and B for review and approval and one copy of item C: [CBC 1998, Section 106.3.2 – Submittal documents.]

- A. Final plant design plans to include:
1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems;
 2. system grounding drawings;
 3. general arrangement or conduit drawings; and
 4. other plans as required by the CBO.

- B. Final plant calculations to establish:
1. short-circuit ratings of plant equipment;
 2. ampacity of feeder cables;
 3. voltage drop in feeder cables;
 4. system grounding requirements;
 5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
 6. system grounding requirements;
 7. lighting energy calculations; and
 8. other reasonable calculations as customarily required by the CBO.
- C. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Commission Decision.

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 electrical equipment installation, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations, for the items enumerated above, including a copy of the signed and stamped statement from the responsible electrical engineer certifying compliance with the applicable LORS. The project owner shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

DEC (Delta Energy Center). 1998a. Application for Certification, Delta Energy Center (98-AFC-3). Submitted to the California Energy Commission, December 18, 1998.

DEC (Delta Energy Center). 1999h. Response to data requests made at the workshops and submitted to the California Energy Commission on May 7, 1999.

DEC (Delta Energy Center) 1999j Supplement to the AFC for the revised wastewater discharge outfall and natural gas pipeline. Submitted to the California Energy Commission on June 16, 1999.

POWER PLANT RELIABILITY

Steve Baker

INTRODUCTION

In this analysis, 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. Such a level of reliability is selected as a benchmark because the resulting project would likely not degrade the overall reliability of the electric system it serves, and because no special reliability requirements pertain to the project.

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. The applicant has predicted a high level of reliability for the power plant (see below). Staff believes the applicant should not be held responsible for achieving this level, but the plant's reliability should at least match that of similar plants.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Presently, there are no laws, ordinances, regulations or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, 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.

SETTING

In the regulated monopoly electric industry of past decades, the utility companies assured overall system reliability, in part, by maintaining a "reserve margin." This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a seven- to ten-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from seven to ten percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the newly restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (Cal-ISO), a newly-formed entity that will work with the California Power Exchange to purchase, dispatch and sell electric power throughout the state. How Cal-ISO will ensure system reliability is not yet thoroughly understood; protocols are now being developed and put in place that will, it is anticipated, allow sufficient reliability to be maintained under the competitive market system. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms currently being considered to ensure an adequate supply of reliable power (Mavis 1998, pers. comm.).

These mechanisms apparently are being 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 will 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 exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability will prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are understood and compensated for, staff deems it wise to encourage power plant owners to continue to build and operate their projects to the level of reliability to which all in the industry have become accustomed.

The applicant proposes to operate the project as a baseload and load following unit (DEC 1998a, AFC §§ 2.2.17, 9.2.2) operating at output levels from 30 to 100 percent of baseload (DEC 1998a, §§ 2.4.1, 9.2.2) at an availability factor from 92 to 98 percent (DEC 1998a, AFC §§ 2.2.2, 2.2.17, 2.4.1, 9.2.2). The applicant speaks of no plans to sell reliability-related power services, such as voltage support or spinning reserve. In the new competitive electric power industry, if such service were desired, the market would put a price on that service. If the price were high enough, the applicant or others would move to serve the need. Since the project does not profess to provide voltage support, spinning reserve or other reliability-related services, staff proposes to place no special reliability requirements on it.

ANALYSIS

A reliable power plant is one that is available when called upon to operate. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability, fuel and water availability, and resistance to natural hazards.

Throughout its intended life, the project will be expected to perform reliably in baseload and load following duty. Baseload power plant systems must be able to operate for extended periods (sometimes months on end) without shutting down for maintenance or repairs. This requirement for equipment availability is typically addressed by control of quality in machinery design, construction, and installation.

Plant reliability is further assured by providing for plant maintainability and sufficient redundancy of critical equipment, fuel and water availability, and resistance to natural hazards.

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; by procuring equipment from qualified vendors and suppliers; and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

QA/QC PROGRAM

The QA/QC program delineated by the applicant (DEC 1998a, AFC § 2.4.5) describes a program typical of the power industry. Equipment and supplies will be purchased from qualified suppliers and will be inspected upon receipt, and construction and installation will be inspected and systems tested, all in accordance with the QA plan. 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**.

QUALIFIED VENDORS AND SUPPLIERS

Vendors of plant equipment and materials will be selected from lists of qualified suppliers, those with known capabilities. To appear on the list of qualified suppliers, a vendor must show satisfactory personnel qualifications, production capability, past performance, and quality assurance program (DEC 1998a, AFC § 2.4.5.2). Procured items will be subjected to a system of inspections, audits and independent testing contracts that ensures the expected quality. This describes an industry standard approach to vendor selection, which staff expects to lead to the acquisition of quality, reliable equipment and materials.

PLANT MAINTAINABILITY

EQUIPMENT REDUNDANCY

A generating facility called on to operate in baseload service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide some redundancy of function (DEC 1998a, AFC §§ 2.2.5, 2.2.6, 2.2.8, 2.2.14.3, 2.4.2; Table 2.4-1). For example:

- The following plant components are provided in sets of two 100 percent capacity units per gas turbine train:
- closed cycle cooling water pumps and heat exchangers;

- condensate pumps;¹
- 125V battery chargers;
- demineralizer/R.O. trains;
- water treatment system metering pumps; and
- The Distributed Control and Information System (DCIS).

The following plant components are provided in a set of two 60 percent capacity units:

- circulating water pumps.²
- The plant's service air and control air needs will be served by two 100 percent capacity air compressors and two 100 percent capacity air dryers.
- The computerized control and protective system for the gas turbine generators, steam turbine generator and HRSGs, known as the Distributed Control and Information System (DCIS), will exhibit typical redundancy.

While some power plants exhibit slightly greater levels of equipment redundancy, the fact that the project consists of three parallel trains of gas turbine generators/HRSGs provides inherent reliability. Failure of a non-redundant component of one train should not cause the other trains to fail, thus allowing the plant to continue to generate (at reduced output). With this opportunity for continued operation in the face of equipment failure, staff believes that the equipment redundancy described here represents an adequate design approach for a project such as this.

MAINTENANCE PROGRAM

The applicant proposes to establish a plant maintenance program typical of the industry (DEC 1998a, AFC §§ 2.4.5.2, 9.2.2). In conjunction with an overall plant quality control program (DEC 1998a, AFC § 2.4.5), staff expects that this will allow the project to be adequately maintained to ensure acceptable reliability.

¹ There will be either two 100% capacity condensate pumps (DEC 1998a, AFC § 2.4.2.4), or three 50% capacity pumps (DEC 1998a, AFC Table 2.4-1). Staff deems either approach to provide adequate redundancy.

² Loss of a single 60 percent capacity circulating water pump typically allows the steam cycle portion of the generating train to continue operating above 65 percent capacity. Since the steam cycle accounts for only 1/3 of the output of a combined cycle plant, overall capacity with loss of one circulating water pump would remain at about 90 percent of full load.

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

Fuel (natural gas) will be supplied to the project from PG&E's Line 400 long distance gas transmission line by a 5.2 mile-long, twenty-inch diameter gas pipeline (DEC 1998a, AFC §§ 1.1, 2.4.3, 7.1; DEC 1999h). The applicant plans to purchase gas supplies on the open market from suppliers in Canada and the Southwest (DEC 1998a, AFC §§ 2.4.3, 9.2.1). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

WATER SUPPLY RELIABILITY

Approximately 90 to 95 percent of the water used in the power plant will be for steam turbine condenser cooling (DEC 1998a, AFC § 8.14.2.1). Secondary effluent water will be supplied for this purpose from the Delta Diablo Sanitation District sewage treatment facility via a new 500 foot-long pipeline. Backup cooling water supply will be from the Contra Costa Water District canal. Potable water and steam cycle process makeup water will be supplied by the Contra Costa Water District via an existing 20-inch diameter Dow Chemical Company pipeline (DEC 1998a, AFC §§ 1.1, 2.1, 2.4.4, 9.2.2). The project's water consumption is chiefly water that would be discharged by Delta Diablo into the San Joaquin River; use of this wastewater eliminates the need to use other, higher quality sources of water. Staff regards this arrangement as an adequately reliable supply. (Please refer to that portion of this document entitled **Soil and Water Resources**.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves) and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but seismic shaking (earthquake) and flooding present credible threats to reliable operation (see that portion of this document entitled **Facility Design**).

SEISMIC SHAKING

The site lies within Seismic Zone 4. The applicant commits to designing and constructing the facility to the latest appropriate LORS (DEC 1998a, AFC § 2.3.1). 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. (Please see that section of this document entitled **Facility Design**.) 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. In

light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

FLOODING

The project will not be located near active flood hazards; the entire site lies outside of any 100-year and 500-year floodplains. The site elevation is 15 feet above mean sea level; the project will be built to 17 feet above msl (DEC 1998a, AFC § 2.3.1). Staff deems this adequate protection from flooding. (Please see those sections of this document entitled **Facility Design** and **Geology**.)

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 1993 through 1997 (NERC 1998):

For Combined Cycle units (of all sizes)

Availability Factor = 91.10 percent

The GE and Siemens-Westinghouse gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor from 92 to 98 percent (DEC 1998a, AFC §§ 2.2.2, 2.2.17, 9.2.2) is not out of line with the NERC figure for similar plants throughout North America (see above). Further, since the plant will consist of three parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures (DEC 1998a, AFC §§ 2.4.5.2, 9.2.2). This practice holds out the promise of adequately high plant availability. 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 step with industry norms, and staff believes they are likely to yield an adequately reliable plant.

CUMULATIVE IMPACTS

The reliability, or lack thereof, of this project cannot be affected by the reliability of any other nearby projects. Likewise, this project's reliability cannot affect that of other nearby projects. Since this project is expected to be built to normal industry standards of power plant reliability, staff believes the potential for cumulative electric system reliability impacts is nil. Any system reliability impacts that might accrue

from multiple nearby power plant projects are dealt with in that portion of this document entitled **Transmission System Engineering**.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, renders a plant unavailable, but does not otherwise affect project reliability itself. Reliability impacts on the electric system from facility closure, should there be any, are dealt with in that portion of this document entitled **Transmission System Engineering**.

CONCLUSION

The applicant predicts an equivalent availability factor from 92 to 98 percent, which agrees fairly well with the industry norm of 91 percent for this type of plant. Based on a review of the proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability.

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POWER PLANT EFFICIENCY

Steve Baker

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the DEC 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 DEC's consumption of energy creates 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:

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

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal laws apply to the efficiency of this project.

