Preliminary Staff Assessment

CONTRA COSTA POWER PLANT UNIT 8 PROJECT

Application For Certification (00-AFC-1)
Contra Costa, California

CALIFORNIA ENERGY COMMISSION

STAFF REPORT

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EXECUTIVE SUMMARY

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INTRODUCTION

This Preliminary Staff Assessment (PSA) contains the Energy Commission staff's independent analysis and recommendation on the Contra Costa Power Plant (CCPP) Unit 8 Power Project. The CCPP Unit 8 and related facilities such as the electric transmission lines, natural gas line, water supply lines and wastewater lines are under the Energy Commission's jurisdiction (Pub. Resources Code §25500). When issuing a license, the Energy Commission acts as lead state agency (Pub. Resource Code §25519(c)) under the California Environmental Quality Act (Pub. Resource Code §§21000 et seq.), and its process is functionally equivalent to the preparation of an environmental impact report (Cal. Code Regs., tit. 14 §15251(k)).

It is the responsibility of the Energy Commission staff to complete an independent assessment of the project's potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and conditions for construction, operation and eventual closure of the project, if approved by the Energy Commission. The analyses contained in this document were prepared in accordance with Public Resources Code section 25500 et seq.; the California Code of Regulations, Title 20, section 12001 et seq.; and the California Environmental Quality Act (Pub. Resources Code §21000 et seq.) and its guidelines (Cal. Code Regs., tit. 14 §15000 et seq.).

This document is prepared by staff and is preliminary in nature. This is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The final decision will be made by the Commissioners of the California Energy Commission only after the completion of evidentiary hearings. The Commissioners will consider the recommendations of all interested parties, including those of the Energy Commission staff; the applicant; intervenors; concerned citizens; and local, state, and federal agencies, before making a final decision on Southern Energy Delta, LLC's application to construct and operate the CCPP Unit 8.

PROJECT LOCATION AND DESCRIPTION

On January 31, 2000, Southern Energy Delta, LLC filed an Application for Certification (AFC) with the California Energy Commission for the CCPP Unit 8. The proposed CCPP Unit 8 will be a nominal 530 megawatt (MW), natural gas-fired, combined cycle, combustion turbine power plant located within the existing CCPP site complex in Contra Costa County, just north of the City of Antioch. (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual generating capacity will

differ from, and likely exceed, this figure. If the project's actual generating capacity should exceed this nominal rating, no conditions of certification would be violated.)

SETTING

The CCPP is on Wilbur Avenue, one mile northeast of Antioch, on the southern shore of the San Joaquin River. State Route (SR) 4, SR 160, and the Antioch Bridge are just east of the site. Unit 8 will be located in the northeast corner of the CCPP site. The plant is surrounded by industrial uses to the south and west, the San Joaquin River to the north, and a commercial marina, industrial uses, and open space to the east. **PROJECT DESCRIPTION Figure 1** depicts the regional setting of the project.

Power plants in the vicinity of the CCPP include seven currently operating plants and two recently certified power projects. Three of the operating plants are located in or near the City of Antioch. The remaining four operating plants, and both power projects, are located in or near the City of Pittsburg.

EXISTING CCPP

Pacific Gas and Electric Company (PG&E) originally constructed the CCPP complex in 1951. Units 4 and 5 were added in 1953, and Units 6 and 7 were added in 1964. In 1994, the original Units 1, 2 and 3 were retired, leaving only Units 4, 5, 6 and 7 in operation. Southern Energy California – parent company of Southern Energy Delta, LLC (Southern) – purchased the CCPP from PG&E in April of 1999.

The existing units are conventional natural gas-fired boilers that use once-through cooling. Units 6 and 7 are the only units that still produce power … Units 4 and 5 are used as synchronous condensers only. Existing power capacity from Units 6 and 7 is 680 MW.

CCPP UNIT 8

Unit 8 will take up approximately 20 acres in the northeast corner of the existing approximately 200 acre site. Since the new unit is to be constructed wholly within the site of the existing CCPP, it will rely on many of the existing plant's systems such as plant process make-up water, the wastewater treatment system, cooling water supply, fire water supply, ammonia supply, and other ancillary systems. The generator output from the new unit will be stepped-up to transmission voltage and interconnected to the existing PG&E switchyard also located within the CCPP site.

The proposed Unit 8 combined cycle power unit will consist of two natural gas-fired combustion turbine generators, two heat recovery steam generators (HRSGs), and a steam turbine generator. In the combined cycle process, electricity is created both from the combustion turbines and the steam turbine. Each combustion turbine generator converts the thermal energy of natural gas to mechanical energy, which drives an electrical generator. At the same time, the thermal energy in the form of hot exhaust gas is directed to the HRSGs to produce steam, which in turn drives the steam turbine electricity generator. The combined cycle process is considered to be "state of the art" in that it creates electricity more efficiently – and creates less pollution – than conventional power systems.

Additional project facilities will include two 195-foot tall exhaust stacks on the heat recovery generators, a 10-cell water cooling tower, a turbine building, storage tanks, a control building, and electrical power transformers and transmission facilities to interconnect with the existing PG&E switchyard on the CCPP site complex. As described by the applicant, no additional electric transmission lines outside of the CCPP complex are needed to transmit Unit 8's electricity to the regional transmission grid. The natural gas fuel for Unit 8 will be supplied by the existing gas pipeline that runs through the CCPP. A pipe tie-in to this existing gas pipeline will deliver natural gas to the new facility.

Primary water needs for Unit 8 will include cooling tower makeup, evaporative cooler makeup, and steam cycle makeup. Cooling water for Unit 8 will be supplied by re-use of the water already withdrawn from the San Joaquin for cooling in Units 6 and 7. Existing facilities that are already part of CCPP will supply Unit 8's process water requirements. The water supply for these systems is also the San Joaquin River. As a first line of backup in the event that river quality is unacceptable for the treatment system to handle, Southern proposes the addition of a 500,000-gallon storage tank for demineralized water storage. If necessary, the City of Antioch will provide water as a second backup source for all process water requirements except Cooling Tower makeup. According to the project description provided by Southern, Unit 8 should not require the withdrawal of additional water from the San Joaquin River.

Wastewater streams that will be generated specifically during the operation and maintenance of Unit 8 include wastewater, or blowdown, from the cooling tower and evaporative coolers. Cooling tower and evaporative cooler blowdown from Unit 8 will be combined with the cooling water discharged into the river from Units 6 & 7. Other wastewater streams to which Unit 8 will contribute include equipment washwater, sanitary waste, drains, and stormwater. Equipment washdown water, which may contain oil, will be treated by an oil/water separator and the oil disposed off site. Wash water from periodic equipment cleaning that may contain heavy metals will be collected and disposed of off site. Sanitary waste will be handled with the existing onsite septic system. Waste water from drains will be directed to an oil/water separator. Oil separated through this process will be disposed off site and the treated water will be combined with the cooling water discharged into the river from Units 6 and 7. The demineralizer regeneration waste is treated in the neutralization system. Once treated, this waste stream is discharged to the existing CCPP discharge channel to the San Joaquin River in accordance with the CCPP's NPDES Permit.

The proposed project is estimated to cost between $240 and $290 million. During the 22-month construction period, approximately 285 construction workers will be employed. Operation of the CCPP Unit 8 will require 10 full time employees in addition to the existing CCPP workforce of 53 employees.

If approved, Southern Energy Delta proposes to begin construction in mid-2001, and start operation of CCPP Unit 8 by mid-2003. It will operate as a merchant power facility, selling its energy via direct sales agreements and in the spot market

through the California Power Exchange. Energy output and operational levels will vary according to demand in the California energy market.

STAFF'S ASSESSMENT

The PSA is a draft document of the Energy Commission staff and therefore, by its very nature, the conclusions and recommendations presented are draft and may change in the FSA.

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 approved.

In summary:

With the additional conditions of certification proposed by staff, the project should be in conformance with all relevant Laws, Ordinances, Regulations and Standards (LORS).

The following summarizes staff's preliminary conclusions regarding subject areas that were 1) identified early on as having unresolved issues, 2) that have potentially significant impacts, or 3) that members of the community have raised as areas of concern:

- **Air Quality:** Staff's analysis shows that the proposed CCPP Unit 8 emissions of air pollutants (nitrogen oxide (NO_x), sulfur dioxide (SO_2) and carbon monoxide (CO) will not violate ambient air quality standards and the air quality impacts from these emissions would be insignificant. The project's air quality impacts from directly emitted particulate matter (PM_{10}) and of the ozone precursor emissions of NO_x, volatile organic compounds (VOC), and PM_{10} precursors of NO_x and SO_2 could be significant, however, if left unmitigated. The applicant will reduce these emissions to the extent feasible by using Best Available Control Technolgy, and will provide emission offsets for their NO_x, VOC, and PM_{10} emissions. These mitigation measures reduce the potential for impacts (including cumulative impacts) from directly emitted PM_{10}, as well as ozone and secondary PM_{10} formation to a level of insignificance.

  At the time of the Issue Identification Report, the timing of ERC acquisition was a staff concern. However, the applicant indicates that they have obtained from local sources all of the ERCs necessary to offset the project emissions liability. The Bay Area Air Quality Management District (District) has completed their Preliminary Determination of Compliance for this project, which confirms

Southern's acquisition of ERCs. Staff has incorporated the District's conclusions and appropriate conditions into the PSA.

- **Biological Resources:** Unit 8 will utilize the existing cooling system for Units 6 and 7 for cooling makeup water. Their once-through cooling water systems, which will be used by Unit 8, is a technology with critical impacts to Delta aquatic organisms from cooling water entrainment at the Contra Costa site that have resulted in "take" of endangered species, primarily Delta smelt and chinook salmon. The US Fish and Wildlife Service (USFWS) is requiring a Habitat Conservation Plan (HCP) which will identify specific impacts of the existing power plant *and* Unit 8. The HCP will also identify any mitigation measures that may be necessary. While the HCP is not yet complete, the USFWS at this juncture is not expecting Unit 8 to result in any additional impacts to biological resources.

  Staff's analysis found the potential for impacts to biological resources associated with this project to be insignificant, provided all proposed mitigation measures and conditions of certification are implemented, as well as any terms and conditions included in a federal or state incidental take authorization (HCP Section 10 permit/2081 permit) under the respective Endangered Species Acts.

- **Environmental Justice:** East Contra Costa County encompasses the cities of Antioch and Pittsburg, and the unincorporated community of Bay Point. East Contra Costa County is characterized largely by industrial uses. For this reason the staff performed a screening analysis to determine if environmental justice issues should be further addressed. EPA guidelines on environmental justice state that if 50 percent of the population affected by a project has minority or low-income status, it must be determined if these populations are exposed to disproportionately high and adverse human health or environmental impacts. The demographics for Contra Costa County indicate that about nine percent of those living within the area affected by the CCPP (six-mile radius) are in a low-income economic status. Within the same geographic area minorities are about 31 percent of the total population. Since these percentages are below the EPA's threshold levels, it was determined that CCPP Unit 8 does not expose a minority or low-income population to a greater impact than a non-minority or higher-income population.

- **Soil and Water Resources:** The existing Contra Costa Power Plant takes in approximately 8,000 acre feet of water per year, predominately for cooling water make-up. The primary source of water proposed for Unit 8 will come from the reuse of the supply for Units 6 & 7, which in turn comes from the San Joaquin River. This water is already diverted for once-through cooling and discharged by the existing Units 6 & 7. In the Issue Identification Report , staff expressed a concern that during days of heavy spring runoff, river water would be replaced with potable supplies from the City of Antioch. The applicant has since added a 500,000 gallon water storage tank to their plan, thus minimizing or eliminating the need for water supplies from the City of Antioch.

Staff has evaluated alternative sources of cooling water as well as alternative sources of cooling technology such as dry and wet/dry cooling which may minimize water consumption and wastewater discharge. At this time staff is not recommending any other alternatives.

At the time of the Issue Identification Report, Energy Commission staff expressed concern over the thermal discharge of wastewater from the proposed Unit 8. The applicant had filed an application with the Central Valley Regional Water Quality Control Board (CVRWQCB) to renew the National Pollutant Discharge Elimination System (NPDES) permit for the existing CCPP, and staff questioned if this permit application also addressed the proposed project. The applicant has since re-filed their application to include Unit 8.

Wastewater from Unit 8 will be addressed either through modification of the existing NPDES permit for the CCPP or through a new NPDES permit for Unit 8 and the existing units. A new NPDES permit will be required if the CVRWQCB considers CCPP Unit 8 a new source under the Clean Water Act. The CVRWQCB will likely treat Unit 8 as a modification of the existing NPDES permit, which is in the process of being renewed. Without an NPDES permit, however, staff is unable to determine that the project will comply with all applicable laws, ordinances and standards. A determination will be made in the FSA.

- **Transmission System Engineering:** At the time of the Issue Identification Report, the concern was that the AFC submittal contained only a transmission interconnection planning report completed by a consultant. Since that time, the more critical document – the Detailed Facilities Study (DFS) – was submitted by the private transmission owner, Pacific Gas and Electric Co. (PG&E 2000a). Upon review of the DFS, the staff's preliminary findings are that the CCPP Unit 8 can interconnect without the need for significant new transmission facilities. The CAL-ISO has granted its preliminary approval of the CCPP Unit 8 project and has identified additional studies required to grant final approval of the project.
- **Visual Resources:** At the time of the Issue Identification Report concern existed about visual impacts. Staff have found that the project, as proposed, has the potential to cause project-specific adverse visual impacts due to intrusion into certain view corridors, reduction of visual quality of certain sensitive views due to an increase in visually unattractive industrial features, vapor plumes of various sizes, and lighting. However, primarily because of the heavy industrial character of the area, project-specific impacts except for lighting are not expected to be significant, and proposed project-specific mitigation is expected to cause residual project-specific lighting impacts to be less than significant. Nevertheless, the project would intensify the industrial character of the area and add to the significant cumulative visual impacts that existing industry has caused. Implementation of Southern's proposed mitigation measures and staff's additional proposed mitigation measures, both specified in staff's recommended Conditions of Certification, would reduce the proposed project's contributions to most of these cumulative impacts. Staff is

continuing to evaluate the magnitude of the contribution of the proposed project's cooling tower plumes to cumulative visual impacts.

The project would result in blockage of a view corridor to the Contra Costa Hills as seen from a portion of Antioch Regional Shoreline Park. Policy 1 of the Community Image Element of the City of Antioch General Plan states that views to the river, hills, and ridgelines should be preserved by prohibiting the siting of structures or landscaping that would block views from adjacent properties. Although the project could be construed to be inconsistent with this policy, the affected view corridor was considered in this analysis to be highly compromised by the existing power plant, and consequently of limited visual quality and value, therefore the view intrusion was found to be a less than significant visual impact. This effect on the park landscape was thus regarded to be of limited importance.

These and the remaining subject areas will be discussed in upcoming workshops. Staff's conclusions, recommendations and proposed conditions of certification for these topic areas may be modified based on those workshop discussions. In addition, staff may recommend mitigation measures to address issues in air quality, biological resources, land use, soil and water resources, and visual resources that may require staff to reevaluate its conclusions and recommendations for the above topic areas.

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INTRODUCTION

Cheri Davis

PURPOSE OF THIS REPORT

The Preliminary Staff Assessment (PSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Southern Energy Delta, LLC Application for Certification (AFC). The PSA is a staff document. It is neither a Committee document, nor a draft decision or proposed decision. The PSA describes the following:

- the existing environmental setting;
- the proposed project;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- cumulative analysis of the potential impacts of the project, along with potential impacts from other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies and intervenors that may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified;
- project alternatives; and
- requirements for project closure.

The analyses contained in this PSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The PSA presents conclusions and proposed conditions of certification that apply to the design, construction, operation and closure of the proposed facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulation section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 15000 et seq.).

ORGANIZATION OF THE STAFF ASSESSMENT

The PSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in 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, and a list of staff that assisted in preparing this report.

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

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

ENERGY COMMISSION SITING PROCESS

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

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

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

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

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

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the FSA, staff will conduct one or more workshops in Antioch to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine their analysis, correct errors, and finalize conditions of certification to reflect areas where we have reached agreement with the parties. Responses to written comments on the PSA will be included in the FSA. The FSA serves as staff's testimony on a proposal.

The staff's assessment is only one piece of evidence that will be considered by the Committee (two commissioners who have been assigned to this project) in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the public hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated for a minimum of 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD is required to undergo a 15-day comment period. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any party may appeal the decision to the Energy Commission.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the PSA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD. The Energy Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission. Staff's proposed Compliance Monitoring Plan and General Conditions are included at the end of the PSA.

PROJECT DESCRIPTION

Cheri Davis

NATURE AND PURPOSE OF PROJECT

On January 31, 2000, Southern Energy Delta, LLC filed an Application for Certification (AFC) with the California Energy Commission for the Contra Costa Power Plant (CCPP) Unit 8 Power Project. The proposed CCPP Unit 8 will be a nominal 530 megawatt (MW), natural gas-fired, combined cycle, combustion turbine power plant located within the existing CCPP site complex in Contra Costa County, just north of the City of Antioch. (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual generating capacity will differ from, and likely exceed, this figure. If the project's actual generating capacity should exceed this nominal rating, no conditions of certification would be violated.) The new combined cycle power unit will increase the overall generating capacity of the CCPP to a total of approximately 1,210 net MW.

PROJECT LOCATION

The CCPP is on Wilbur Avenue, one mile northeast of Antioch, on the southern shore of the San Joaquin River. State Route (SR) 4, SR 160, and the Antioch Bridge are just east of the site. Unit 8 will be located in the northeast corner of the CCPP site. The plant is surrounded by industrial uses to the south and west, the San Joaquin River to the north, and a commercial marina, industrial uses, and open space to the east. See **PROJECT DESCRIPTION Figure 1** for the regional setting of the project.

Power plants in the vicinity of the CCPP include seven currently operating plants and two recently certified power projects. Three of the operating plants are located in or near the City of Antioch. The remaining four operating plants, and both power projects, are located in or near the City of Pittsburg.

PROJECT DESCRIPTION AND LINEAR FACILITIES

EXISTING CCPP

Pacific Gas and Electric Company (PG&E) originally constructed the CCPP complex in 1951. Units 4 and 5 were added in 1953, and Units 6 and 7 were added in 1964. In 1994, the original Units 1, 2 and 3 were retired, leaving only Units 4, 5, 6 and 7 in operation. Southern Energy California – parent company of Southern Energy Delta, LLC (Southern) – purchased the CCPP from PG&E in April of 1999.

The existing units are conventional natural gas-fired boilers that use once-through cooling. Units 6 and 7 are the only units that still produce power … Units 4 and 5 are used as synchronous condensers only. Existing power capacity from Units 6 and 7 is 680 MW.

CCPP UNIT 8

Unit 8 will take up approximately 20 acres in the northeast corner of the existing approximately 200 acre site. Since the new unit is to be constructed wholly within the site of the existing CCPP, it will rely on many of the existing plant's systems such as plant process make-up water, wastewater treatment system, cooling water supply, fire water supply, ammonia supply, and other ancillary systems. The generator output from the new unit will be stepped-up to transmission voltage and interconnected to the existing PG&E switchyard also located within the CCPP site.

The proposed Unit 8 combined cycle power unit will consist of two natural gas-fired combustion turbine generators, two heat recovery steam generators (HRSGs), and a steam turbine generator. In the combined cycle process, electricity is created both from the combustion turbines and the steam turbine. Each combustion turbine generator converts the thermal energy of natural gas to mechanical energy, which drives an electrical generator. At the same time, the thermal energy in the form of hot exhaust gas is directed to the HRSGs to produce steam, which in turn drives the steam turbine electricity generator. The combined cycle process is considered to be "state of the art" in that it creates electricity more efficiently – and creates less pollution – than conventional power systems.

Additional project facilities will include two 195-foot tall exhaust stacks on the heat recovery generators, a 10-cell water cooling tower, a turbine building, storage tanks, a control building, and electrical power transformers and transmission facilities to interconnect with the existing PG&E switchyard on the CCPP site complex.

The linear facilities (electric transmission facilities, natural gas line, and water supply facilities) are described below and are depicted on the map titled **PROJECT DESCRIPTION Figure 2**.

TRANSMISSION LINE FACILITIES

Included in the plan for Unit 8 is a new transmission interconnection to the existing PG&E switchyard. As described by the applicant, no additional electric transmission lines outside of the CCPP complex are needed to transmit Unit 8's electricity to the regional transmission grid.

NATURAL GAS PIPELINE

The natural gas fuel for Unit 8 will be supplied by the existing gas pipeline that runs through the CCPP. A pipe tie-in to this existing gas pipeline will deliver natural gas to the new facility.

WATER SUPPLY

Primary water needs for Unit 8 will include cooling tower makeup, evaporative cooler makeup, and steam cycle makeup. Cooling water for Unit 8 will be supplied by re-use of the water already withdrawn from the San Joaquin for cooling in Units 6 and 7. Existing facilities that are already part of CCPP will supply Unit 8's process water requirements. The water supply for these systems is also the San Joaquin River. As a first line of backup in the event that river quality is unacceptable for the

treatment system to handle, Southern proposes the addition of a 500,000-gallon storage tank for demineralized water storage. If necessary, the City of Antioch will provide water as a second backup source for all process water requirements except Cooling Tower makeup. According to the project description provided by Southern, Unit 8 should not require the withdrawal of additional water from the San Joaquin River.

Potable water for personnel use will be provided by the City of Antioch.

WASTEWATER TREATMENT

Wastewater streams that will be generated specifically during the operation and maintenance of Unit 8 include wastewater, or blowdown, from the cooling tower and evaporative coolers. Cooling tower and evaporative cooler blowdown from Unit 8 will be combined with the cooling water discharged into the river from Units 6 & 7.

Other wastewater streams to which Unit 8 will contribute include equipment washwater, sanitary waste, drains, and stormwater. Equipment washdown water, which may contain oil, will be treated by an oil/water separator and the oil disposed off site. Wash water from periodic equipment cleaning that may contain heavy metals will be collected and disposed of off site. Sanitary waste will be handled with the existing onsite septic system. Waste water from drains will be directed to an oil/water separator. Oil separated through this process will be disposed off site and the treated water will be combined with the cooling water discharged into the river from Units 6 and 7. The demineralizer regeneration waste is treated in the neutralization system. Once treated, this waste stream is discharged to the existing CCPP discharge channel to the San Joaquin River in accordance with the CCPP's NPDES Permit.

CONSTRUCTION AND OPERATION

Southern Energy Delta proposes to begin construction in mid-2001, and start operation of CCPP Unit 8 by mid-2003. The proposed project is estimated to cost between $240 and $290 million. During the 22-month construction period, approximately 285 construction workers will be employed. Operation of the CCPP Unit 8 will require 10 full time employees in addition to the existing CCPP workforce of 53 employees.

Southern proposes to operated CCPP Unit 8 as a merchant power facility, selling its energy via direct sales agreements and in the spot market via the California Power Exchange. Energy output and operational levels will vary according to demand in the deregulated California energy market. Electricity prices and operational levels will not be subject to California Public Utilities Commission regulation.

AIR QUALITY

Tuan Ngo, P.E.

INTRODUCTION

This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the Contra Costa Power Project (CCPP). Criteria air pollutants are those for which a state or federal standard has been established. They include nitrogen dioxide (NO_2), sulfur dioxide (SO_2), volatile organic compounds (VOC), carbon monoxide (CO), ozone (O_3) and its precursors (NO_2 and VOC), particulate matter less than 10 microns in diameter (PM10) and its precursors: NO_2, VOC, SO_x, and lead (Pb).

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

- whether the CCPP Unit 8 is likely to conform with applicable Federal, State and the Bay Area Air Quality Management District (District) air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations, section 1742.5 (b);
- whether the CCPPUnit 8 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, section 1742 (b); and
- whether the mitigation proposed for the CCPP Unit 8 is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, section 1744 (b).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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 a construction 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 regulations and has delegated to the District the implementation of the federal PSD, Non-attainment NSR, and Title V programs. The District implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations.

The CCPP's Unit 8 gas turbines are also subject to the federal New Source Performance Standards (NSPS). These standards include a NO_x emissions concentration of no more than 75 parts per million (ppm) at 15 percent excess oxygen (ppm@15%O2), and a SO_x emissions concentration of no more than 150 ppm@15%O2.

STATE

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 cause injury, detriment, nuisance, or annoyance to any considerate 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

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the applicant for the CCPP Unit 8, the District will prepare and present to the Commission a Determination of Compliance (DOC). The DOC will evaluate whether and under what conditions the proposed project will comply with the District's applicable rules and regulations, as described below. The Energy Commission staff will coordinate its air quality analysis with the District staff as they prepare the DOC, will review and comment on the Preliminary DOC to identify any issues of concern, and will incorporate the Final DOC recommended conditions of certification in its Final Staff Assessment.