STATE

CALIFORNIA ENVIRONMENTAL QUALITY ACT GUIDELINES

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).

LOCAL

No local or county ordinances apply to power plant efficiency.

SETTING

Calpine/Bechtel proposes to construct and operate a (nominal) 880 MW combined cycle cogeneration power plant to generate baseload and load-following power (DEC 1998a, AFC §§ 1.1, 2.2.17, 5.6.1). The Delta Energy Center (DEC) will consist of three F-class combustion turbine generators with evaporative inlet air coolers and steam injection producing approximately 200 MW each, three heat recovery steam generators (HRSGs) with duct burners, and one 300 MW steam turbine generator (DEC 1998a, AFC §§ 1.1, 2.2.2, 2.2.3, 2.2.4). The project will supply 20 MW of electricity and 200,000 pounds per hour of cogeneration steam to the Dow Chemical Company facility (DEC 1998a, AFC §§ 2.2.6, 2.2.8.5).

ANALYSIS

ADVERSE IMPACTS ON ENERGY RESOURCES

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. The DEC will burn natural gas at a maximum rate approaching 159 billion Btu per day (DEC 1998a, AFC § 2.2.7). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies.

Under expected project conditions, electricity will be generated at a peak load efficiency of approximately 55 percent LHV¹ (DEC 1998a, AFC § 9.3; Fig. 2.2-3); compare this to the average fuel efficiency of a typical utility company baseload power plant at approximately 35 percent LHV.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

Calpine/Bechtel has described its sources of supply of natural gas for the DEC (DEC 1998a, AFC § 2.4.3, 9.2.1). Gas will be purchased on the open market. The DEC will have access to supplies from the Southwest and Canada, transmitted via a PG&E pipeline system. These sources represent far more gas than would be required for a project this size. It is therefore highly unlikely that the DEC could pose a substantial increase in demand for natural gas in California.

¹ Lower heating value.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project via a new 5.2-mile long, 20 inch diameter line from PG&E's Line 400, a 900 psi² trunk line that serves numerous users throughout California (DEC 1998a, AFC §§ 1.1, 2.4.3, 7.1; CH2M Hill 1999). As the natural gas supply system in California is so large and well-established, there is no real likelihood that the DEC will require development of any new sources of energy.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the DEC or other non-cogeneration projects in the state. Although the project will cogenerate both electricity and steam for industrial use, it does not and need not meet the state definition of a cogeneration facility, since cogeneration status was not relied upon in gaining exemption from the requirement to file an NOI.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

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 to generate power.

PROJECT CONFIGURATION

The DEC will be configured as a compound-train combined cycle power plant, in which electricity is generated by three gas turbines, and additionally by a steam turbine that operates on heat energy recuperated from the gas turbines' exhaust. By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or steam turbines operating alone. Such a configuration is well suited to the large, steady loads met by a baseload plant, intended to supply energy efficiently for long periods of time.

The DEC will further be configured to cogenerate both electricity and useful thermal energy (heat). By making use of waste heat from the electric generation process that would otherwise be lost, a cogeneration power plant is inherently more efficient than the separate power plant and industrial heat source (boiler or heater) that it replaces.

The number of turbines further contributes to efficiency at part load. Gas turbine generators operate most efficiently at one particular output level, typically at full load. Whenever desired output is less than full load, the unit must be throttled back. Rather than being forced to throttle back one large turbine, with the consequent reduction in efficiency, the power plant operator will have the option of shutting off one or more gas turbines. This allows the plant to generate at less than full load

² Pounds per square inch.

while maintaining optimum efficiency, suitable for a plant meant for load-following duty. Loads down to 33 percent of full load allow one gas turbine, operating at full load, and the steam turbine to maintain peak efficiency.

EQUIPMENT SELECTION

Modern gas turbines, at the leading edge of design and manufacturing progress, embody the most fuel-efficient electric generating technology available today. The "F-class" gas turbines to be employed in the DEC represent some of the most modern and efficient such machines available at this time. Calpine/Bechtel will employ a combined cycle power train from a prominent manufacturer, either the General Electric Frame 7FA, nominally rated at 263 MW and 56.0 percent efficiency LHV at ISO³ conditions, or the Siemens-Westinghouse 501F, nominally rated at 272 MW at 55.8 percent efficiency (DEC 1998a, AFC § 3.11.3.2; GTW 1998).

A possible alternative is the ASEA Brown-Boveri KA-24, another "F-class" machine. While the KA-24 promises slightly higher fuel efficiency (57.4 percent) (GTW 1998) than the other F-class machines, any differences among the three in actual operating efficiency will be insignificant. Selecting among these machines is thus based on other factors, such as generating capacity, cost, ability to meet air pollution limitations, and commercial availability. The ABB machine, for instance, is available only in one-on-one trains, with one gas turbine and one steam turbine paired on a single shaft generating 271 MW (Orsini 1999, pers. comm.). The GE and Siemens-Westinghouse machines, which can be configured more flexibly, offer some advantage here.

EFFICIENCY OF ALTERNATIVES TO THE PROJECT

The project objectives include generation of baseload or load following electricity, as market conditions dictate (DEC 1998a, AFC §§ 2.2.17, 2.4.1, 5.6.1).

Alternative Generating Technologies

Calpine/Bechtel considers alternative generating technologies in its application (DEC 1998a, AFC §§ 5.1, 5.5, 5.6). Oil-burning, coal-burning, solar, wind, hydroelectric, biomass, geothermal and nuclear technologies are all considered. Given the project objectives, location and air pollution control requirements, staff agrees with Calpine/Bechtel that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

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

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

Capital cost is also important in selecting generating machinery. Recent progress in the development of large, stationary gas turbines, aided by the incorporation into these machines of technological advances made in the development of aircraft jet engines, has created a situation in which several large manufacturers compete vigorously to sell their machines. This, combined with the cost advantages of assembly-line manufacturing, has driven down the prices of these machines. Thus, the power plant developer can purchase a turbine generator that not only offers the best available fuel efficiency, but at the same time sells for the lowest per-kilowatt capital cost.

One possible alternative to an F-class gas turbine is the Siemens-Westinghouse 501G gas turbine generator, which employs partial steam cooling to allow slightly higher temperatures, yielding greater efficiency. While the 501G is rated at 58 percent efficiency, 2.2 percent higher than the 501F, the G machine produces 367 MW to the 501F's 272 MW; an 880 MW power plant would thus require only two 501G machines instead of the three F machines. As discussed above, gas turbines run most efficiently at one setting, typically full load. This reduction in number of turbines serves to limit flexibility during operation at less than full load. Given the minor efficiency improvement promised by the G-class turbine, and the likelihood that the plant will frequently be dispatched at less than full load,⁴ Calpine/Bechtel's decision to purchase an "F-class" machine is a reasonable one.

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler and the chiller; both devices increase gas turbine power output by cooling the gas turbine inlet air. A chiller can offer greater power output than the evaporative cooler on hot, humid days, while an evaporative cooler promises slightly higher operating efficiency on dry days. Capital and operating costs are higher for the chiller. Calpine/Bechtel plans to install evaporative cooling (DEC 1998a, AFC §§ 2.2.2, 2.2.3). Given project climate and the relative lack of superiority of one system over the other, staff deems this a reasonable approach to optimum efficiency.

In conclusion, the project configuration (combined cycle cogeneration) and generating equipment ("F-class" gas turbines) chosen appear to represent the most efficient feasible combination to satisfy the project objectives. Wasteful, inefficient and unnecessary consumption of energy is not likely to occur.

CUMULATIVE IMPACTS

The fuel efficiency of this project cannot affect the fuel efficiency of any nearby projects. Neither can the efficiency of those nearby projects affect the efficiency of this project. From the standpoint of power plant efficiency, in this case, there are no cumulative impacts.

⁴ Calpine/Bechtel plans to operate between 30 and 100 percent of full load (DEC 1998a, AFC § 2.4.1).

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, will not influence, nor will it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. Yet the vast size of the electric system serving California, the number of generating plants offering to sell power into it, and the existence of the California Independent System Operator and Power Exchange to ensure the efficient management of the system, all lend assurance that closure of this facility will not produce significant adverse impacts on efficiency.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The DEC, if constructed and operated as proposed, would generate 880 MW of electric power at an overall project fuel efficiency of 55 percent. 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. In actual operation, the DEC may actually displace power that would have been generated by other, less efficient plants serving the utility system. The end result could thus be a beneficial, rather than adverse, impact on energy resources. No energy standards apply to the project. Staff therefore concludes that the DEC would present no significant adverse impacts upon energy resources.

The project would also have no cumulative impacts on power plant efficiency. Facility closure would not likely present significant impacts on electric system efficiency.

RECOMMENDATION

From the standpoint of energy efficiency, staff recommends certification of the DEC. No Conditions of Certification are proposed.

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TRANSMISSION SYSTEM ENGINEERING

Al McCuen

INTRODUCTION

Transmission System Engineering (TSE) analysis is conducted to provide a basis for the findings required in the California Energy Commission's (Commission) decision identified below. This preliminary staff analysis (PSA) provides an indication of whether the transmission facilities associated with the proposed project appropriately conform to all applicable laws, ordinances, regulations and standards (LORS) required for safe and reliable electric power transmission.

Calpine Corporation and Bechtel Enterprises, Inc. (Calpine/Bechtel), the applicant, proposes to connect its project to Pacific Gas & Electric Company's (PG&E) transmission system. The California Independent System Operator (Cal-ISO) is responsible for ensuring system reliability and must determine both the standards necessary to achieve reliability and a proposed project's conformity with those standards. The Cal-ISO's authority for ensuring reliability applies to the Cal-ISO controlled grid and any projects that are proposed to interconnect to the grid. The Commission will rely on the Cal-ISO's determinations to make its finding related to conformity with applicable reliability standards, the need for additional transmission facilities, and environmental review of the whole of the project. In this case, staff's primary role is facilitation of the timely coordination of the Cal-ISO's process and results with the certification process and Commission decision. The Cal-ISO will provide testimony for the Commission's hearings.

Staff's analysis also evaluates outlet alternatives identified by the applicant and provides recommended conditions of certification to ensure that applicable LORS are complied with during the design, construction and operation of the project. Condition of certification (TSE-1g) is recommended in order to ensure the Cal-ISO's approval to interconnect the Delta Energy Center's (DEC) project to the Cal-ISO controlled grid prior to construction of the project.

Public Resources Code, section 25523 requires the Energy Commission to "prepare a written decision...which includes:...findings regarding conformity of the proposed site and related facilities...with public safety standards...and with other relevant local, regional, state, and federal standards, ordinances, and laws." Under the California Environmental Quality Act (CEQA) the Energy Commission must conduct an environmental review of the "whole of the project," which may include facilities not licensed by the Energy Commission (Cal. Code Regs., tit. 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities beyond the project's interconnection with the existing transmission system that are required as a result of the power plant addition to California's transmission system.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

- 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 will ensure adequate service and safety to persons engaged in the construction, maintenance, operation or use of overhead electric lines and to the public in general.
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- CPUC General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” establishes uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety.
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- CPUC Rule 21 provides standards for the reliable connection of parallel generating stations connected to participating transmission owners.
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- Western Systems Coordinating Council (WSCC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system that provides continuity of service to loads as a first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria includes the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 “Criteria for Transmission System Contingency Performance” which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (such as loss of load or a single transmission element out of service) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas during major disturbances (such as loss of all lines in a right of way). While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).
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- North American Electric Reliability Council (NERC) Planning Standards provides policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC’s Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions. However, the NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1997).
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- Cal-ISO Reliability Criteria also provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid.
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- Cal-ISO Scheduling Protocols and Dispatch Protocols require conformance with NERC, WSCC, and Local Area Reliability and Planning Criteria. These standards will be applied in assessing the system reliability implications of the DEC. Also of major importance to the DEC and other privately funded projects which may sell through the California Power Exchange (Cal-PX) is the Cal-ISO Day/Hour Ahead Inter-zonal Congestion Management Scheduling Protocol (SP 10), the Transmission System Loss Management Scheduling Protocol (SP 4), and the Creation of the Real Time Merit Order Stack (SP 11). The Congestion Management Scheduling Protocol provides that dispatch not violate system criteria as market participants are requesting generation dispatch or the use of major interties. The Real Time Merit Order Stack is developed based on increasing energy bid prices so that the least cost bids are accepted early on and if congestion is anticipated the highest bids are not selected. The Transmission System Loss Management Scheduling Protocol uses the Cal-ISO power flow model to identify the effects on total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine if the participant will be paid more or less than, for instance, the net power output dispatched by the generating units (Cal-ISO 1998b, Cal-ISO 1998c).

SETTING

PROJECT DESCRIPTION

Dow Chemical Plant has leased approximately 20 acres of land to Calpine/Bechtel for the DEC project. The site is approximately 35 miles northeast of San Francisco and is located in the city limits of Pittsburg and borders the City of Antioch. The DEC will provide a nominal electrical output of 880 megawatts (MW). The applicant will also construct a 230 kilovolt (kV) (see **Definition of Terms**) switchyard, approximately 3.3 miles of a combination overhead/underground double circuit 230 kV transmission line and approximately 0.8 miles of an underground single circuit 13.8 kV service line. The overhead/underground double circuit 230 kV transmission line will connect into Southern Company's (Southern) existing Pittsburg Power Plant switchyard (formerly owned by PG&E). The underground single circuit 13.8 kV service line will serve the Dow Chemical Plant (DEC 1998, AFC pages 2-1 & 2-11).

DEC's switchyard will be located on the west side of the project site. The proposed overhead double circuit 230 kV transmission line will exit DEC's switchyard and proceed in a westerly direction along the Burlington Northern and East Santa Fe (BN&SF) right of way for approximately 7,000 feet. The Pittsburg District Energy Facility (PDEF) project has proposed to interconnect the two USS-POSCO substations providing an opportunity for DEC to remove from service and deconstruct the existing 115 kV USS-POSCO tap. Within the existing BN&SF right of way DEC will construct its proposed overhead double circuit 230 kV transmission line. The overhead double circuit 230 kV transmission line will transition underground just east of the CEMCO building (DEC 1999i, data response # 4.0, page 5 & Figures 4-1 & 4-3).

The underground double circuit 230 kV transmission line will continue in a westerly direction north of the newly constructed truck bypass route along East Santa Fe Avenue, approximately 3,000 feet. It should be noted that this section of the underground route was changed due to conflicts with the PDEF project. PDEF has proposed as part of their project to construct a truck bypass route, sound wall and linear park along East Santa Fe Avenue. PDEF intends to have the truck bypass in place and landscaping completed in the initial part of its project. Due to PDEF being at the final stages of the Commission's siting process, DEC was requested by Commission staff to investigate the BN&SF right of way north of the truck bypass route. This route would eliminate the need for DEC to cut the newly constructed truck bypass road thereby avoiding future road sinkage. DEC is in the final stages of securing the right of way from BN&SF (DEC 1999i, data response #3.0, page 4).

Near Harbor Street the underground transmission line route will turn northwards to the 8th Street corridor, approximately 1,000 feet. DEC proposes to locate the transmission line within the 8th Street median. The underground line will continue approximately 5,500 feet in a westerly direction along the 8th Street median to the west side of the Delta Diablo Sanitation District's (DDSD) pumping station. DDSD has agreed to this route with the understanding that DEC relocate DDSD's pressurized wastewater line and "deadhead" pressurized line stub to a depth of 14 feet. This would allow a nominal separation of eight feet between the transmission lines and DDSD's lines (DEC 1999i, data response #1.0, page 2). The line separation between the two facilities will meet GO-128 requirements. At this point the underground transmission line will turn north inside the fence line of Southern's property. The transmission line will continue northward to the existing Pittsburg Power Plant switchyard, approximately 1,500 feet (DEC 1999i, data response #1.0 & 2.0, pages 2 & 3).

DEC will also construct an approximately 0.8 mile 13.8 kV underground service line that will provide up to 20 MW of power to the Dow Chemical Plant. The line will exit out of the DEC switchyard in a northerly direction for approximately 1,000 feet. The line will then turn west above the industrial waste ponds for approximately 1,500 feet and then north approximately 1,500 feet before connecting into the Dow Chemical Plant (DEC 1998a, AFC pages 2-11 & 2-13).

EXISTING FACILITIES AND RELATED SYSTEMS

The transmission system in the vicinity of DEC consists mainly of 230 kV and 115 kV transmission lines. The Pittsburg/Antioch area has two existing power plants in the DEC area, Pittsburg Power Plant and Contra Costa Power Plant. DEC will be located in PG&E's East Bay Zone 268 that has 3,758 MW of load (DEC 1998a, AFC page 6-4 & Figure 6.0-1).

ANALYSIS

INTERCONNECTION FACILITIES

The proposed DEC transmission facilities will consist of a 230 kV switchyard, a 230 kV double circuit combination overhead/underground transmission line connecting to the existing Pittsburg Power Plant switchyard. A single circuit 13.8 kV underground service line will connect into the Dow Chemical Plant (DEC 1998a, AFC page 2-1).

PROJECT SWITCHYARD

The project switchyard will consist of twelve 230 kV gas circuit breakers. A breaker-and-half arrangement will be used to provide reliability and facilitate future expansion. All switchyard equipment will be designed for a 63,000 amp interrupting capacity. The main buses and bays will be designed for 3,000 amp continuous current. Each generator will have an independent tie to the switchyard (DEC 1998a, AFC page 6-10).

Short circuit analyses are conducted to assure that breaker ratings are sufficient to withstand high levels of current during a fault (such as when a line touches the ground). The switchyard components will be rated in accordance with the results of a short circuit study. The short circuit study was completed by PG&E in DEC's Detailed Facilities Study based on parameters provided by DEC. The short circuit study results did not indicate any overstressed equipment (DEC 1999a, page 15). The Cal-ISO, in its review of the Detailed Facilities Study¹, noted that the step-up transformer impedance of 15 percent seemed high for generator step-up transformers. The Cal-ISO concurred with PG&E's assessment that in the event the parameters change significantly some additional facilities may be required (Cal-ISO 1999a, page 4). An example of additional facilities would be replacing circuit breakers inside the fence line of the Pittsburg Power Plant switchyard and adjacent substations. The acceptability of breaker ratings will be determined during the compliance phase. Condition of certification TSE-1b will ensure compliance.

OUTLET LINE

The overhead transmission line connecting to the existing Pittsburg Power Plant switchyard will be a 230 kV double circuit with bundled conductor. The conductors

¹ A Detailed Facilities Study is the final interconnection study that includes all the pertinent information required by the Cal-ISO in order to grant interconnection to the Cal-ISO controlled grid. It also provides the cost to the applicant to interconnect to the grid within plus or minus ten percent.

will be constructed on steel tubular poles ranging from 105 to 125 feet in height (DEC 1998a, AFC Figure 6.2-4). Final height determination will be made further in the design process. A crossover tower will be required at the point where the new overhead 230 kV double circuit transmission line crosses the existing 115 kV service line to Dow Chemical/UPI. The 115 kV line will be hung below the new 230 kV double circuit transmission line conductors on the steel tubular pole (DEC 1999i, data response #4.0, page 5 & Figure 7). The final height determination of the steel tubular pole will be made later in the design phase. Condition of certification TSE-1d will ensure compliance.

DEC's proposed conductor size is bundled 1272 kcm 45/7 ACSR, "Bittern," which is a standard PG&E conductor. Other suitable conductors include 1431.0 kcm 61 strand all aluminum conductor (AAC) "Marigold" or 2300 AAC bundled. Final determination of conductor size will be made further in the design process. The conductor will be sized in order to accommodate DEC's maximum current of 2,600 amps (assuming worse case power factor of .85 percent at 880 MW). The bundled conductor will have a rating of 2,368 amps and an emergency rating of 2,600 amps (DEC 1998a, AFC page 6-10). Condition of certification TSE-1d will ensure compliance.

The underground portion will be constructed with High Pressure Fluid Filled (HPFF) pipe-type cable that consists of a 10" steel pipe encasing three single-phase cables (DEC 1998a, AFC Figure 6.2-8). Final determination of conductor size will be made further in the design process. Condition of certification TSE-1d will ensure compliance. The area around the cable and steel pipe will be filled with oil that is pressurized to approximately 200 pounds per square inch (psi) (DEC 1998a, AFC page 6-16). The cables will be installed in two separate trenches approximately five feet wide by seven feet deep. There will be a 15-foot separation between the two trenches. Final determination of the trench width will be made pending the soil thermal conductivity tests. Separation between the DEC and PDEF project along the 8th Street corridor will be determined once the soil thermal conductivity tests are completed (DEC 1999i, data response #2.0, page 3). The soil thermal conductivity tests are in the process of being completed and the final results will be available approximately at the end of July 1999. The depth from the street surface to the top of the 10" steel pipe will be six feet (DEC 1999i, data response #1.0, Figure 2-1). Installation of the underground cable will require pulling/splicing manholes spaced approximately 2,500 feet apart. The dimensions of each manhole is 20 feet long by 10 feet wide by 7 feet deep (DEC 1998a, AFC page 6-16 & Figure 6.2-11). The exact number of manholes required for the project will be determined further in the design process. Condition of certification TSE-1c will ensure compliance.