The project is subject to the specific District rules and regulations that are briefly described below:

REGULATION 2

Rule 1 - General Requirements. This rule contains general requirements, definitions, and a requirement that an applicant submit an application for an authority to construct and permit to operate.

Rule 2 - New Source Review. This rule applies to all new and modified sources. The following sections of Rule 2 are the regulations that are applicable to this project.

- Section 2-2-301 - Best Available Control Technology (BACT) Requirement: This rule requires that BACT be applied for each pollutant which is emitted in excess of 10.0 pounds per day.

- Section 2-2-302 - Offset Requirement, Precursor Organic Compounds and Nitrogen Oxides. This section applies to projects with an emissions increase of 50 tons per year or more of organic compounds and/or NO_x. Offsets shall be provided at a ratio of 1.15 tons of emission reduction credits for each 1.0 ton of proposed project permitted emissions.
- Section 2-2-303 - Offset Requirements, Particulate Matter (TSP), PM_{10} and Sulfur Dioxide: If a Major Facility (a project that emits any pollutant greater than 100 tons per year) has a cumulative increase of 1.0 ton per year of PM_{10} or SO_2, emission offsets must be provided for the entire cumulative increase at a ratio of 1.0:1.0.

Emission reductions of nitrogen oxides and/or sulfur dioxide may be used to offset increased emissions of PM_{10} at offset ratios deemed appropriate by the Air Pollution Control Officer.

A facility that emits less than 100 tons of any pollutant may voluntarily provide emission offsets for all, or any portion, of their PM_{10} or sulfur dioxide emissions increase at the offset ratio required above (1.0:1.0).

- Section 2-2-606 - Emission Calculation Procedures, Offsets. This section requires that emission offsets must be provided from the District's Emissions Bank, and/or from contemporaneous actual emission reductions.

Rule 7-Acid Rain. This rule applies the requirements of Title IV of the federal Clean Air Act, which are spelled out in Title 40, Code of Federal Regulations, Part 72. The provisions of Part 72 will apply when EPA approves the District's Title IV program, which has not been approved at this time. The Title IV requirements will include the installation of continuous emission monitors to monitor acid deposition precursor pollutants.

REGULATION 6

Regulation 6 - Particulate Matter and Visible Emission. The purpose of this regulation is to limit the quantity of particulate matter in the atmosphere. The following two sections of Regulation 6 are directly applicable to this project:

- Section 301 - Ringelmann No. 1 Limitation: This rule limits visible emissions to no darker than Ringelmann No. 1 for periods greater than three minutes in any hour.
- Section 310 - Particulate Weight Limitation: This rule limits source particulate matter emissions to no greater than 0.15 grains per standard dry cubic foot.

REGULATION 9

Rule 1 - Limitations

- Section 301: Limitations on Ground Level Sulfur Dioxide Concentration. This section requires that emissions of sulfur dioxide shall not impact at ground level in excess of 0.5 ppm for 3 consecutive minutes, or 0.25 ppm averaged over 60 minutes, or 0.05 ppm averaged over 24 hours.

- Section 302: General Emission Limitation. This rule limits the sulfur dioxide concentration from an exhaust stack to no greater than 300 ppm dry.

Rule 9 - Nitrogen Oxides from Stationary Gas Turbines. This rule limits gaseous fired, SCR equipped, combustion turbines rated greater than 10 MW to 9 ppm@15%O2.

REGULATION 10

Rule 26 - Gas Turbines - Standards of Performance for New Stationary Sources. This rule adopts the national maximum emission limits (40 CFR, Part 60) which are 75 ppm NO_x and 150 ppm SO_2 at 15 percent O_2. Whenever any source is subject to more than one emission limitation rule, regulation, provision or requirement relating to the control of any air contaminant, the most stringent limitation applies.

SETTING

METEOROLOGY AND CLIMATE

The CCPP Unit 8, if approved, would be located in the Carquinez Strait region, which covers the areas surrounding the Carquinez Strait, and includes 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 summer, fall and winter. Sometimes during spring, 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 measured wind data are graphically represented as quarterly and annual wind roses in Appendix A. The data collection monitor is located approximately four miles northwest (upwind) from the proposed project. The District 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

AIR QUALITY Figure 1 summarizes the historical air quality data for the project location for particulate matter less than 10 microns (PM10), CO, SO_2, O_3, and NO_2. In **AIR QUALITY Figure 1**, the normalized concentrations 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. Because PM_{10} concentration data in the Antioch area are available for only five months in 1999, staff has used the PM_{10} concentrations collected at the nearest monitoring station, which is located at Bethel Island. One of the concerns raised by the community is that the PM_{10} data at

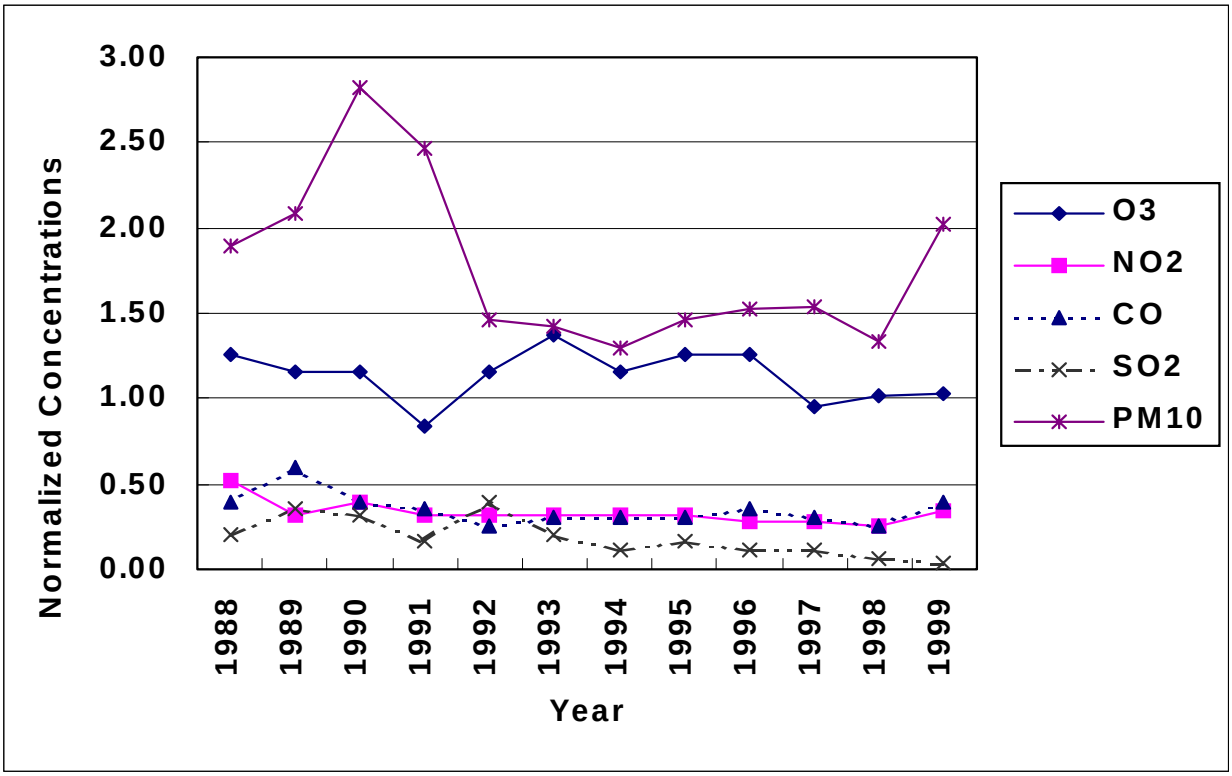
Bethel Island might not represent the PM_{10} condition at the Antioch area. Staff has compared the data, collected at the same period, from Bethel Island and Pittsburg monitoring stations and concluded that data from Bethel Island can be considered to be representative of the Antioch area. Detailed discussions of these findings are presented in a later portion of this section.

Following is a more in-depth discussion of ambient air quality conditions in the Antioch area for O_3, CO, NO_2, and PM_{10}.

OZONE

In the past 8 years, the Antioch area has experienced an average of four or five days per year with violations of the 1-hour state ambient air quality standard for ozone.

AIR QUALITY Figure 1
Normalized Maximum Short-Term Historical Air Pollutant Concentrations: 1988-1999



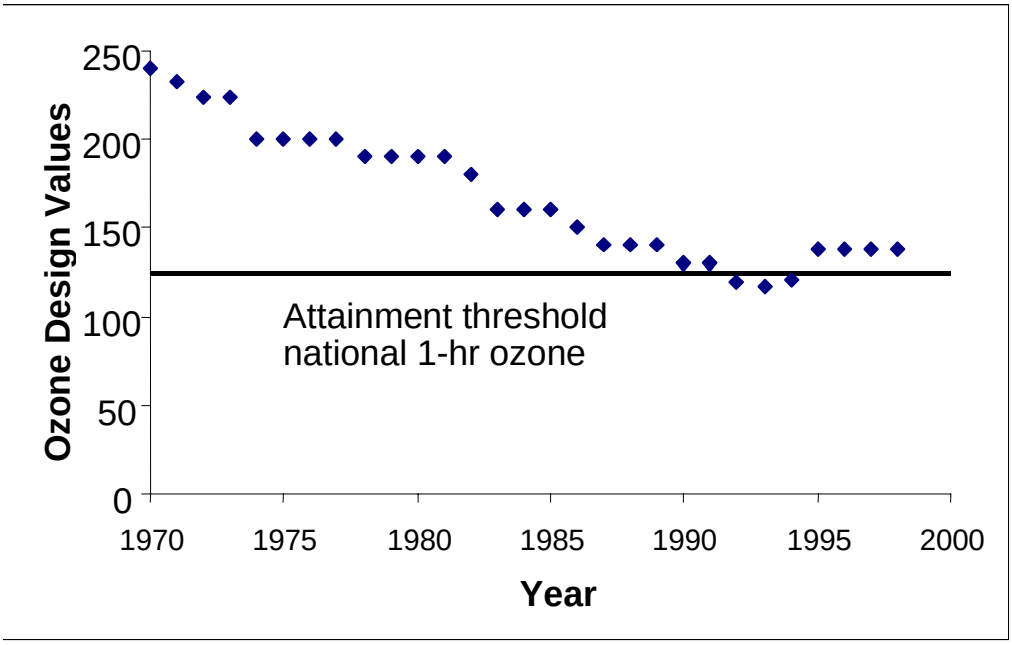
A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. For example, in 1997 the highest 24-hour average PM10 concentration measured in Bethel Island was 77 $\mu g/m^3$. Since the most stringent ambient air quality standard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

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 a steady stride toward attainment of the federal 1-hour ozone standard.

The exact reasons for the recent violations of the federal ozone standard shown in **AIR QUALITY Figure 2** are not known. The District developed its 1997 State Implementation Plan (SIP) to identify a strategy to bring the air basin back to attainment of the federal 1-hour ozone standard (BAAQMD, 1997). The District will conduct additional studies 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 an equitable and effective air quality management strategy 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

While the maximum hourly ozone concentrations are important, they do not reflect the geographical and temporal extent of ozone levels. The population weighted ozone exposure level, calculated from the area population, 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, 1997).

CARBON MONOXIDE (CO)

The highest CO concentration levels measured in Pittsburg and Antioch are at least 50 percent 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, and buses) 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 Antioch, 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 Antioch and/or adjacent areas.