There will be one transition station and one oil pressurization station. The transition station will be east of the CEMCO building (DEC 1999i, data response #4.0, Figure 4-3) with overall dimensions of 75 feet long by 110 feet wide by 105 feet high (DEC 1998a, AFC Figure 6.2-7). The oil pressurization station dimensions are 34 feet long by 9 feet 2 inches wide by 10 feet 5 inches high (DEC 1998a, AFC Figure 6.2-12) and will be placed at or near the CEMCO building (DEC 1999i, data response #4.0, page 5).

Three alternative transmission line routes have been assessed for interconnecting into the existing Pittsburg Power Plant switchyard. Two buried cable alternatives were also assessed (see **Alternatives Section**).

SYSTEM RELIABILITY

INTRODUCTION

A system reliability evaluation consists principally of determining if there would be thermal overloads, voltage violations (voltages too high or low), and/or electric system instability (excessive oscillations) caused by the addition of the new project to the electric system. In addition to the above analysis, additional studies may be performed to verify that there is sufficient reactive power (see **Definition of Terms**) available. The reliability evaluation must be conducted for all credible “emergency” conditions that the system might be subjected to. For example, loss of a single or double circuit lines, loss of a transformer, or a combined loss of these facilities. Planning analyses are conducted in advance of potential system changes, such as the addition of the DEC into the system, in order to prevent a criteria violation. The criteria being used in this evaluation to determine conformance includes the WSCC Planning Criteria, NERC Planning Standards and applicable Cal-ISO reliability criteria. System reliability implications of the DEC and the need for additional facilities related to interconnecting the project will be determined by the Cal-ISO based additional information to be provided in the Detailed Facilities Study. The Cal-ISO has granted preliminary interconnection approval based on DEC’s initial Detailed Facilities Study (Cal-ISO 1999a, cover letter). Final approval can be granted subject to additional studies requested by the Cal-ISO (Cal-ISO 1999a, Attachment A).

SCOPE OF RELIABILITY STUDIES

The DEC will have a maximum generation output of 880 MW. PG&E performed power flow, short circuit and stability studies. PG&E’s year 2002 Heavy Summer Peak and 2002 Summer Off-Peak base cases were used for the power flow and generation sensitivity analyses. The key assumptions made in these base cases included the following:

	Year 2002 Peak	Year 2002 Off-Peak
California-Oregon 500 kV	4,800 MW	3,000 MW
California-Oregon 115 kV	80 MW	0 MW
Midway-Vincent (South Tie)	Swing Bus ²	Swing Bus
Total Bay Area Load	8,740 MW	6,495 MW
Total Bay Area Generation ³	4,680 MW	3,416 MW
Generating Units	Net Capacity	Net Capacity
Pittsburg 1 through 7	2,052 MW	1,920 MW
Contra Costa 6 & 7	680 MW	400 MW

Source: DEC 1999a, page 6.

² A swing bus is used for the calculation of steady-state power flow and is chosen to “take up the slack” and balance the real power in the system.

³ Bay Area generation is comprised of San Francisco, Peninsula, East Bay, Diablo, Mission, San Jose and De Anza Divisions plus municipalities such as Palo Alto, Santa Clara and Alameda.

POWER FLOW STUDY RESULTS

This study identified normal and emergency overloads under peak and off-peak conditions. Normal overloads are caused solely by the addition of DEC to the system. Emergency overloads are caused solely by the addition of DEC to the system following a single contingency such as the loss of a single circuit. A total of 22 circuits⁴ could be overloaded under normal and emergency conditions for both peak and off-peak conditions (DEC 1999a, pages 8 through 10).

Additional sensitivities were also analyzed. The first sensitivity included both DEC and PDEF added to the system. A total of 39 circuits could be overloaded under normal and emergency conditions for both peak and off-peak conditions. The second sensitivity included DEC and three Calpine/Bechtel South Bay Projects totaling 2,680 MW added to the system. The total number of circuits that could be overloaded under normal and emergency conditions for peak and off-peak conditions decreased to four circuits with these projects operating. What these two sensitivities lead to is the speculative nature of what, if any, impacted facilities might have to be mitigated by DEC. The last sensitivity performed was DEC connected to the Contra Costa Substation 230 kV switchyard. The total number of circuits that could be overloaded under normal and emergency conditions for peak and off-peak conditions was two circuits (DEC 1999a, pages 11 through 14).

SHORT CIRCUIT STUDY RESULTS

The short circuit study results did not indicate any overstressed equipment at the Pittsburg Power Plant switchyard and adjacent substations (DEC 1999a, page 15). As indicated previously, the Cal-ISO, in its review of the initial Detailed Facilities Study, noted that the step-up transformer impedance of 15 percent seemed high for generator step-up transformers. The Cal-ISO concurred with PG&E's assessment that in the event the parameters change significantly some additional facilities may be required (Cal-ISO 1999a, Attachment A, page 4). An example of additional facilities would be replacing circuit breakers inside the fence line of the Pittsburg Power Plant switchyard and adjacent substations. The acceptability of breaker ratings will be determined during the compliance phase. Condition of certification TSE-1b requires a short circuit study which will ensure compliance.

STABILITY STUDY RESULTS

A stability study is performed to ensure that the transmission system remains in operating equilibrium during normal and abnormal operating conditions with DEC connected to the system. The results of the outages studied indicated that the system would remain stable with the addition of DEC to the system (DEC 1999a, page 16 through 18).

⁴ The total number of overloaded circuits was a compilation of the overloaded circuits taken from the normal overloads under peak and off-peak conditions and emergency overloads under peak and off-peak conditions in tables provided in the Detailed Facilities Study (DEC 1999a, pages 8 through 14).

CAL-ISO REVIEW

The Cal-ISO has reviewed DEC's initial Detailed Facilities Study and has concluded the following. The Detailed Facilities Study is adequate for the Cal-ISO to grant preliminary interconnection approval. Based on the Detailed Facilities Study there are a number of facilities that will need to be reinforced in order for DEC to interconnect to the Cal-ISO controlled grid and maintain system reliability. The Cal-ISO is in the process of developing a New Generator Interconnection Policy that was approved by the Cal-ISO Governing Board on March 25, 1999. On May 27, 1999, the Cal-ISO Governing Board approved, in principal, the tariff language changes presented by Cal-ISO management. The Cal-ISO expects to file the tariff language changes with FERC in early June 1999. FERC needs a minimum review period of two months. Therefore, the earliest the New Generator Interconnection Policy could be implemented by the Cal-ISO is September 1999, barring any opposition by stakeholders.

During the transition period the Cal-ISO will utilize the policies and practices of the Participating Transmission Owner (PTO) for generators that have initiated an interconnection request from the PTO. In the case of DEC, the Cal-ISO will utilize PG&E's policies and practices (Cal-ISO 1999a, cover letter). In DEC's Detailed Facilities Study, PG&E states that some of the identified overloads might be able to be mitigated through operational measures. Those overloads equal to or greater than 105 percent of each circuits normal or emergency rating that cannot be mitigated through operational measures will have to be reconductored (DEC 1999a, page 5). It is not clear whether the applicant, if they want to commit to mitigation, can select from the six options provided for in Section 5.7.2.3.4 of the new tariff language during the transition period (Cal-ISO 1999, Attachment A page A-6). The mitigation options a generator could choose from include:

- Paying for a system reinforcement,
- Implementing a Remedial Action Scheme (RAS),
- Paying the Cal-ISO's costs for Intra-Zonal congestion management,
- Entering into a bi-lateral contract with another Generating Unit to curtail other Generating Units in the event of Intra-Zonal congestion,
- Curtailing its own output to mitigate Intra-Zonal congestion or
- Choosing another site.

PG&E will have to perform additional work prior to the Cal-ISO granting final interconnection approval to DEC. All 60 kV single contingency outages have to be studied as well as double circuit tower line outages, bus section outages in Diablo, Mission and East Bay Divisions and Bay Area 500/230 kV transformer bank outages. The Cal-ISO also requests that transient stability studies be conducted in order to determine if the addition of the DEC to the Cal-ISO controlled grid will result in any adverse stability impacts (Cal-ISO 1999a, Attachment 1 page 5). None of these studies would result in the identification of downstream facilities, but could impact equipment within the existing Pittsburg Power Plant switchyard.

Calpine/Bechtel has requested that PG&E run additional sensitivity studies based on different assumptions. It is not clear at this time how these additional studies might impact the already completed initial Detailed Facilities Study or when PG&E

will complete the studies (DEC 1999d, cover letter). A condition of certification (TSE-1g) is recommended to provide for Commission review of the additional sensitivity cases of the Detailed Facilities Study and the PG&E/applicant facility Interconnection Agreement.

ALTERNATIVES

OUTLET LINE

The applicant identified three alternative outlet line routes. Alternative 1 (Preferred Alternative) – Route 4 was initially considered equal to or superior to the proposed route pending right of way approval. The applicant could not obtain the required rights of way for Route 4 and no longer considers it as a “preferred alternative.” Route 4 would consist of approximately 9.1 miles of a new double circuit overhead 230 kV transmission line that would parallel an existing 115 kV right of way. The transmission line exits the DEC to the west for approximately 1,500 feet to the existing 115 kV right of way. The line proceeds in a southwesterly direction approximately 8,000 feet and then 3,800 feet to the west. The line continues 1,500 feet to the south and then proceeds 11,500 feet to the west. The line turns north for approximately 15,000 feet before entering the existing Pittsburg Power Plant 230 kV switchyard. This alternative is no longer feasible due to problems obtaining existing rights of way (DEC 1998, AFC page 6-23 & Figure 6.3-1).

Alternative 2 – Route 3 exits the DEC to the west approximately 1,500 feet and then turns south to the Contra Costa Power Plant to San Mateo double circuit 230 kV transmission line. This alternative was rejected due to lack of capacity on the Contra Costa Power Plant to San Mateo line as well as construction problems (DEC 1998, AFC page 6-25 & Figure 6.3-1).

Alternative 3 – Route 2 exits the DEC to the west approximately 1,500 feet and proceeds to the south for approximately 4,000 feet. The line then turns to the west along Highway 4 for approximately 15,000 feet and then northwest approximately 6,000 feet before entering the Pittsburg Power Plant 230 kV switchyard. This alternative was rejected for the following reasons (DEC 1998, AFC page 6-25 & Figure 6.3-1):

- Existing 60 kV line would have to be underbuilt to the new 230 kV double circuit line.
- Existing right of way may not be wide enough to accommodate the new 230 kV double circuit transmission line.
- Plans to widen Highway 4 would reduce the existing right of way.