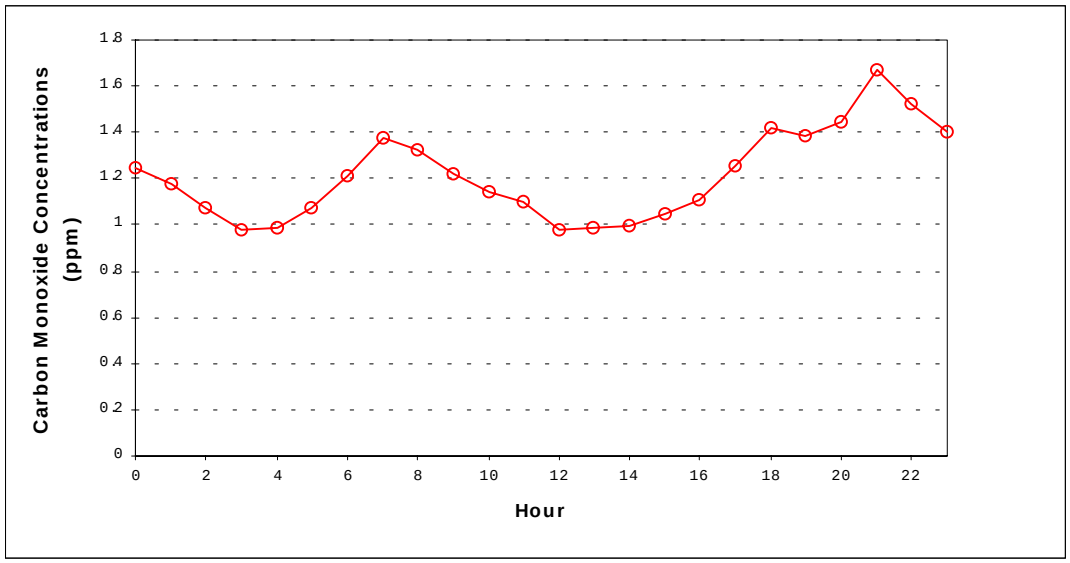
NITROGEN DIOXIDE (NO_2)

NO_2 levels in Antioch are no more than one-third of the most stringent NO_2 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 NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. This is why the highest concentrations of NO_2 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 NO_2 are high but the relatively high temperatures and windy conditions (atmospheric unstable conditions) disperse pollutants, preventing the accumulation of NO_2 to levels approaching the 1-hour ambient air quality standard.

PARTICULATE MATTER (PM)

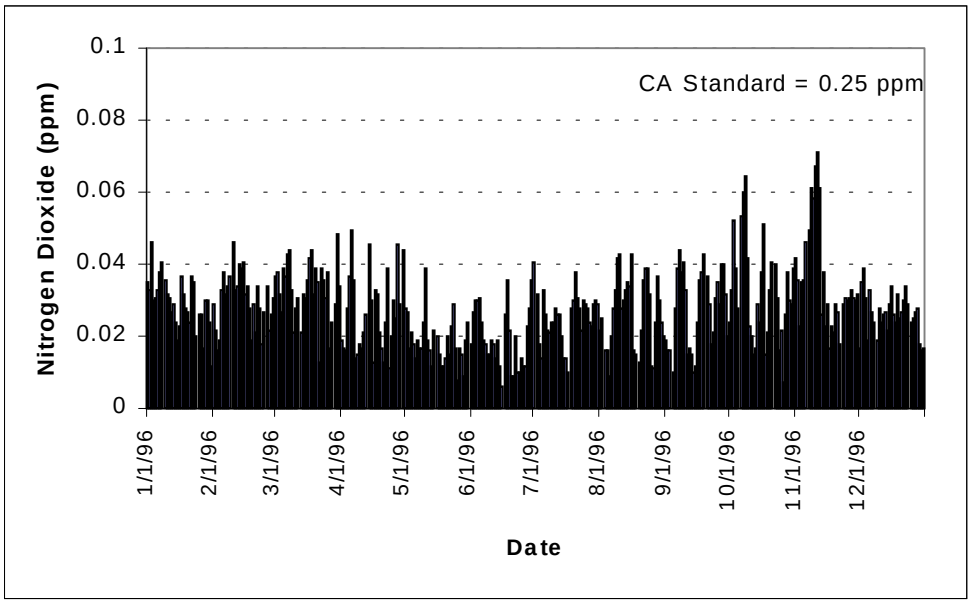
As shown in **AIR QUALITY Figure 1**, PM10 concentrations measured at the Bethel Island monitoring station show a declining trend in the last ten years. The same trend has been observed at other sites at Contra Costa County, including the City of Concord. The highest PM10 concentrations are measured in the winter. During wintertime high PM10 episodes, the contribution of ground level releases to ambient PM10 concentrations is disproportionately high. For example, wood smoke contributes approximately 47 percent of the PM10 mass in San Jose, while the contribution at Pittsburg may be on the order of 30 percent (Chow et al. 1995). The contribution of wood smoke particles to the PM2.5 concentrations may be even higher, considering that most of the wood smoke particles are smaller than 2.5 microns.

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



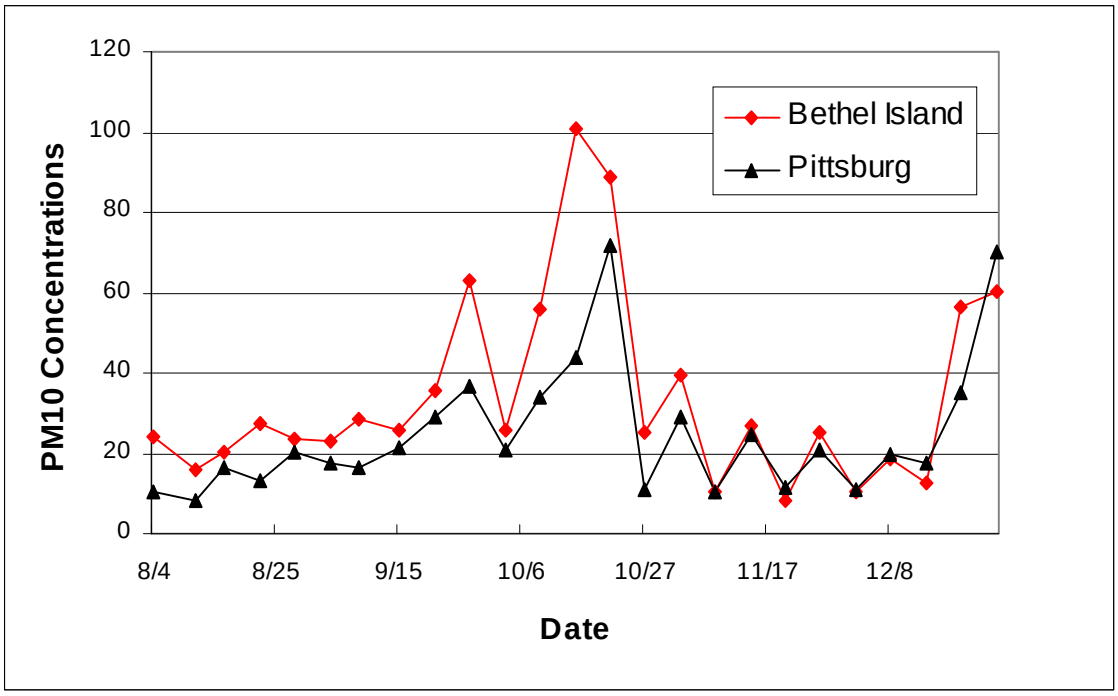
Source: ARB

AIR QUALITY Figure 4
Maximum Daily 1-hour average NO_2 Concentrations measured in 1996: Pittsburg Station



Source: ARB,1998a

Air Quality Figure 5
PM10 Concentrations at Bethel Island and Pittsburg
Measured Between August 1999 Through December 1999



Source: ARB

One issue that has been raised by the public is the lack of a PM10 monitoring station in Pittsburg. The concern is that PM10 concentrations collected in Bethel Island may not represent the existing ambient conditions in the Antioch area. To address this issue, staff compared the PM10 concentrations measured at Bethel Island to those measured at the Pittsburg monitoring station during the same time frame (August to December, 1999). As **Air Quality Figure 5** shows, PM10 concentrations in Pittsburg consistently correspond to and were generally lower than those measured at Bethel Island. The number of the state's PM10 violations in 1999 (when PM10 concentrations were measured to be higher than 50 µg/m3) measured at Bethel Island was four, and the number of violations measured in Pittsburg was two. Thus, due to the lack of long-term measured PM10 data in the Antioch area, Bethel Island's PM10 data can be alternatively used without affecting the outcome of staff's analysis.

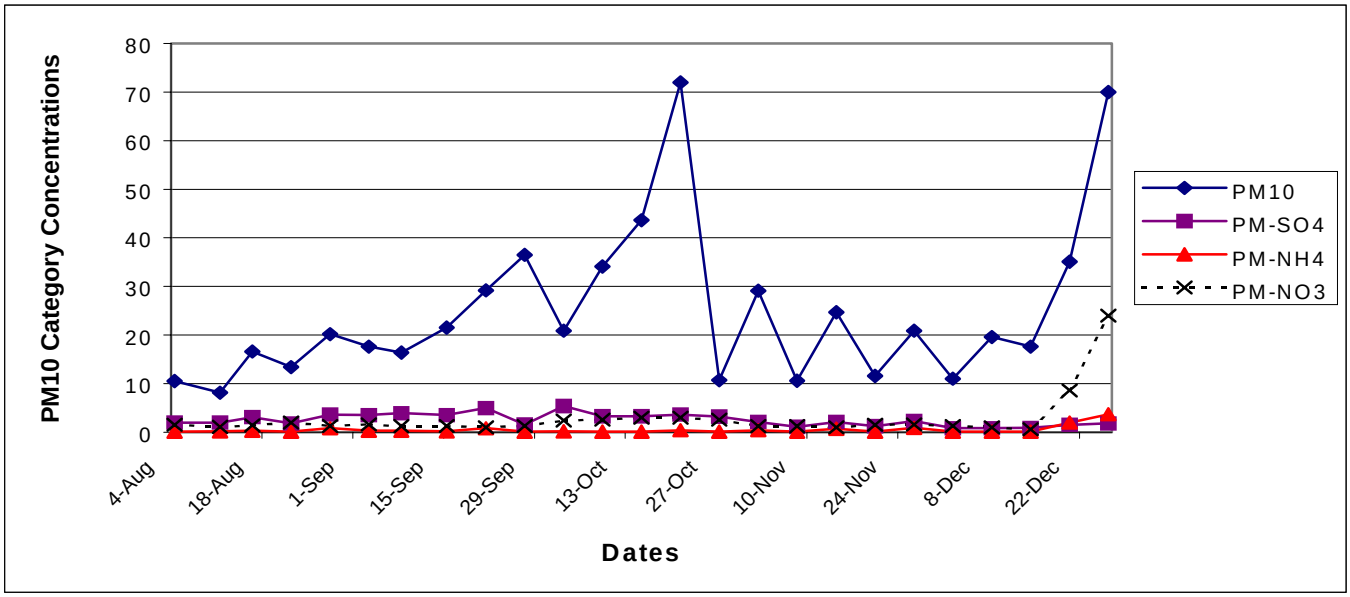
NITRATES AND SULFATES

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** shows that the nitrate ion concentrations during the winter time are a significant portion of the total PM10 and

could be an even higher contributor to particulate matter of less than 2.5 microns (PM2.5).

PM sulfate (mainly ammonium sulfate) is formed in the atmosphere from the oxidation of SO2 and subsequent neutralization by ammonia in the atmosphere. The oxidation of SO2 depends on many factors, which includes: the availability of hydroxyl (OH), hydroperoxy (HO2) and Methylperoxy (CH3OH), and humidity. **AIR QUALITY Figure 6** shows that the sulfate portion can range from 5 to 25 percent of the total PM10 measured.

AIR QUALITY Figure 6
PM10 Portions of Sulfates, Nitrates and Ammonium
Measured at Pittsburg Monitoring Station in 1999 (ARB)



AIR QUALITY Figure 6 also shows that the annual highest PM10 measurement happened on December 26, 1999, a Sunday after a major holiday. This limited data indicated that the highest PM10 concentration measured in the Antioch area might not be the result of industrial activities. Staff suspects that motor vehicles, domestic activities during the holiday, and perhaps limited air movement during this period might have caused such a spike of PM10.

PROJECT EMISSIONS

CONSTRUCTION ACTIVITIES

The construction of the proposed project will last approximately 22 months, and generally consists of two major activities; site preparation, and construction and installation of major equipment and structures. The applicant provided estimated peak hourly, monthly and annual construction equipment exhaust emissions (Southern, 2000a). These estimated construction emissions are identified in **AIR**

QUALITY Table 4. Staff reviewed the applicant's estimated construction emissions, and believes that they are accurate.

Emissions from construction equipment exhausts, such as vehicles and internal combustion engines, are also expected during the project construction phase. A small amount of hydrocarbon emissions may also occur as a result of the temporary storage of petroleum fuel at the site.

AIR QUALITY Table 4
Construction Emissions

Construction Emission Sources	NOx	SO2	VOC	CO	PM10
Facility Construction					
Hourly (lbs/hr)	43	4	4	15	4
Monthly (lbs/mo.)	8,600	800	800	3,000	800
Annual (tons/yr)	36	3	4	13	4
Fugitive Dust (tons/yr)					21

Sources: Southern, 2000a. AFC, Section 8.1.2.1 and Tables 8.1-8

PROJECT OPERATION

The project will be built with the following major components:

- Two natural gas fired, General Electric (GE) Frame 7FA combustion turbines,
- Two heat recovery steam generators (HRSG),
- One steam turbine,
- One cooling tower, and
- One emergency diesel fuel water pump to be used in case of fire.