BURIED CABLE

The applicant considered two alternative underground cables. Both alternatives are used extensively in Europe. The first alternative is the self-contained fluid-filled (SCFF) cable. This cable consists of a hollow-core conductor insulated with oil-impregnated paper tapes covered with a lead or aluminum sheath. The hollow conductor is filled with oil and is pressurized from 15 to 25 psi. SCFF is direct buried and requires that trenches remain open for extended periods of time during

the construction phase of the project. Trenches being open for prolonged periods of time are usually prohibited in the United States (U.S.). The possibility of dig-ins raise reliability and liability issues. SCFF cable is typically limited to submarine cable crossings of rivers, bays and other types of water bodies in the U.S. For these reasons the SCFF cable alternative was rejected (DEC 1998, AFC page 6-25).

The second alternative is the cross-linked high-density polyethylene solid-dielectric (XLPE) cable. In the late 1960's XLPE cable was used for transmission voltages in the U.S., but due to line failures its usage was abandoned. The Europeans and Japanese refined the XLPE cable technology and it is being used throughout Europe and Japan at 230 kV. In the past ten years, U.S. utilities have begun using XLPE at the 138 kV and are beginning to test XLPE at 230 kV.

Both cable alternatives were rejected for the following reasons (DEC 1998, AFC page 6-26):

- PG&E's practice is to use HPFF cable
- magnetic fields are lower
- HPFF is a proven performer

CUMULATIVE IMPACTS

The DEC and PDEF projects will both be connecting to the existing Pittsburg Power Plant switchyard. The sensitivity cases PG&E performed for DEC's Detailed Facilities Study indicate that with the addition of both DEC and PDEF to the Cal-ISO controlled grid a total of 39 circuits could be overloaded under normal and emergency conditions for both peak and off-peak conditions. The other sensitivity case that was run indicates that with DEC and the three Calpine/Bechtel South Bay Projects totaling 2,680 MW added to the system the number of overloaded circuits decreases to four. In the Transmission System Engineering section of PDEF's Staff Assessment, staff provided testimony that, based on PDEF's Preliminary Facilities Study, 17 lines were overloaded due to PDEF being added to the system. With both of the projects added to the system, study results indicate that 12 of the 17 lines that are overloaded by DEC are also impacted by PDEF (CEC 1999, staff assessment page 428). With this level of uncertainty, staff cannot fully identify cumulative impacts due to the speculative nature at this point.

Adding to the uncertainty of what, if any, overloaded facilities the applicant might be required to mitigate in order to connect to the Cal-ISO controlled grid is PG&E's 1998 Transmission Assessment (PG&E 1998). PG&E's Transmission Assessment identifies potential projects that might be built due to load growth. Five of the overloaded lines identified in DEC's Detailed Facilities Study are included in these projects. Transmission projects proposed for load growth would not constitute projects engendered by the DEC, but there is uncertainty that these load growth projects would actually be built.

The results of the power flow sensitivity cases and PG&E's 1998 Transmission Assessment indicate that the cumulative system response to multiple projects may reduce line overloads in the area, which leads to the speculative nature of what, if

any, impacted facilities might have to be mitigated by DEC. Therefore, only potential “outlet” lines can be identified at this time.

FACILITY CLOSURE

INTRODUCTION

The parallel operation of generating stations is controlled, in part, by CPUC Rule 21. This rule and standard utility practices for interconnecting a generating unit provide for the PTO to have control of breakers and disconnect switches where the outlet line terminates (the existing Pittsburg Power Plant switchyard) and general control over the interconnected generators. Prior to construction and interconnection of a generating unit, the PTO reviews and comments on the plans and specifications for the power plant and termination equipment that is important to safe and reliable parallel operation⁵ and inspects the interconnection facilities. Contractual provisions may be developed to provide backup or other power service and codify procedures to be followed during parallel operation. Before generating stations are permitted to bid into the Cal-PX and be dispatched by the Cal-ISO, generator standards must be met and the generating station must commit to comply with instructions of the Cal-ISO dispatchers. All participating generators must sign a Participating Generator Agreement (Cal-ISO 1998b, Cal-ISO 1998c). Procedures for planned, unexpected temporary closure and unexpected permanent closure must be developed or verified to facilitate effective communication and coordination between the generating station owner, PTO and the Cal-ISO to ensure safety and system reliability.

CPUC General Order 95, Rule 31.6 requires that “lines or portions of lines permanently abandoned shall be removed by their owners so that such lines shall not become a public nuisance or a hazard to life or property.” Condition of Certification TSE-1c requires compliance with this rule.

The ability of the above LORS to reasonably assure safe and reliable conditions in the event of facility closure was evaluated for three scenarios:

PLANNED CLOSURE

This type of closure occurs in a planned and orderly manner such as at the end of a facility’s useful economic or mechanical life or due to gradual obsolescence. Under such circumstances the requirement for the owner to provide a closure plan 12 months prior to closure in conjunction with applicable LORS is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the PTO⁶ to assure (as one example) that the PTO’s system will not energize the project switchyard. Alternatively, the

⁵ As an example the PTO has control over the generating unit breakers so that only when the PTO’s line crews have completed maintenance, for instance and are clear of the line or other facilities could the unit reclose into the system.

⁶ The PTO in this instance is PG&E e.g., the system owner to which the project is interconnected.

owner may coordinate with the PTO to maintain some power service via the outlet line to supply critical station service equipment or other loads⁷.

UNEXPECTED TEMPORARY CLOSURE

This unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishment of an on-site contingency plan (see **General Conditions Including Compliance Monitoring and Closure Plan**).

UNEXPECTED PERMANENT CLOSURE

This unplanned closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan that is in place and approved by the Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities will be developed to assure safety and reliability (see **General Conditions Including Compliance Monitoring and Closure Plan**).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff and the Cal-ISO have reviewed DEC's Detailed Facilities Study performed by PG&E. Staff agrees with the Cal-ISO's assessment that additional work needs to be completed prior to the Cal-ISO granting final interconnection approval to DEC. There remains uncertainty as to what, if any, transmission upgrades DEC would be responsible for based on: 1) the results of the power flow sensitivity cases, 2) the New Generator Interconnection Policy and 3) PG&E's 1998 Transmission Assessment. Staff does not believe that any specific upgrades can currently be identified and described as reasonably foreseeable consequences of the project.

The conductor sizes of the transmission lines will be determined further in the design phase of the project. Once the applicant determines the conductor size, staff will assess whether the conductor sizes are adequate according to industry standards and able to accommodate DEC's full output in the event one of the two circuits fail (see TSE-1d). Termination facilities and bus configuration are acceptable and will conform to all applicable LORS (see TSE-1a & 1e).

RECOMMENDATIONS

If the Committee approves the DEC Project, staff recommends that the following conditions of certification be adopted.

⁷ These are mere examples. Many more exist.

CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to requirements 1a through 1g listed below. The substitution of CPM approved "equivalent" equipment and equivalent switchyard configurations is acceptable.

- a. The project 230 kV switchyard shall include a breaker-and-a-half, breaker and bus configuration.
- b. Breakers and bus shall be sized to comply with a short circuit analysis.
- c. The transmission facilities shall meet or exceed the requirements of CPUC General Order 95 and CPUC General Order 128.
- d. An approximately 3.3 mile long double circuit 230kV overhead and underground line will be constructed and interconnect into the existing Pittsburg Power Plant switchyard. The size of both the overhead and underground conductor will be determined further in the design process, but will be sized to accommodate DEC's full output in the event one of the two circuits fail. The overhead line will be constructed on steel poles with final height to be determined further in the design process.
- e. Termination facilities at the existing Pittsburg Power Plant switchyard shall comply with applicable Cal-ISO and PG&E interconnection standards (CPUC Rule 21 and PG&E Interconnection Handbook).
- f. Outlet line parallels and crossings with other transmission or distribution lines shall be coordinated with the transmission/distribution line owner and comply with the owner's standards.
- g. The project owner applicant shall provide a completed Detailed Facilities Study and an executed facility Interconnection Agreement for the DEC transmission interconnection with PG&E. The completed Detailed Facilities Study and Interconnection Agreement shall be coordinated with the Cal-ISO.

Verification: At least 60 days prior to start of construction of transmission facilities, the project owner shall submit for approval to the CPM, electrical one-line diagrams signed and sealed by a registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements 1a through 1g above. The project owner will also provide the conductor sizes for both the overhead and underground portion of the project, the Detailed Facilities Study and the Interconnection Agreement (if either one are not otherwise provided to the Commission). Substitution of equipment and substation configurations shall be identified and justified by the project owner for CPM approval.

TSE-2 The project owner shall inform the CPM of any impending changes, which may not conform to the requirements 1a through 1g of TSE-1, and have not received CPM 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, transmission facilities or switchyard configurations shall not begin without prior written approval of the changes by the CPM.

Verification: At least 30 days prior to construction of transmission facilities, the project owner shall inform the CPM of any impending changes which may not conform to requirements 1a through 1g of TSE-1 and request approval to implement such changes.

TSE-3 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction and any subsequent CPM approved changes thereto, to ensure conformance with CPUC GO-95, CPUC GO-128 and CPUC Rule No. 21 and these conditions. In case of non-conformance, the project owner shall inform the CPM in writing within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after synchronization of the project, the project owner shall transmit to the CPM an engineering description(s) and one-line drawings of the "as-built" facilities signed and sealed by a registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95, CPUC GO-128, CPUC Rule No. 21 and Cal-ISO and PG&E interconnection requirements shall also be provided. These documents shall be concurrently provided.

REFERENCES

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DEFINITION OF TERMS

ACSR	Aluminum cable steel reinforced. A composite conductor made up of a steel core surrounded by aluminum wire.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) which carries the current.
Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation, and transmission loading (imports) will not violate criteria.
Emergency Overload	See Single Contingency. This is also called an L-1.
High-Pressure Fluid Filled Cable	Coated steel pipe that encases three single phase cables. The cable consists of copper conductor insulated with oil-impregnated paper tapes. The void in the steel pipe is filled with oil and pressurized to approximately 200 pounds per square inch.
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.
L-1	The outage of a single circuit.
Megavar (MVR)	One megavolt ampere reactive.
Megavars	Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)	A unit of apparent power, 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. Also called an L-1.
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 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 that, for instance, will trip a selected generating unit upon a circuit overload.
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.
Thermal rating	See ampacity.
TSE	Transmission System Engineering.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line – generally at 90 degrees.
Underbuild	A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Eileen Allen & Paul Richins

INTRODUCTION

The purpose of staff's alternatives analysis is to provide the Energy Commission with an analysis of a reasonable range of feasible alternatives which would attain most of the basic objectives of the project, but substantially reduce or avoid any potentially significant adverse impacts of the proposed project. (Cal. Code Regs., tit. 14, §15126.6(a); tit. 20, § 1765). This analysis identifies the potentially significant impacts of the proposed project, and those project alternatives that are capable of reducing or avoiding significant impacts.