The turbines will be operating in combined cycle mode to produce approximately 530 MW of electricity. The facility is expected to be between 75 to 85 percent available and can operate up to 8,626 hours per year. Each HRSG will be equipped with a duct burner to increase steam production. The applicant proposes to equip each combustion turbine with a dry low NOx combustion technology and a selective catalytic reduction (SCR) system in the HSRG, which together limits the NOx emissions to 2.5 ppm@15% O2. To control the CO and VOC emissions, the applicant proposes to equip each combustion turbine/HRSG with a high-temperature oxidation catalyst system, which limits the CO emissions to 6 ppm and the VOC emissions to 2 ppm (Southern 2000a, AFC Table 8.1-26).

The applicant is requesting that the project be analyzed with the assumption of 28 cold-starts, 83 hot-starts and 111 shutdowns for both turbines each year (Southern 2000a, AFC Section 8.1-6). A hot start would occur after an overnight turbine shutdown. The duration of a hot start is relatively short, approximately half an hour. A cold start takes considerably longer, as much as three hours. However, this type of start-up would be very rare, occurring only after the turbines have been under

extended shutdown, such as the annual maintenance inspection that the manufacturer may require.

The facility's hourly, daily and annual emissions were estimated based on information on the GE 7F turbines provided by Southern, and are presented in **AIR QUALITY Tables 5, 6 and 7**.

The cooling tower is equipped with drift eliminators that limit the drift rate to 0.0005 percent. The cooling tower is designed to circulate approximately 125,000 gallons of water per minute (gpm). The cooling tower emissions are estimated using this circulation rate, a drift rate of 0.0005 percent and a 5,666 ppm total dissolved solid content of the cooling tower make up water.

The daily emissions from the project are shown in **AIR QUALITY Table 6**. The table shows different operating scenarios, and the resultant emissions, including CTG startup (cold and hot), shutdown, and steady state operation. Staff has estimated that the emergency generator would add approximately four pounds of NOx emissions each week during its 30 minutes testing. This amount of emissions is relatively insignificant to change the impact of the project. The project's typical daily emissions are presented in the last row of the table.

AIR QUALITY Table 5
Project Hourly Emissions
(pound per hour [lb/hr] except where noted)

Operational Profile	NOx	SO2	PM10	VOC	CO
Cold Start-up (total emissions for 4 hours)	904	28	77	218	1,980
Hot Start-up (total emissions for 90 min.)	378	10	27	52	582
Shutdown (total emissions for 30 min.)	118	2	7	11	146
Steady State @ 100% load	40	12	39	11	58
Cooling Towers	--	--	1.78	--	--
Total Facility Emissions at Steady State (lbs/hr)	40	12	41	11	58

Source: Southern, 2000a. AFC Tables 8.1-9, 8.1-10 and Southern, 2000o. Data Responses.

AIR QUALITY Table 6
Project Daily Emissions
(pound per day [lb/day])

Operational Profile	Nox	SO2	PM10	VOC	CO
2 turbine sequential cold-start, hot start and steady state operation (maximum daily)	1,990	300	624	468	3,600
2 turbine 24-hr steady state full load operation	960	300	312	270	1,400
Cooling towers operating 24-hr	--	--	43	--	--
Maximum steady state daily operation: 2 turbines and cooling towers	960	300	360	270	1,400

Source: Southern, 2000a. AFC Tables 8.1-9 and 8.1-10, and Southern, 2000o. Data Responses.

AIR QUALITY Table 7
Project Annual Emissions
(tons per year [TPY])

Operational Profile	NOx	SO2	PM10[1]	VOC	CO
28 cold starts, 83 hot starts, 111 shut downs, and 8,626 hr steady state[2]	174	48	112	47	260
Steady State for 8,626 hrs per year	172	48	112	48	252

Notes:
[1] Including cooling tower emissions.
[2] Assume 4 hr for each cold start, 1.5 hr for each hot start, 8,626 hr steady state, and 8,626 hours cooling towers operation.
Source: Southern, 2000a. AFC Tables 8.1-9 to 8.1-11, and Southern, 2000o. Data Responses.

INITIAL COMMISSIONING

The initial commissioning refers to a period of approximately 60 days prior to beginning commercial operation when the combustion turbines will undergo initial test firing. During this commissioning phase, the project may operate at a low-load for a long period of time for fine-tuning. The District typically requires that each activity of the commissioning period be planned carefully, and that all NOx and CO emissions and the time of commissioning be optimized to lessen the emissions from the turbines, duct burners and HRSG. It should also be noted that the NOx and CO emissions during the commissioning period are not higher than emissions during normal start up of the facility; therefore, staff expects no new impacts will be a direct result of the emissions during the commissioning period. All criteria air contaminant emissions during the commissioning period will be counted toward the annual emission limits; thus there is an incentive for the applicant to limit the commissioning period to the shortest time possible.

CLOSURE

Eventually the CCPP 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 will cease and thus all impacts associated with those emissions will no longer occur. The only other expected emissions will be fugitive particulate emissions from the dismantling activities. These activities will be short term and will create fugitive dust emissions levels much lower than those created during the construction of the project. Nevertheless, staff recommends that a facility closure plan be submitted to the Energy Commission Compliance Project Manager to demonstrate compliance with applicable District Rules and Regulations during closure activities.

AMMONIA EMISSIONS

Due to the large combustion turbines used in this project and the need to control NOx emissions, significant amounts of ammonia will be injected into the flue gas stream as part of the SCR system. Not all of this ammonia will mix with the flue gases to reduce NOx; a portion of the ammonia will pass through the SCR and will be emitted unaltered, out the stacks. These ammonia emissions are known as ammonia slip. The applicant has committed to an ammonia slip no greater than 5 ppm (Southern, 2000a. AFC Table 8.6-2 and Southern, 2000o). On a daily basis,

a 5 ppm slip is equivalent to approximately 1,400 pounds of ammonia emitted into the atmosphere. In actual operation, staff expects that an ammonia slip concentration of 1 ppm or less for the proposed facility. At this concentration, the ammonia emissions are typically 200 to 300 lb/day.

IMPACTS

Air dispersion models provide a means of predicting the location and magnitude of the air contaminant impacts of a new emissions source at ground level. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$). They are an estimate of the concentration of the pollutant emitted by the project that will occur at ground level.

The applicant has used an EPA-approved ISCST3 model to estimate the impacts of the project's estimated NO_x, PM_{10}, CO and SO_x emissions resulting from project construction and operation. A description of the modeling analyses and results are provided in Section 8.1.2.3 and Tables 8.1-15 to 8.1-17 of the AFC (Southern, 2000a). Staff added the applicant's modeled impacts to the available highest ambient background concentrations measured during 1993 through 1998 at the Pittsburg monitoring station. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or contribute to an existing violation.

Inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the project site.

CONSTRUCTION IMPACTS

The results of the project construction impacts analyses are presented in **AIR QUALITY Table 8**. The modeling analyses included both the fugitive dust and vehicle exhaust emissions, which include PM_{10}, NO_x and CO. In **AIR QUALITY Table 8**, the first and second columns list the air contaminant, i.e., NO_2, PM_{10}, and CO, and the averaging time for each air contaminant analyzed. The third and fourth columns present the project emission impacts and the highest measured concentration of the criteria air contaminants in the ambient air (background), respectively. The fifth column presents the total impact, i.e., the sum of project emission impact and background measured concentration. As indicated in **Air Quality Table 8**, the project construction activities would further exacerbate existing violations of the state 24-hour PM_{10} standard. In reviewing the modeling output files, the project's construction impacts are expected to occur over an area at the project's property fence lines where the general public does not have access.

The predicted impacts are high for a number of reasons. First, the model itself calculates impacts that are very conservative, usually exceeding actual impact levels by a considerable margin. For example, the emissions inputs to the model were from the highest monthly emissions assumed during the 22-month construction period. During the other months of construction work, considerably less emission generating equipment will be used and thus the impacts will be even lower. In addition, staff believes that the impacts from the construction of the project can be further reduced with the implementation of the staff recommended construction mitigation measures, as discussed in the **Mitigation** section.

AIR QUALITY Table 8
Facility Construction Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impacts ($\mu g/m^3$)	Standards ($\mu g/m^3$)	Percent of Standard
NO2	1-hr.	330	130	460	470	98%
CO	8-hr.	450	3,700	4,150	10,000	42%
PM10	24-hr.	170	80	250	50	500%

Source: Southern, 2000a. AFC Table 8.1-15

OPERATION IMPACTS

Southern provided staff with a modeling analysis of the project's operating emissions impacts from directly emitted pollutants, which they believe demonstrates that no violations of ambient air quality standards will be caused by the operation of the project. Staff reviewed the applicant's modeling analysis and concludes that it is adequate.

AIR QUALITY Table 9 presents the results of the modeling analysis using worst case hourly emissions, which include turbine start-up and cooling tower emissions as presented in **AIR QUALITY Table 5**. **AIR QUALITY Table 9** shows that, with the exception of PM10, CCPP Unit 8 would not cause any new violations of any applicable air quality standard. As for PM_{10}, staff believes that the project itself will contribute to existing violations of the state 24-hour PM_{10} air quality standards. Therefore, the project's PM_{10} emission impacts are significant. It should also be noted that the typical project emission impacts representing normal project operation, not including start ups, will be less than the values shown in **AIR QUALITY Table 9** because the project emissions during normal operation will be lower than the emissions used in the modeling analyses.

AIR QUALITY Table 9
Worst Case Facility Emission Impacts on Ambient Air Quality

Pollutants	Avg. Period	Impacts(μg/m^3)	Background (μg/m^3)	Total Impacts (μg/m^3)	Standard (μg/m^3)	Percent of Standard
NO2	1-hour	95	130	225	470	50%
	Annual	0.2	28	28	100	30%
SO2	1-hour	16	155	171	655	25%
	24-hour	2	42	44	105	40%
CO	1-hour	190	7,800	8,000	23,000	40%
	8-hour	25	3,650	3,700	10,000	40%
PM10	24-hour	5	80	85	50	170%
	Annual	0.2	22	22	30	80%

Notes: All short-term (1-hour) ambient air quality impacts have been modeled as the impacts caused by the emissions during start-ups. All long-term (8-hour, 24 hour and annual) impacts are the impacts from the project caused by normal operations.
Source: Southern, 2000o. Data Responses.

CUMULATIVE IMPACTS

Staff's cumulative impact assessment is composed of two types of analyses. The first is an analysis of the project's directly emitted pollutants along with similar emissions from other foreseeable future projects that are currently under construction, or are currently under District review. The second is a discussion of the project's potential contribution to the formation of secondary pollutants, namely ozone and PM10.

DIRECTLY EMITTED POLLUTANT IMPACTS

To evaluate the direct emission impacts of the CCPP along with other probable future projects, staff needs specific information that is included when project applicants file an application with the District for a permit. Projects located up to six miles from the proposed facility usually need to be included in the analysis. Staff assumes that impacts from projects beyond six miles would not effect the modeling analysis on a cumulative basis. Staff received information from the District, which indicates that there are five sources that need to be included in the cumulative impact analysis. These sources are the Los Medanos, Delta Energy, Bio-Energy, the existing Contra Costa boilers 7, 9 and 10, and the existing Pittsburg facilities. The applicant submitted a cumulative impact analysis for NO2 and PM10 (Southern, 2000p), which includes all the aforementioned sources and their emissions. Staff believes that the cumulative impacts for other criteria pollutants such as CO and SO2 are relatively minor, and therefore has not required such analysis. **AIR QUALITY Table 10** presents the results of the cumulative impacts analysis. The table is organized to show the location of the point where maximum impact is expected. The point of maximum impact is coordinated by the universal transverse mercator (UTM) in the true north and true east directions. The UTM north and east are depicted in the top two rows for each point of maximum impact of the NO2 1-hour, annual, and the PM10 24-hour and annual ambient air quality standards.

Subsequent values under each of the air quality standard's column are the impacts from each individual sources (described above) as seen by the model. The sum of each source impact as seen by the model at the point of maximum impact is totaled. This result is added to the background concentration, which then will be compared to the most stringent ambient air quality standard to verify whether significant impacts could occur as CCPP Unit 8 being built and operated.

AIR QUALITY Table 10
Summary of CCPP Cumulative Impacts on the Area

		NO2		PM10	
		1-hour	Annual	24-hour	Annual
Location of maximum impact	UTM North	**4,208,114**	**4,207,000**	**4,207,000**	**4,207,000**
	UTM East	**609,097**	**594,000**	**593,000**	**594,000**
Contra Costa Unit 8 ($\mu g/m^3$)		93	0.04	0	0.02
Los Medanos ($\mu g/m^3$)		0	0.03	0	0.02
PG&E Pittsburg ($\mu g/m^3$)		0	0.11	0	0.01
Contra Costa Units 7,9,10 ($\mu g/m^3$)		0	0.05	0	0.01
Delta Energy Center ($\mu g/m^3$)		0	0.05	0	0.03
Bio Energy LLC ($\mu g/m^3$)		0	2.84	4	0.50
Cumulative Impacts ($\mu g/m^3$)		93	3.11	4	0.60
Background ($\mu g/m^3$)		134	28.20	77	22
Total Cumulative Impacts ($\mu g/m^3$)		***227***	***31.31***	***81***	***22.6***
Ambient Air Quality Standards ($\mu g/m^3$)		470	100	50	30
Percent of Ambient Air Quality Standards		48%	31%	162%	75%

Source: Southern, 2000p. October 13, 2000 Response to Data Requests.

As seen from **AIR QUALITY Table 10**, the cumulative impacts of CCPP and all other potential sources did not cause any new violation of the 1-hour and annual NO2 and the annual PM10 standards. The proposed CCPP and other potential sources cumulatively add 4 $\mu g/m^3$ of PM10 impact to the existing violation of the state 24-hour PM10 standard. Therefore, the proposed project's cumulative PM10 impact is significant. It should also be noted that the proposed CCPP Unit 8 and other sources' maximum cumulative impact for the 1-hour NO2 is directly at the property fence line located at the south east of the PG&E switchyard. For the annual NO2 and the 24-hour and annual PM10 standards, the point of maximum impact is at the south of the town of Pittsburg, which is approximately 6 miles west of the proposed CCPP. The cumulative impacts for the 24-hour PM10 and the annual NO2 and PM10 were heavily influenced by the Bio Energy LLC facility.

SECONDARY POLLUTANT IMPACTS

OZONE IMPACTS

The proposed project's gaseous emissions, primarily NO_x and VOC, can contribute to the formation of ozone. There are air dispersion models that can be used to quantify ozone impacts, but they are only appropriate for use in regional air quality planning efforts where numerous sources are input into the modeling to determine the regional ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NO_x and VOC emissions to ozone formation, staff believes that the emissions of NO_x and VOC from the CCPP Unit 8 do have the potential to contribute to higher ozone levels if not mitigated. The contribution of NO_x and VOC to the regional ozone problem is not considered to be significant because the applicant has proposed to purchase emission reduction credits of NO_x and VOC to fully trade off for the emission increases by the proposed facility.

SECONDARY PM10 IMPACTS

The project's NO_x, VOC, NH3 and SO_x emissions can contribute to the formation of secondary PM10, namely organic condensable nitrates, sulfates particulate matter.

Not all hydrocarbons can form secondary PM_{10}. Hydrocarbons with six or less carbon in the chain will not participate in the formation of the carbon based PM_{10}. The VOC emissions from CCPP Unit 8 will be in the form of unburned natural gas, which is mostly methane and ethane, which contain only one to two carbon atoms. Thus the turbine exhaust is not expected to emit any significant amount of VOC that can participate in the formation of secondary PM_{10}.

Concerning ammonium nitrate, staff believes that the project's ammonia emissions from CCPP Unit 8 have the potential to contribute to the ammonium nitrate emissions, which may worsen the violation of the PM_{10} standard. Available research (Spicer, 1982) indicates that the conversion of NO_x to nitrate is approximately between 10 to 30 percent per hour in a polluted urban area where ozone and ammonia are present in sufficient amount to participate in the reaction. Assume a 30 percent NOx to nitrate conversion rate and a linear extrapolation of the project's PM_{10} modeling results, staff has estimated that the NO_x to nitrate impact from the project can be at a maximum 2 $\mu g/m^3$. Because the area is non-attainment for the state 24-hr PM_{10} standard, the ammonium nitrate contribution, although small, is significant without providing emission reductions as offsets.

Concerning sulfates as PM_{10}, staff believes that CCPP Unit 8 will contribute to sulfate levels in the area, although in a very small amount. Currently, there are no agency (EPA or CARB) recommended models or procedures for estimating sulfate formation. Nevertheless, studies during the past two decades have provided data on the oxidation rates of SO2. The data from these studies can be used to approximate the conversion of SO2 to particulate (typically about 0.01 to 1 percent per hour) with Gaussian dispersion models such as ISCST3. The model can be performed with and without chemical conversion (decay factor) and the difference

corresponds to the amount of SO2 that is converted to PM10. Because the project uses natural gas as fuel, very little SO2 emissions will be emitted; thus the SO2 to sulfates conversion modeling is not performed or needed. Staff still recommends that offsets, in the form of emission reductions, should be provided to lessen the project's PM10 contribution to the ambient air to the level of insignificance.

VISIBILITY IMPACTS

Southern has provided, as part of their PSD application to the District, a visibility impact analysis, which shows that the project is not expected to exceed any significant visibility impairment increment inside any nearby PSD Class I areas (Southern, 2000a). Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective.

APPLICANT'S PROPOSED MITIGATION

CONSTRUCTION PHASE

The applicant proposed that it would implement Best Available Control Measures (BACM) during construction of the project. These measures include the use of water or chemical stabilizers to disturbed areas. In addition, Southern will maintain the construction emissions so that fugitive emissions will be limited by District rules to a maximum 20 percent opacity during any three minute span. Because the construction emissions are short-term, the applicant has not proposed any emission reduction credits to offset the new emissions.

OPERATION PHASE

Southern proposes to mitigate the emission increases from the proposed facility using a combination of clean fuel, emission control devices and emission reduction credits. The applicant proposes to use a combination of dry low-NOx combustion design, Selective Catalytic Reduction (SCR) and high-temperature CO oxidation catalyst technology for each of the combined cycle turbine trains to minimize its NOx and CO emissions. The proposed control devices are designed to maintain the turbine/duct burner emissions to 2.5 ppm NOx, 6 ppm CO, and 2 ppm VOC (Southern, 2000a). The ammonia slip emissions (from unreacted ammonia in the SCR) will be maintained at 5 ppm or less. Natural gas will be the only fuel used, which will minimize the project's PM10 and SOx emissions. In addition, the applicant will equip the cooling towers with high efficiency drift eliminators that limit the drift rate to 0.0005 percent. The drift eliminators will minimize the cooling tower's PM10 emissions. Below is a brief description of the emission control technologies that CCPP Unit 8 will employ.

DRY LOW-NOX COMBUSTORS

Over the last 20 years, combustion turbine manufacturers have focused their attention on limiting the NOx formed during combustion. Because of the expense and efficiency losses due to the use of steam or water injection in the combustor cans to reduce combustion temperatures and the formation of NOx, CTG manufacturers are presently choosing to limit NOx formation through the use of dry

low-NOx technologies. In this process, firing temperatures remain somewhat low, thus minimizing NOx formation, while thermal efficiencies remain high.

FLUE GAS CONTROLS

To further reduce the emissions from the combustion turbines before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed in the HRSG. The applicant is proposing two catalyst systems: a selective catalytic reduction system (SCR) to reduce NOx, and an oxidizing system to reduce CO and VOC.

SELECTIVE CATALYTIC REDUCTION

Selective catalytic reduction refers to a process that chemically reduces NOx by injecting ammonia into the flue gas stream, over a catalyst, in the presence of oxygen. The process is termed selective because the ammonia reducing agent preferentially reacts with NOx rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures, which may vary with catalyst designs. Flue gas temperatures from a combustion turbine typically range from 950 to 1100°F.

Catalysts generally operate between 600 to 750°F (ARB 1992), and are normally placed inside the HRSG where the flue gas temperature has cooled. At temperatures lower than 600°F, the ammonia reaction rate may start to decline, resulting in increasing ammonia emissions, called ammonia slip. At temperatures above about 800°F, depending on the type of material used in the catalyst, damage to some catalysts can occur. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or a noble metal are also used. These newer catalysts (versus the older alumina-based catalysts) are resistant to fuel sulfur fouling at temperatures below 770°F (EPRI 1990).

Regardless of the type of catalyst used, efficient conversion of NO_x to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream. Also, the catalyst surface has to be large enough to ensure sufficient time for the reaction to take place.

The applicant proposes to use a combination of dry low-NO_x combustor and an SCR system to produce a maximum NO_x concentration exiting the HRSG stack of 2.5 ppm, corrected to 15 percent excess oxygen averaged over a 1-hour period.

OXIDIZING CATALYST

To reduce the turbine CO and VOC emissions, the applicant proposes to install an oxidizing catalyst similar in concept to catalytic converters used in automobiles. The catalyst is usually coated with a rare metal, such as platinum, which will oxidize unburned hydrocarbons and CO to water vapor and carbon dioxide (CO2). The CO catalyst is proposed to limit the CO concentrations to 6 ppm at 15 percent O2.

COOLING TOWER

To limit the particulate emissions, drift eliminators are installed in the cooling tower to capture the water droplets. The applicant intends to use drift eliminators on the cooling tower with a design efficiency of 0.0005 percent. This is a very high level of efficiency for cooling tower drift eliminators.

OFFSETS

The proposed CCPP Unit 8 facility is required by the BAAQMD to provide offsets on an annual basis (tons per year (tpy)) for NO_x, VOC, and PM10 as shown in **AIR QUALITY Table 11**. The applicant has purchased emission reduction credits, in the form of District issued banking certificates, from sources of offsets located in the Antioch area and a very small portion of SO2 (0.17 tpy) from another source in San Leandro. Banking certificate #693, in the amount of 200.5 TPY of NO2, 53.6 TPY of VOC, and 321.9 TPY of SO2, was issued to Gaylord Container in Antioch for the shut down of boilers at the facility. Certificate # 694, in the amount of 14.53 TPY of SO2, was issued to the PG&E Avon-Martinez facility due to improvement of their equipment at the facility. Certificate #695, in the amount of 0.17 TPY of SO2, was issued to Hudson ICS in San Leandro due to improvement of equipment at their facility. In total, as presented in **AIR QUALITY Table 11**, 200.5 TPY of NO2, 53.6 TPY of VOC, and 336.6 TPY of SO2 are proposed by the applicant to mitigate impacts caused by the proposed CCPP Unit 8.

The applicant has proposed the use of inter-pollutant offsets, i.e., use emission reduction credits of SO2 to trade for the project's PM10 emissions. The applicant has proposed a "3 to 1 ratio," i.e., for every pound of new PM10 emissions from the proposed facility, three pounds of SO2 are purchased to offset the increase. It should be noted in the Pittsburg District Energy Facility project case (now Los Medanos), the District required an inter-pollutant offset ratio of 4 pounds of SOx for every pound of new PM10 emissions. The District has changed their position, and starting with the Delta Energy project has required an offset ratio of 3 pounds SOx for every pound of new PM10 emissions. Thus the applicant's proposed inter-pollutant trade off ratio is consistent with the current District policy.

AIR QUALITY Table 11
Maximum Annual NO2, VOC, and PM10 Emissions and Offsets

Pollutant	New Emissions (tpy)	Offset Ratio[1]	Offsets Required (tpy)	Proposed Offsets (tpy)
NO2	174	1.15:1	200	***200*** (Cert. #693-Gaylord Container-Antioch)
VOC	47	1:1	47	***54*** (Cert. #693-Gaylord Container-Antioch)
PM10	112	3:1[2]	337	***321.9*** (Cert.#693-Gaylord Container-Antioch) ***14.53*** (Cert.#694-PG&E-Avon/Martinez) ***0.17*** (Cert.#695-Hudson ICS-San Leandro)

Notes: 1. Offset ratio as required by the BAAQMD.
2. Proposed 3:1 SO2 for PM10 inter-pollutant offset ratio (Southern, 2000o. Data Responses).

ADEQUACY OF PROPOSED MITIGATION MEASURES

CONSTRUCTION PHASE MITIGATION

As mentioned earlier in the impact section, the construction of the project will cause PM10 emissions that will add to the existing violations of the ambient PM10 air quality standard. Therefore, the project PM10 emission impacts due to construction of the project is significant. Staff recommends that the following specific mitigation measures be implemented during construction of the facility to reduce the short-term impacts of NO2 and PM10 to a level of less than significance.