In addition to electric generation, DEC will be providing saturated steam to Dow Chemical for industrial uses. Projects such as the proposed DEC require a steam line connection between the power plant site and the existing industrial steam user (i.e., the steam host). The steam line is generally limited to a length of about one-half mile; beyond which there is a significant loss of heat.¹ Therefore, potential sites and site alternatives usually need to be located within about one-half mile of the steam host.

Energy Commission staff has looked at six alternative sites, of which four were considered by the applicant, and two were included by staff. Staff has concluded that the six alternative sites are not superior to the applicant's proposed site. Staff also analyzed the no project alternative and alternative technology options, and found that they were not superior to the proposed project.

ALTERNATIVES ANALYSIS METHODOLOGY

To prepare this alternatives analysis, staff used the methodology summarized below:

- Identify the basic objectives of the project.
- Provide an overview of the project and potentially significant adverse impacts.
- Identify and evaluate alternative electricity generation technologies.
- Conduct a screening analysis to assess the feasibility of the alternative sites mentioned by the applicant and staff.
- Determine whether the alternative sites reduce or avoid any significant impacts of the proposed project.
- Determine whether the alternative sites would cause one or more impacts that could be significant.

¹ Steam lines can never be perfectly insulated to reduce heat losses. When the line is longer than about one-half mile, the quality of steam that must be supplied detracts from the power plant's efficiency and can make the cogeneration project less economic.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Presently, there are no federal or local laws, ordinances, regulations or standards (LORS) that pertain to project alternatives. However, under state law as noted in the Introduction to this section, the Energy Commission is required to analyze a reasonable range of feasible alternatives which could substantially reduce or avoid any potentially significant impacts of the proposed project.

SETTING

BASIC PROJECT OBJECTIVES

After studying the DEC Application for Certification (AFC), Energy Commission staff has determined the project's objectives to be:

- To build and operate a reliable power plant with a steam and electricity connection to Dow Chemical Company in Pittsburg, California.
- To generate electricity which will be sold in the electricity market through the Independent System Operator.
- To provide electricity to Dow Chemical.
- To provide steam to Dow Chemical for use in their industrial processes.

PROJECT AND SITE DESCRIPTION

The proposed project is located on an approximately 20 acre industrial site owned by Dow Chemical in the northeast corner of the City of Pittsburg. The site is adjacent to the corporate boundary between the Cities of Pittsburg and Antioch, in Contra Costa County. The project site consists of undeveloped land which is part of a 139 acre parcel owned by Dow.

Surrounding land uses include the Delta Diablo Wastewater Treatment Facility (DDWTF) to the east, the DDWTF administrative offices to the southeast, Dow's petrochemical production facility to the northwest, the GWF Unit 2 facility to the southwest, and unused parcels to the west owned by Dow Chemical and USS-POSCO². The site is zoned for general industrial uses with electric power plants being allowed in this zone.

The nearest occupied residences, which are the closest noise receptors, are approximately 2300 feet from the project site. These residences consist of a small, multi-family unit, with no other residential development in the immediate area. The closest residential neighborhood is approximately one mile from the site. The site's northern boundary is the Burlington Northern and Santa Fe Railroad Line, with the southern boundary located north of the Pittsburg-Antioch Highway. The eastern and western boundaries of the site are located west of Arcy Lane.

² USS-POSCO is a steel refining company with property located to the west of Dow Chemical.

The proposed site was chosen by the applicant for the following reasons:

- The site is close to the Dow Chemical complex, which would receive steam and electricity from the DEC facility;
- Sufficient land (i.e. 20 acres plus a construction laydown area) was available;
- The site is close to the DDWTF where the applicant will obtain tertiary treated wastewater for cooling;
- The site is zoned industrial;
- The nearest residential area is approximately one mile away; and
- It appeared that development of this site would result in a lower level of environmental impact when compared to other site possibilities near the Dow complex.

The applicant has requested certification for a nominal 880 megawatt cogeneration power plant providing steam and 20 megawatts of electricity to Dow Chemical and selling the remaining electricity to the deregulated power market. A short, new reclaimed water supply and discharge line connected to the DDWTF will be installed by the applicant.

The applicant plans to build a new 230 kV electric transmission line to connect the project with PG&E's existing substation at the Pittsburg power plant, and an underground 13.8 kV line to supply power to Dow. The 230 kV line will be above ground as it runs in front of USS-POSCO's property, then will transition to underground along 8th Street. The line would be below ground within the substation premises. Where the line transitions from above ground to below ground, and vice-versa, transition facilities will be required. Other planned linear facilities include a new 5.2-mile underground natural gas pipeline to be connected to PG&E's existing Line 400 gas line.

POTENTIALLY SIGNIFICANT ADVERSE IMPACTS

The environmental consequences of the proposal are discussed in detail in the individual sections of the PSA. Although staff identified numerous potential project related impacts in the air quality, water, biology, land use, and transmission areas, with the proposed mitigation none of the potential impacts reached a level of significance. In visual resources, there is a potential for a significant impact, however staff is working with the applicant and the City of Pittsburg on mitigation options.

ANALYSIS

GENERATION TECHNOLOGY ALTERNATIVES

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 Electricity Report and shall

not be considered as alternatives to a proposed facility during the siting process. Thus, such alternatives are not included in the analysis.

Staff did compare various alternative technologies with the proposed project. We examined the principal electricity generation technologies which do not burn fossil fuels such as natural gas. The technologies which could serve as alternatives to the proposed project are geothermal, solar, hydroelectricity, and wind. Each of these technologies could be attractive from an environmental perspective because of the absence or reduced level of air pollutant emissions.

There are no geothermal resources in the Pittsburg vicinity. Solar and hydroelectric resources in the San Francisco Bay Area region are insufficient for commercial scale electricity generation. The Montezuma Hills region to the north in Solano County does have some wind generation activity. However, the intermittent nature of the wind resource and the 1-2 mile distance from the Hills to the project site across the Sacramento River and the New York Slough, would preclude its use for a project involving a steam host. Staff believes there are no local, non-fossil fueled generation technology alternatives that would reliably serve a project with a need to be close to its industrial steam host.

Staff also considered the option of building a coal-fired power plant. Conventional boiler steam turbine technology using coal as a fuel would be feasible for commercial scale generation. However, coal would have to be imported from outside California, resulting in increased truck and/or train traffic, and coal storage issues. Furthermore, coal combustion results in a higher level of emissions than that for natural gas burning facilities. Staff concluded that this alternative technology option is not superior to the proposed project.

Staff also considered the possibility of a smaller sized alternative, such as a 240 MW gas fired combined cycle project, located at the DEC site. Although the actual quantity of emissions would be smaller, since the emissions from both the 500 MW proposed project and a smaller project could be offset, the smaller project alternative would not result in a greater reduction of potential impacts. In addition, the applicant would most likely be required to interconnect at the PG&E facility in this scenario as well and thus, propose similar transition line along 8th Street.

ALTERNATIVE SITE SCREENING ANALYSIS

Alternative sites (see **ALTERNATIVES Figure 1**) were identified through a review of the applicant's AFC discussion of alternative sites, and staff discussion with Calpine/Bechtel.

**ALTERNATIVES Figure 1 - NOT AVAILABLE IN PDF VERSION
Site Alternatives**

SITE ALTERNATIVES

Staff evaluated six alternative sites in the Pittsburg/Antioch region. Of these six, four were considered by the applicant, which are Alternative Sites A, B, C, and D. The remaining two are the proposed site for the Pittsburg District Energy Facility and a site on Dow Chemical's property fronting on the New York Slough. Staff concluded that none of the alternative sites are superior to the proposed project site. The analysis leading to this conclusion is summarized below.

DEC ALTERNATIVE SITE A

SITE DESCRIPTION

- The approximately 91 acre parcel owned by Dow is east of the DDWTF within the City of Antioch.
- Surrounding land uses include the DDWTF to the west, light industrial and commercial businesses on the south and east, and a restaurant, residence, and baseball fields to the southeast.
- The Antioch General Plan designation for the site is "business park".
- The nearest residence is approximately 500 feet away.

ADVANTAGES

- Staff is aware of no advantages when Alternative Site A is compared to the proposed DEC site.

DISADVANTAGES

- Alternative Site A is bisected by an approximately 15 acre freshwater marsh which contains riparian habitat, wetland plant communities, and several sensitive wildlife species. Although this marsh could conceivably be avoided, power plant construction activities would be more complicated than at the proposed site, which has a smaller (i.e. approximately 0.15 acre) seasonal wetland area. On an overall basis, the potential for biological impacts would be less at DEC's proposed site.
- Alternative Site A is much closer to a residence than the proposed DEC site.
- Development of a power plant on Alternative Site A would conflict with the City of Antioch's General Plan designation of business park.

DEC ALTERNATIVE SITE B

SITE DESCRIPTION

- The approximately 178 acre parcel is located within the City of Antioch.
- The parcel's owner, Dow Chemical has designated approximately 150 of the 178 acres as the Dow Wetland Preserve. The alternative site consists of marsh, transitional marsh, tidal shoreline, lagoons, and sand dunes.

ADVANTAGES

- Staff is aware of no advantages when this alternative site is compared to the proposed DEC site.

DISADVANTAGES

- Industrial development of a portion of this area would hamper Dow Chemical's long standing efforts to maintain the majority of the parcel as a biological preserve.
- Given the presence of wetlands and the related potential for the presence of threatened and endangered species, development of a generating facility here would require prohibitively expensive mitigation and the likelihood of a long, complicated permitting process.

DEC ALTERNATIVE SITE C³

SITE DESCRIPTION

- Alternative Site C is an undeveloped parcel which is owned by USS-POSCO, and located in the City of Pittsburg. The parcel is approximately 170 acres in size. Its western boundary is east of the baseball fields near Columbia Street on the Pittsburg-Antioch Highway, with the southern boundary fronting on the Antioch Highway. USS-POSCO's buildings form the northern boundary, and the eastern boundary is near Loveridge Road.
- This site contains undulating hills, with Great Valley Willow scrub and a small wetland area.
- Residential development is located approximately 2000 feet from the area's northeastern boundary.
- Pittsburg's zoning ordinance designates Alternative Site C as General Industrial which allows power plant construction.