Staff recommended construction control measures are listed below:

- Frequent watering of unpaved roads and disturbed areas (at least twice a day).
- Limit speed of vehicles on the construction areas to no more than 10 MPH.
- Employ tire washing and gravel ramps prior to entering a public roadway to limit accumulated mud and dirt deposited on the roads.
- Treat the entrance roadways to the construction site with soil stabilization compounds.
- Place sandbags adjacent to roadways to prevent run-off to public roadways.
- Install windbreaks at the windward sides of construction areas prior to the soil being disturbed. The windbreaks shall remain in place until the soil is stabilized or permanently covered.
- Employ dust sweeping vehicles at least twice a day to sweep the public roadways that are used by construction and worker vehicles.
- Sweep newly paved roads at least twice weekly.
- Limit on equipment idle times (no more than fifteen minutes).
- Employ electric motors for construction equipment when feasible.
- Apply covers or dust suppressants to soil storage piles and disturbed areas that remain inactive over two weeks.
- Pre-wet the soil to be excavated during construction.
- Employ oxidizing soot filters on all large suitable off-road construction equipment with an engine rating of at least 100 bhp.

OPERATIONAL PHASE MITIGATION

The project emissions will be fully offset, and will be built using BACT (clean burning using natural gas, SCR and CO oxidation catalyst systems) in accordance with the District NSR. The applicant has proposed an adequate amount of emission reduction credits from the local area to offset the new NOx, VOC, SO2 and PM10 emissions from the proposed facility. The project will not cause new violations of

any NO2, SO2, or CO ambient air quality standards, and therefore, its NOx, SOx and CO emission impacts are not significant.

COMMUNITY CONCERNS

During various workshops, staff has received many comments from the public, which staff is attempting to respond to as follows:

1. The project should be evaluated using local PM10 Air Quality Data

The public has concerns that the available PM10 air quality data were collected at the Bethel Island monitoring station, which is located about ten miles from the project site, may not be representative of the area.

Staff Response:

Staff has not been able to obtain any long term PM10 air quality data in the Pittsburg/Antioch area. However, the District staff believes that the PM10 air quality in the Pittsburg/Antioch area is actually slightly *better* than the Bethel Island area; therefore, the use of Bethel Island data is more conservative in assessing the project air quality impacts. Staff has located PM10 air quality data that were collected at the Pittsburg monitoring station for a few months in 1999. In Figure 5 of the Setting Section, staff compared these data with those collected at the Bethel Island station, and found that the PM10 concentrations in Pittsburg/Antioch area were slightly lower than those of Bethel Island. In addition, the number of PM10 violations in Pittsburg is half the number of violations measured at the Bethel Island. Therefore, the use of Bethel Island air quality data is acceptable and will not affect the outcome of the staff analysis.

2. The project should be evaluated for impacts on the PM2.5 standard

The public has requested that the CCPP project should be evaluated for PM2.5 impacts similar to the staff analysis in the Pittsburg District Energy Facility project (now Los Medanos).

Staff Response:

Throughout the staff analysis, staff has referred to all particulate matter emissions and offsets as PM10 (particulate matter with a diameter less than 10 microns). The project's particulate matter emissions and offsets, with the exception of fugitive dusts from construction activities, are actually particulate matter of 2.5 microns or less. Therefore, staff has actually evaluated the project with criteria similar to PM2.5 standard.

3. Offsets

The public raised concerns that the project did not secure local emission reductions to offset the facility's new criteria air contaminant emissions.

Staff Response:

All 590 tons of offsets proposed are from the Antioch area with the exception of 0.17 tons per year of SO2 emission reduction credits that has been obtained from San Leandro. Therefore, offsets are being provided by local sources.

4. Potential Ion Emissions and Its Impacts

The public has concerns that the facility can emit ions, which can be positive ions or negative ions that can affect the mood or behavior of a certain ion sensitive group of people.

Staff Response

Staff has no possible way to estimate the potential ion emissions from a power plant. In addition, there is no standard, rule or regulation to deal with these types of emissions; therefore, evaluation of these possible emissions and their potential impacts was not performed.

COMPLIANCE WITH LORS

FEDERAL

The applicant has submitted to the District an application for the federal PSD permit. The District issued a Preliminary Determination of Compliance (PDOC) on October 23, 2000, which includes the demonstration of compliance with the federal PSD requirements. Staff have incorporated the District's recommended Conditions in this Preliminary Staff Assessment.

In addition, the applicant is required to obtain from the District a Federal Operating Permit (Title V) within one month after the project starts to operate. The applicant is also required to submit an acid rain application (Title IV) to the District at least 24 months prior to the project generating electricity. Compliance with both of these federal titles will be determined at a later date.

STATE

The project, with the anticipated full mitigation (offsets) that will be necessary for the project to secure a Determination of Compliance from the District, will comply with Section 41700 of the California Health and Safety Code. The project will be fully mitigated and therefore would not cause any injury, detriment, nuisance or annoyance to the public.

LOCAL

The District issued a PDOC (October 23, 2000), which states that the proposed project is expected to comply with all applicable District rules and regulations, and

that offsets will be provided prior to the issuance of the project Authority to Construct permit.

CONCLUSIONS AND RECOMMENDATIONS

The Contra Costa Power Project's emissions of NO_x, SO_2 and CO will not cause a violation of any NO_2, SO_2 or CO ambient air quality standards, and therefore, their impacts are not significant.

The project's air quality impacts from directly emitted PM10 and of the ozone precursor emissions of NOx and VOC and PM10 precursors of NO_x and SO_2 could be significant if left unmitigated. The applicant will reduce these emissions to the extent feasible by using Best Available Control Technology, and will provide emission offsets for their NOx, VOC, and PM10 emissions. Thus these mitigation measures reduce the potential for directly emitted PM10, as well as ozone and secondary PM10 formation to a level of insignificance.

The District has provided a Preliminary Determination of Compliance and Energy Commission staff has incorporated into the PSA. The District recommended conditions are presented here as Conditions 1 through 47. Staff also recommends the inclusion of two Conditions of Certification AQC-1 and AQC-2 to address the construction-related impacts.

CONDITIONS OF CERTIFICATION

Definitions:

Clock Hour:	Any continuous 60-minute period beginning on the hour.
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours.
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf.
Rolling 3-hour period:	Any three-hour period that begins on the hour and does not include start-up or shutdown periods.
Firing Hours:	Period of time during which fuel is flowing to a unit, measured in fifteen-minute increments.
MM BTU:	million British thermal units
Gas Turbine Start-up Mode:	The lesser of the first 180 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of conditions 20(b) and 20(d).
Gas Turbine Shutdown Mode:	The lesser of the 30 minute period immediately prior to the termination of fuel flow to the Gas Turbine or the period of time from non-compliance with any requirement listed in Conditions 20(b) through 20(d) until termination of fuel flow to the Gas Turbine.
Specified PAHs:	The polycyclic aromatic hydrocarbons listed below shall be considered to Specified PAHs for these permit conditions. Any emission limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds. Benzo[a]anthracene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenzo[a,h]anthracene Indeno[1,2,3-cd]pyrene
Corrected Concentration:	The concentration of any pollutant (generally NO_x, CO, or NH_3) corrected to a standard stack gas oxygen concentration. For emission point P-11 (combined exhaust of S-41 Gas Turbine and S-42 HRSG duct burners) and emission point P-12 (combined exhaust of S-43 Gas Turbine and S-44 HRSG duct burners) the standard stack gas oxygen concentration is 15% O_2 by volume on a dry basis.
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the CCCP UNIT#8 construction contractor to insure safe and

	reliable steady state operation of the gas turbines, heat recovery steam generators, steam turbine, and associated electrical delivery systems.
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange.
Precursor or Volatile Organic Compounds (POC or VOC):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate
CEC CPM:	California Energy Commission Compliance Program Manager
CCCP UNIT#8:	CCPP Unit 8

AQC-1 During construction of this facility, the following fugitive emission control measures shall be implemented at the plant site:

a. Suspend all land clearing, grading, earth moving, or excavation activities when winds (including instantaneous gusts) exceed 20 miles per hour.
b. Apply water to active construction sites and unpaved roads at least twice daily to control fugitive dust.
c. Apply sufficient water or dust suppressants to all material excavated, stockpiled, or graded to prevent fugitive dust from leaving the property boundaries and causing a public nuisance or a violation of an ambient air standard.
d. Apply a non-toxic solid stabilizer to all inactive construction areas (previously graded areas which remain inactive for 96 hours).
e. No on-site vehicle shall exceed a speed of 10 miles per hour on unpaved roads or areas.
f. All trucks hauling dirt, sand, soil, or other loose material will be watered or covered and will maintain at least two feet of freeboard to prevent a public nuisance.
g. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
h. Sweep streets with a water sweeper at the end of each day if visible soil materials are carried onto adjacent public or private paved roads.
i. Re-establish ground cover on the construction site through seeding and watering as soon as possible, but no later than final occupancy.
j. Implement all dust control measures in a timely and effective manner during all phases of project development and construction.
k. Place sandbags adjacent to roadways to prevent run off to public roadways.

l. Install wind breaks at the windward sides of construction areas prior to the soil being disturbed. The wind breaks shall remain in place until the soil is stabilized or permanently covered.
m. Limit construction vehicles and equipment idle time to no more than 15 minutes.

Verification: The project owner shall maintain a daily log of water truck activities, including record of the frequency of public road cleaning. These logs and records shall be available for inspection by the CPM during the construction period. The project owner shall identify I n the monthly construction reports, the area(s) that the project owner shall cover or treat with dust suppressants. The project owner shall make the construction site available to the District staff and the CPM for inspection and monitoring.

AQC-2 The project owner shall ensure that all heavy earthmoving equipment including, but not limited to, bulldozers, backhoes, compactors, loaders, motor graders and trenchers, and cranes, dump trucks and other heavy duty construction related trucks, have been properly maintained and the engines tuned to the engine manufacturer's specifications. The project owner shall also install oxidizing soot filters on all suitable construction equipment used either on the power plant construction site or associated linear construction sites. Where the oxidizing soot filter is determined to be unsuitable, the owner shall install and use an oxidizing catalyst. Additionally, the project owner shall employ high pressure fuel injection, timing retardation, and reduced idle time on all suitable construction equipment. Suitability is to be determined by an independent California Licensed Mechanical Engineer or a Qualified Environmental Professional who will stamp and submit for approval an initial and all subsequent Suitability Reports as necessary containing at a minimum the following:

Initial Suitability Report:

1. The initial suitability report shall be submitted to the CPM for approval 60 days prior to the relevant equipment being used at the project site.

2. A list of all fuel burning, construction related equipment used,

3. A determination of the suitability of each piece of equipment to work appropriately with an oxidizing soot filter, or an oxidizing catalyst,

4. If a piece of equipment is determined to be suitable, a statement by the equipment or catalyst manufacturers, the independent California Licensed Mechanical Engineer, or a Qualified Environmental Professional that the oxidizing soot filter has been installed and is functioning properly,

5. If a piece of equipment is determined to be unsuitable, an explanation by the equipment or catalyst manufacturers, the independent California Licensed Mechanical Engineer, or a Qualified Environmental Professional as to the cause of this determination, and

6. A statement by the equipment or catalyst manufacturers, the California Licensed Mechanical Engineer, or a Qualified Environmental Professional as to the suitability of using high-pressure fuel injectors, timing retardation and/or reduced idle time on all construction equipment after the installation of either oxidizing soot filters or oxidizing catalysts.

Subsequent Suitability Reports

- If a piece of construction equipment is subsequently determined to be unsuitable for an oxidizing soot filter after such installation has occurred, the filter may be removed immediately. However notification must be sent to the CPM for approval containing an explanation for the change in suitability within 10 days.

- Changes in suitability are restricted to three explanations, which must be identified in any subsequent suitability report. Changes in suitability may not be based on the use of high-pressure fuel injectors, timing retardation and/or reduced idle time.

  1. The oxidizing soot filter is reducing normal availability of the construction equipment due to increased downtime, and/or power output due to increased back pressure by 20% or more.
  2. The oxidizing soot filter is causing or is reasonably expected to cause significant damage to the construction equipment engine.
  3. The oxidizing soot filter is causing or is reasonably expected to cause a significant risk to nearby workers or the public.