ADVANTAGES

- Alternative Site C is slightly preferred from the visual resources perspective when compared to the proposed site, since a power plant on the property would not reduce or block a view corridor to the San Joaquin River.

DISADVANTAGES

- This area is in the very preliminary stages of soil remediation, with years of work before industrial site development would be possible. USS-POSCO is working with the California Department of Toxic Substances Control on a remediation plan. Note that the previous landowner, U.S. Steel, is liable for the toxics problem.

³ Staff evaluated this parcel in the Alternatives Section of the Final Staff Assessment for the proposed Pittsburg District Energy Facility (98-AFC-1).

DEC ALTERNATIVE SITE D

SITE DESCRIPTION

- The approximately 48 acre site is located south of the proposed site in the City of Pittsburgh. Its southern boundary is adjacent to Highway 4.
- Alternative Site D is primarily surrounded by commercial and residential uses, with a large residential neighborhood located south of Highway 4.

ADVANTAGES

- Staff is aware of no advantages when this alternative site is compared with the proposed site.

DISADVANTAGES

- An industrial development such as a power plant would conflict with the City of Pittsburgh's zoning for this parcel, Community Commercial.
- This alternative site is much closer to residential development than the proposed site.

DOW CHEMICAL WATERFRONT SITE ALTERNATIVE⁴

SITE DESCRIPTION

- The approximately 10 acre site is located on the New York Slough waterfront on the northwestern edge of Dow Chemical's property.
- A power plant and related transmission line at this alternative site would be visible to boaters along New York Slough. Staff has concluded that any visual impacts would be insignificant, given the highly industrial nature of the area, and the boater's brief exposure.
- Surrounding land uses include Dow Chemical's production facilities, and USS-POSCO's marine dock and truck loading/parking lot.
- The nearest residence is approximately one mile away.
- The PDEF applicant had some discussion with Dow Chemical regarding possible availability of this site during the preliminary planning stages of the PDEF project.

ADVANTAGES

- This alternative site is very disturbed, with minimal biological resources. Therefore, biological resource impacts would be somewhat less than at the proposed DEC site.
- A project located at this alternative site would be farther away from residences. Therefore potential noise impacts would be diminished when compared with the proposed DEC site.

⁴ Staff evaluated this alternative site in the Alternatives section of the Final Staff Assessment for the proposed Pittsburgh District Energy Facility (98-AFC-1).

DISADVANTAGES

- This alternative site does not meet the applicant's minimum size requirement of twenty acres.
- This alternative site lacks an equipment laydown area for construction, since it is surrounded by existing Dow Chemical facilities and USS-POSCO's wharf.

PROPOSED PITTSBURG DISTRICT ENERGY FACILITY SITE ALTERNATIVE

SITE DESCRIPTION

- The proposed Pittsburg District Energy Facility (PDEF) site alternative is located on an existing 12 acre industrial site owned by USS-POSCO in the northeast corner of the City of Pittsburg. It is approximately 0.8-mile from Dow Chemical.
- The proposed PDEF site lies within an approximately 65 acre area, owned by USS-POSCO, called "Area LB". The area's northern boundary is 3rd Street, with the southern boundary near East Santa Fe Avenue. Harbor Street is the area's western boundary, with USS-POSCO's mill forming the eastern boundary.
- The site was formerly used for sludge drying and wastewater treatment related to steel production and is now unused. Approximately eight acres of the site contain arsenic contaminated soil. The PDEF applicant plans to cap the contaminated soil area with additional layers of fill and asphalt. The California Department of Toxic Substances Control has cleared the site for industrial development.
- Adjacent land uses include the Pittsburg Marine Terminal Petroleum Coke Handling Facility to the northwest, the GWF power plant to the northeast, the USS-POSCO steel mill to the southeast, Dow Chemical's petrochemical production facility to the east, and a Johns-Manville sheetrock production facility to the west.
- The site is zoned for general industrial uses with electric power plants being allowed in this zone.
- The nearest occupied residences, which are the closest noise receptors, are approximately 1800 feet from the project site.

ADVANTAGES

- The PDEF site alternative is more disturbed than the proposed DEC site. Therefore, biological resource impacts would be somewhat less at this alternative site, when compared with the DEC site.

DISADVANTAGES

- The applicant's minimum size requirement of twenty acres is not met with this alternative site, which is approximately 12 acres in size.
- This alternative site is closer to residences than the proposed DEC site.

THE “NO PROJECT” ALTERNATIVE

CEQA requires consideration of the “no project” alternative, requiring agencies to evaluate whether “no project” is environmentally preferable to the proposed project.

The project, described previously, would be a large industrial facility built in an industrial area, on vacant land that is zoned industrial and has an industrial general plan designation. Since the project is a power plant, it requires a transmission line to deliver its power to the PG&E switchyard west of the project. The transmission line, as proposed by the applicant, would be above ground to a location near the perimeter of the industrial zone, which borders on a residential neighborhood. From this point, the applicant proposes that the transmission line go underground.

Staff is discussing mitigation options with the applicant and the City of Pittsburg related to a potentially significant impact in the visual resources area. Given the environmental mitigation DEC has proposed or already agreed to, staff has identified no other impacts that are potentially significant.

If the project is not built, the project structure would for the time being, be avoided, and the project site would remain vacant. However, the site is zoned industrial, and it is reasonably likely that another industrial project would eventually be constructed there. If the project is not approved or built, the energy efficiency advantages of a large industrial project with a connection to a steam host would not be realized. Staff believes that the project will have environmental and industrial benefits from more efficient use of fuel that outweigh those of the “no project” alternative.

CONCLUSION

CEQA requires the project alternatives analysis to focus on reasonable alternatives to the project or to the site that would avoid or substantially lessen a project’s significant impacts. These impacts are in the visual resources area. No mitigation has been proposed at this time. However, staff is confident that reasonable mitigation can be developed.

The option of a smaller project, such as a 240 MW combined cycle unit would have impacts which would need to be mitigated similarly to the proposed project. Therefore, the smaller project option is not better than the proposed project.

Regarding the alternative sites examined, each of them does nothing to reduce the potential for visual resource impacts to a level lower than that of the proposed project. Additionally, each is undesirable for various reasons. DEC Alternative Site A has a freshwater marsh where potentially significant biological resource impacts could occur, and it is much closer to a residence than the proposed DEC site. Development of DEC Alternative Site B would result in significant biological resource impacts since it contains the Dow Wetland Preserve. DEC Alternative Site C has contaminated soil with preliminary planning for a soil remediation process underway. DEC Alternative Site D is zoned Community Commercial and is close to a large residential area. The proposed PDEF site is smaller than 20 acres, and it is not available due to USS-POSCO’s existing contract with the Pittsburg District

Energy Facility, Limited Liability Company for development of a competing power plant. The Dow Chemical Waterfront site is also smaller than 20 acres.

After analyzing various alternatives for the DEC, staff concludes that none of the alternatives is preferable to the proposed project at the proposed site, with additional mitigation as recommended by staff.

REFERENCES

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Calpine Corporation Bechtel Enterprises, Inc. 1998. Application for Certification for Delta Energy Center, Vol.1.

Peck, K. 1999. USS-POSCO staff. Interviews by Eileen Allen. February 19 and June 22.

Pittsburg District Energy Facility, L.L.C. 1998. Application for Certification for Pittsburg District Energy Facility.

Thompson, A. 1999. Counsel for Pittsburg District Energy Facility, L.L.C. Interview by Eileen Allen. February 24.

COMPLIANCE MONITORING AND FACILITY CLOSURE

Jeri Zene Scott

INTRODUCTION

The General Conditions, including Compliance Monitoring (Compliance Plan), have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the Delta Energy Center facility is constructed and operated in conjunction with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of the following elements:

1. General conditions that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions; and
- establish requirements for facility closure plans.

2. Specific conditions of certification which are found following each technical area that contain 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 verifying that the condition has been satisfied.

GENERAL CONDITIONS OF CERTIFICATION

COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES

A CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the 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, it should be understood that the approval would involve all appropriate staff and management.

The Commission has established a toll free 800 number for the public to use for notifying the Commission about power plant construction and operation related complaints or events of concern. The telephone number is **1-800-858-0784**.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM may schedule 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 shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight or inadvertence and to preclude any last minute, unforeseen issues from arising.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record in either the Compliance file or Docket 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 changes and the resulting staff or Energy Commission action taken.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner and any successors in interest to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner and any successors in interest must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in revocation of Energy Commission certification, an administrative fine, or other action as appropriate.

ACCESS

The CPM, designated staff, and delegated agencies or consultants, shall be guaranteed and granted 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.

COMPLIANCE RECORD

The project owner shall maintain project files on-site or at an alternative site approved by the CPM, for the life of the project. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents for the life of the project, unless a lesser period is specified by the conditions of certification.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given access to the files.

COMPLIANCE VERIFICATIONS

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
Delta Energy Center Project (98-AFC-3C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

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, in most cases without Energy Commission approval. (See Title 20, California Code of Regulations, Section 1769, for when Commission approval is required. See attachment A)

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) appropriate letters from delegate agencies verifying compliance;
- 3) Energy Commission staff audit of project records; and/or
- 4) Energy Commission staff inspection of mitigation and/or other evidence of mitigation.

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 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

A compliance matrix is to 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 compliance conditions 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) an indication of the compliance status for each condition (e.g., “not started”, “in progress” or “completed date”).

Completed or satisfied conditions do not need to be included in the compliance matrix after they have been identified as completed/satisfied in at least one monthly or annual compliance report.

MONTHLY COMPLIANCE REPORT

During construction of the project, the project owner or authorized agent shall submit Monthly Compliance Reports 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 should be submitted as attachments to the Monthly Compliance Report;

- 3) an initial, and thereafter updated compliance matrix which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
- 4) a list of conditions which have been satisfied during the reporting period, and a description or reference to the actions which 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 with, or permits issued by, other governmental agencies during the month;
- 8) a projection of project compliance activities scheduled during the next two months;
- 9) a listing of the month's additions to the on-site compliance file; and
- 10) any requests to dispose of items that are required to be maintained in the project owner's compliance file.

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date that the project was approved, unless the project owner notifies the CPM in writing that a delay is warranted. 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 is found at the end of this section.

ANNUAL COMPLIANCE REPORT

After the air district has issued a Permit to Operate, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The Permit to Operate is issued following the satisfactory completion of the required source test.

The annual 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 which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
- 2) a summary of the current project operating status and an explanation of any significant changes to facility operations during the year (i.e. total hours of operation, scheduled and unscheduled maintenance and any major repairs);

- 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 should be 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 made 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, and
- 9) an evaluation of the on-site contingency plan for unexpected facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section].

CONFIDENTIAL INFORMATION

Any information, which the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, which is determined to be confidential, shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

DEPARTMENT OF FISH AND GAME FILING FEE

Pursuant to the provisions of Fish and Game Code section 711.4, the project owner must remit to the Secretary of the Resources Agency a filing fee in the amount of eight hundred and fifty dollars (\$850). The filing fee shall be paid upon the filing of the notice of determination pursuant to Section 21080.5 of that code.

The project owner shall submit a copy of the receipt for the filing fee to the CPM within 30 days of the payment. The receipt shall identify the project, the date paid and the amount paid.

FACILITY CLOSURE

INTRODUCTION

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 which provide the flexibility to deal with the specific situation and project setting which will exist at the time of closure. 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, unexpected temporary closure and unexpected permanent closure.

PLANNED CLOSURE

This planned closure occurs at the end of a project's life, 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.

UNEXPECTED TEMPORARY CLOSURE

This unplanned 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.

UNEXPECTED PERMANENT CLOSURE

This unplanned closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

PLANNED CLOSURE

In order that a planned facility closure does not create adverse impacts, a closure process, that will provide 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 twelve months prior to commencement of closure activities (or other period of time agreed to by the

CPM). 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 all facilities and equipment that will a) be immediately removed from the site after closure (e.g. hazardous materials); b) temporarily remain on the site after closure (e.g., until the item is sold or scrapped); and c) permanently remain on the site after closure. The plan must explain both why the item cannot be removed and why it does not present a risk of harm to the environment and the public health and safety to remain *insitus* for in indefinite period.
4. Address conformance of the plan with all-applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Workshops and/or hearings may be conducted as part of the Commission's approval procedure if there are significant issues associated with the proposed facility closure plan, or the desires of local officials or interested parties are inconsistent with the plan.

In addition, prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Commission CPM for the purpose of discussing the specific contents of the plan.

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 or the environment, but shall not commence any other closure activities, until Commission approval of the facility closure plan is obtained.

UNEXPECTED TEMPORARY CLOSURE

In order to ensure that public health and safety and the environment are protected in the event of an unexpected 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, 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 facilities 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 recommend 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 temporary 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.

In addition, consistent with requirements under unexpected 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 unexpected temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., 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 circumstances and expected duration of the closure.

If it is determined that a temporary closure is likely to be permanent, or for a duration of more than twelve months, a closure plan consistent with that for a planned closure shall be submitted to the CPM within 90 days of the determination. The CPM and project owner may agree to a period of time other than the 90 days.

UNEXPECTED PERMANENT CLOSURE

In order to ensure that public health and safety and the environment are protected in the event of an unexpected permanent 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, and environmental impacts, are taken in a timely manner (even in an unlikely abandonment scenario).

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 facilities 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 recommend 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, 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.

Furthermore, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment. 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 unexpected permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., 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.

DELEGATE AGENCIES

To the extent permitted by law, the Energy Commission may delegate authority for compliance verification and enforcement to various state and local agencies that have expertise in subject areas where specific requirements have been established as a condition of certification. If a delegate agency does not participate in this program, the Energy Commission staff will establish an alternative method of verification and enforcement. Energy Commission staff reserves the right to independently verify compliance.

In performing construction and operation monitoring of the project, the Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). The Commission staff retains this authority when delegating to a local CBO. Delegation of authority for compliance verification includes the authority for enforcing codes, the responsibility for code interpretation as necessary, and the authority to use discretion as necessary in implementing the various codes and standards.

Whenever an agency's responsibility for a particular area is transferred by law to another entity, all references to the original agency shall be interpreted to apply to the successor entity.

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 Commission Decision.

Moreover, to ensure compliance with the terms and conditions of certification and applicable laws, ordinances, regulations, and standards, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

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 1230 et. seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure are described below:

INFORMAL DISPUTE RESOLUTION PROCEDURE

The following procedure is designed to informally resolve disputes concerning 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 1230 et. seq., 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 referred to 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 (7) working days of the CPM's request, provide a written report of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. 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 forty-eight (48) hours, followed by a written report filed within seven (7) 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 undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within fourteen (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 agency 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 which 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 1230 et. seq.

FORMAL DISPUTE RESOLUTION PROCEDURE-COMPLAINTS AND INVESTIGATIONS

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's Chief Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for filing a complaint or a request for investigation and a description of how they are processed are in Title 20, California Code of Regulations, section 1230 et. seq. The formal process may be in lieu of or in addition to the informal process.

Within 30 days after receipt of a written complaint or a request for investigation, the Chairperson or, if one is assigned, the Committee may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Title 20, California Code of Regulations, sections 1232 - 1236).

POST CERTIFICATION CHANGES TO THE COMMISSION DECISION: AMENDMENTS, STAFF CHANGES AND VERIFICATION CHANGES

The project owner must petition or request the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to 1) delete or change a condition of certification; 2) modify the project design or operational requirements; 3) transfer ownership or operational control of the facility; or 4) change a condition verification requirement.

The petition or request for a change should be submitted to the Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209. The criteria under section 1769 that determine which type of change process applies are explained below.

AMENDMENT

A proposed change will be processed as an amendment requiring Commission approval if it involves a change to the requirement or protocol (and in some cases the verification) portion of a condition of certification, an ownership or operator change, or a potential significant environmental impact.

INSIGNIFICANT STAFF CHANGE

The proposed change will be processed as an insignificant staff change, not requiring Commission approval, if it does not require changing the language in a condition of certification, does not have a potential significant environmental impact, and will not cause the project to violate laws, ordinances, regulations or standards.

VERIFICATION CHANGE

The proposed change will be processed as a verification or insignificant change if it involves only the language in the verification portion of the condition of certification. This procedure can only be used to change verification requirements that are of an administrative nature, usually the timing of a required action. In the event that verification language contains technical requirements, the proposed change must be processed as an amendment requiring Commission approval.

KEY EVENT LIST

PROJECT _____ DATE ENTERED _____

DOCKET # _____ PROJECT MANAGER _____

<i>EVENT DESCRIPTION</i>	<i>DATE ASSIGNED</i>
Date of Certification	
Start of Construction	
Completion of Construction	
Start of Operation (1st Turbine Roll)	
Start of Rainy Season	
End of Rainy Season	
Start T/L Construction	
Complete T/L Construction	
Start Fuel Supply Line Construction	
Complete Fuel Supply Line Construction	
Start Rough Grading	
Complete Rough Grading	
Start of Water Supply Line Construction	
Complete Water Supply Line Construction	
Start Implementing Erosion Control Measures	
Complete Implementing Erosion Control Measures	

ATTACHMENT A
TITLE 20, CALIFORNIA CODE OF REGULATIONS
SECTION 1769

1769. Post Certification Amendments and Changes.

(a) Project Modifications

1. After the final decision is effective under section 1720.4, the applicant shall file with the commission a petition for any modifications it proposes to the project design, operation, or performance requirements. The petition must contain the following information:
 - (A) A complete description of the proposed modifications, including new language for any conditions that will be affected;
 - (B) A discussion of the necessity for the proposed modifications;
 - (C) If the modification is based on information that was known by the petitioner during the certification proceeding, an explanation why the issue was not raised at that time;
 - (D) If the modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, an explanation of why the change should be permitted;
 - (E) An analysis of the impacts the modification may have on the environment and proposed measures to mitigate any significant adverse impacts;
 - (F) A discussion of the impact of the modification on the facility's ability to comply with applicable laws, ordinances, regulations, and standards;
 - (G) A discussion of how the modification affects the public;
 - (H) A list of property owners potentially affected by the modification; and
 - (I) A discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings.
2. Within 30 days after the applicant files a petition pursuant to subsection (a)(1) of this section, the staff shall review the petition to determine the extent of the proposed modifications. Where staff determines that there is no possibility that the modifications may have a significant effect on the environment, and if the modifications will not result in a change or deletion of a condition adopted by the commission in the final decision or make changes that would cause the project not to comply with any applicable laws, ordinances, regulations, or standards, no commission approval is

required and the staff shall file a statement that it has made such a determination with the commission docket and mail a copy of the statement to each commissioner and every person on the post-certification mailing list. Any person may file an objection to staff's determination within 14 days of service on the grounds that the modification does not meet the criteria in this subsection.

3. If staff determines that a modification does not meet the criteria in subsection (a)(2), or if a person objects to a staff determination that a modification does meet the criteria in subsection (a)(2), the petition must be processed as a formal amendment to the decision and must be approved by the full commission at a noticed business meeting or hearing. The commission shall issue an order approving, rejecting, or modifying the petition at the scheduled hearing, unless it decides to assign the matter for further hearing before the full commission or an assigned committee or hearing officer. The commission may approve such modifications only if it can make the following findings:
 - (A) The findings specified in section 1755(c), and (d), if applicable;
 - (B) That the project would remain in compliance with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code section 25525;
 - (C) That the change will be beneficial to the public, applicant, or intervenors; and
 - (D) That there has been a substantial change in circumstances since the Commission certification justifying the change or that the change is based on information that was not available to the parties prior to Commission certification.
4. The staff shall compile and periodically publish a list of petitions filed under this section and their status.

- (A) Change in Ownership or Operational Control

1. A petition to transfer ownership or operational control of a facility shall contain the following information:

- (A) A discussion of any significant changes in the operational relationship between the owner and operator;
 - (B) A statement identifying the party responsible for compliance with the commission's conditions of certification; and
 - (C) A statement verified by the new owner or operator in the same manner as provided in Section 1707 that the new owner or operator

understands the conditions of certification and agrees to comply with those conditions.

(2) The commission may approve changes in ownership or operational control after fourteen days notice.

NOTE: Authority cited: Sections 25213, 25218(e) and 25541.5, Public Resources Code. Reference: Sections 25523, 25532 and 25534, Public Resources Code.

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Transmission Line Safety and Nuisance	Obed Odoemelum
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Traffic and Transportation	David Flores
Noise	Steve Baker
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Cultural Resources.....	Gary Walker
Socioeconomics	Amanda Stennick
Biological Resources.....	Marc Sazaki
Soil and Water Resources.....	Joe O'Hagan
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Power Plant Efficiency.....	Steve Baker
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