  Verification: The project owner shall submit to the CPM, via the Monthly Compliance Report, documentation, which demonstrates that the contractor's heavy earthmoving equipment is properly maintained and the engines are tuned to the manufacturer's specifications. The project owner shall maintain all records on the site for six months following the start of commercial operation. The project owner will submit to the CPM for approval, the initial suitability report stamped by an independent California Licensed Mechanical Engineer or a Qualified Environmental Professional, 60 days prior to breaking ground on the project site. The project owner will submit to the CPM for approval, subsequent suitability reports as required, stamped by an independent California Licensed Mechanical Engineer or a Qualified Environmental Professional, no later than 10 working days following a change in the suitability status of any construction equipment.

CONDITIONS FOR THE COMMISSIONING PERIOD

1. The owner/operator of the CCPP Unit 8 (CCPP UNIT 8) shall minimize emissions of carbon monoxide and nitrogen oxides from S-41 and S-43 Gas Turbines and S-42 and S-44 Heat Recovery Steam Generators (HRSGs) to the maximum extent possible during the commissioning period. Conditions 1 through 12 shall only apply during the commissioning period as defined above. Unless otherwise indicated, Conditions 13 through 47 shall apply after the commissioning period has ended.

Verification: The owner/operator shall submit a monthly compliance report to the California Energy Commission (CEC) Compliance Project Manager (CPM). In this report the owner/operator shall indicate how this condition is being implemented.

2. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the S-41 & S-43 Gas Turbine combustors and S-42 & S-44 Heat Recovery Steam Generator duct burners shall be tuned to minimize the emissions of carbon monoxide and nitrogen oxides.

Verification: See verification in Condition 1.

3. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the A-11 and A-13 SCR Systems and A-12 and A-14 CO Oxidation Catalyst Systems shall be installed, adjusted, and operated to minimize the emissions of carbon monoxide and nitrogen oxides from S-41 & S-43 Gas Turbines and S-42 & S-44 Heat Recovery Steam Generators.

Verification: See verification in Condition 1.

4. Coincident with the steady-state operation of A-11 & A-13 SCR Systems pursuant to conditions 3, 10, 11, and 12, the Gas Turbines (S-41 & S-43) and the HRSGs (S-42 & S-44) shall comply with the NO_x and CO emission limitations specified in conditions 20(a) through 20(d).

Verification: See verification in Condition 1.

5. The owner/operator of the CCPP UNIT#8 shall submit a plan to the District Permit Services Division and the CEC CPM at least four weeks prior to first firing of S-41 or S-43 Gas Turbines describing the procedures to be followed during the commissioning of the turbines, HRSGs, and gas-fired preheater. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the Dry-Low-NO_x combustors, the installation and operation of the SCR systems and oxidation catalysts, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-41 & S-43) and HRSGs (S-42 & S-44) without abatement by their respective SCR and CO oxidation catalyst systems.

Verification: See verification in Condition 1.

6. During the commissioning period, the owner/operator of the CCPP UNIT#8 shall demonstrate compliance with conditions 8 through 11 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

firing hours for each gas turbine and each HRSG
fuel flow rates to each train
stack gas nitrogen oxide emission concentrations at P-11 and P-12
stack gas carbon monoxide emission concentrations at P-11 and P-12
stack gas carbon dioxide concentrations at P-11 and P-12.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-41 & S-43) and HRSGs (S-42 & S-44). The owner/operator shall use District-approved methods to calculate heat input rates, NOx mass emission rates (as NO2), carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request.

Verification: See verification in Condition 1.

7. The District-approved continuous monitors specified in condition 5 shall be installed, calibrated, and operational prior to first firing of the Gas Turbines (S-41 & S-43) and Heat Recovery Steam Generators (S-42 & S-44). After first firing of the turbines, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.

Verification: See verification in Condition 1.

8. The total number of firing hours of S-41 Gas Turbine and S-42 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-11 SCR System and/or A-12 Oxidation Catalyst System shall not exceed 500 hours during the commissioning period. Such operation of S-41 Gas Turbine and S-42 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 500 firing hours without abatement shall expire.

Verification: See verification in Condition 1.

9. The total number of firing hours of S-43 Gas Turbine and S-44 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-13 SCR System and/or A-14 Oxidation Catalyst System shall not exceed 500 hours during

the commissioning period. Such operation of S-43 Gas Turbine and S-44 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 500 firing hours without abatement shall expire.

Verification: See verification in Condition 1.

10. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM_{10}, and sulfur dioxide that are emitted by the Gas Turbines (S-41 & S-43) and Heat Recovery Steam Generators (S-42 & S-44) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in condition 24.

Verification: See verification in Condition 1.

11. Combined pollutant mass emissions from the Gas Turbines (S-41 & S-43) and Heat Recovery Steam Generators (S-42 & S-44) shall not exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-41 & S-43).

NO_x (as NO_2)	8,400 pounds per calendar day	400 pounds per hour
CO	13,000 pounds per calendar day	584 pounds per hour
POC (as CH_4)	535 pounds per calendar day	
PM_{10}	624 pounds per calendar day	
SO_2	297 pounds per calendar day	

Verification: See verification in Condition 1.

12. Prior to the end of the Commissioning Period, the Owner/Operator shall conduct a District and CEC approved source test using external continuous emission monitors to determine compliance with condition 21. The source test shall determine NO_x, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods.

Verification: Twenty working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CEC Compliance Program Manager (CPM) a detailed source test plan designed to satisfy the requirements of this condition. The District and the CEC CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CEC CPM comments into the test plan. The Owner/Operator shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CEC CPM within 30 days of the source testing date.

Conditions for the Gas Turbines (S-41 & S-43) and the Heat Recovery Steam Generators (HRSGs; S-42 & S-44)

13. The Gas Turbines (S-41 and S-43) and HRSG Duct Burners (S-42 and S-44) shall be fired exclusively on natural gas with a maximum sulfur content no greater than 1 grain per 100 standard cubic feet. (BACT for SO_2 and PM_{10})

Verification: The project owner shall maintain, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The monthly sulfur analysis shall be incorporated into the quarterly compliance reports as required in Condition 14 and its verification.

14. The combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-41 & S-42 and S-43 & S-44) shall not exceed 2,227 MM BTU per hour, averaged over any rolling 3-hour period. (PSD for NO_x)

Verification: The project owner shall prepare quarterly reports for the preceding calendar quarter by January 30, April 30, July 30, and October 30, and an annual compliance report. These reports shall incorporate all information required and specified in Condition 20 and its verification. The reports shall be submitted to the District and the CEC CPM.

15. The combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-41 & S-42 and S-43 & S-44) shall not exceed 53,440 MM BTU per calendar day. (PSD for PM_{10})

Verification: See verification in Condition 14.

16. The combined cumulative heat input rate for the Gas Turbines (S-41 & S-43) and the HRSGs (S-42 & S-44) shall not exceed 34,900,000 MM BTU per year. (Offsets)

Verification: See verification in Condition 14.

17. The HRSG duct burners (S-42 and S-44) shall not be fired unless its associated Gas Turbine (S-41 and S-43, respectively) is in operation. (BACT for NO_x)

Verification: As part of the Compliance Reports, the owner/operator shall include information on the date, time, and duration of any violation of this permit condition.

18. Except as provided in Condition 8, S-41 Gas Turbine and S-42 HRSG shall be abated by the properly operated and properly maintained A-11 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-11 catalyst bed has reached minimum operating temperature. (BACT for NO_x)

Verification: As part of the Compliance Reports, the owner/operator shall provide information on any major problem in the operation of the Oxidizing Catalyst and Selective Catalytic Reduction Systems for the Gas Turbines and

HRSGs. The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

19. Except as provided in Condition 8, S-43 Gas Turbine and S-44 HRSG shall be abated by the properly operated and properly maintained A-13 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-13 catalyst bed has reached minimum operating temperature. (BACT for NO_x)

Verification: See verification of Condition 17.

20. The Gas Turbines (S-41 & S-43) and HRSGs (S-42 & S-44) shall comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode and steam injection power augmentation mode. Requirements (a) through (h) do not apply during a gas turbine start-up or shutdown. (BACT, PSD, and Toxic Risk Management Policy)

(a) Nitrogen oxide mass emissions (calculated as NO_2) at P-11 (the combined exhaust point for the S-41 Gas Turbine and the S-42 HRSG after abatement by A-11 SCR System) shall not exceed 20 pounds per hour or 0.0090 lb/MM BTU (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated in accordance with District approved methods as NO_2) at P-12 (the combined exhaust point for the S-43 Gas Turbine and the S-44 HRSG after abatement by A-3 SCR System) shall not exceed 20 pounds per hour or 0.0090 lb/MM BTU (HHV) of natural gas fired. (PSD for NO_x)

(b) The nitrogen oxide emission concentration at emission points P-11 and P-12 each shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (BACT for NO_x)

(c) Carbon monoxide mass emissions at P-11 and P-12 each shall not exceed 0.013 lb/MM BTU (HHV) of natural gas fired or 29.22 pounds per hour, averaged over any rolling 3-hour period. (PSD for CO)

(d) The carbon monoxide emission concentration at P-11 and P-12 each shall not exceed 6 ppmv, on a dry basis, corrected to 15% O_2, averaged over any rolling 3-hour period. (BACT for CO)

(e) Ammonia (NH_3) emission concentrations at P-11 and P-12 each shall not exceed 5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-11 and A-13 SCR Systems. The correlation between the gas turbine and HRSG heat input rates, A-11 and A-13 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-11 and P-12 shall be determined in accordance with permit condition #29. (TRMP for NH_3)

(f) Precursor organic compound (POC) mass emissions (as CH_4) at P-11 and P-12 each shall not exceed 5.6 pounds per hour or 0.0025 lb/MM BTU of natural gas fired. (BACT)

(g) Sulfur dioxide (SO_2) mass emissions at P-11 and P-12 each shall not exceed 6.18 pounds per hour or 0.0028 lb/MM BTU of natural gas fired. (BACT)

(h) Particulate matter (PM_{10}) mass emissions at P-11 and P-12 each shall not exceed 11 pounds per hour or 0.00588 lb./MM Btu of natural gas fired when the HRSG duct burners are not in operation. Particulate matter (PM_{10}) mass emissions at P-11 and P-12 each shall not exceed 13 pounds per hour or 0.00584 lb./MM Btu of natural gas fired when the HRSG duct burners are in operation. (BACT)

Verification: The project owner shall submit to the District and CEC CPM the following information for the preceding calendar quarter by January 30, April 30, July 30 and October 30 of each year the permit is in effect. Each January 30 submittal shall include a summary of the reported information for the previous year. This information shall be maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.

a. Operating parameters of emission control equipment, including but not limited to ammonia injection rate, NO_x emission rate and ammonia slip.
b. Total plant operation time (hours), number of startups, hours in cold startup, hours in warm startup, hours in hot startup, and hours in shutdown.
c. Date and time of the beginning and end of each startup and shutdown period.
d. Average plant operation schedule (hours per day, days per week, weeks per year).
e. All continuous emissions data reduced and reported in accordance with the District approved CEMS protocol.
f. Maximum hourly, maximum daily, total quarterly, and total calendar year emissions of NO_x, CO, PM_{10}, VOC and SO_x (including calculation protocol).
g. Fuel sulfur content (monthly laboratory analyses, monthly natural gas sulfur content reports from the natural gas supplier(s), or the results of a custom fuel monitoring schedule approved by the District.
h. A log of all excess emissions, including the information regarding malfunctions/breakdowns.
i. Any permanent changes made in the plant process or production, which would affect air pollutant emissions, and indicate when changes were made.
j. Any maintenance to any air pollutant control system (recorded on an as-performed basis).

21. The regulated air pollutant mass emission rates from each of the Gas Turbines (S-41 and S-43) during a start-up or a shutdown shall not exceed the limits established below. (PSD)

	Cold Start-Up (lb/event)	Hot Start-Up (lb/event)	Shutdown (lb/event)
Oxides of Nitrogen (as NO_2)	452	189	59
Carbon Monoxide (CO)	990	291	73
Precursor Organic Compounds (as CH_4)	109	26	6

Verification: See verification of Condition 20.

22. The Gas Turbines (S-41 and S-43) shall not be in start-up mode simultaneously. (PSD)

Verification: See verification of Condition 20.

23. Total combined emissions from the Gas Turbines and HRSGs (S-41, S-42, S-43, and S-44), including emissions generated during Gas Turbine start-ups and shutdowns shall not exceed the following limits during any calendar day:

(a)	1,994 pounds of NO_x (as NO_2) per day	(CEQA)
(b)	3,602 pounds of CO per day	(PSD)
(c)	468 pounds of POC (as CH_4) per day	(CEQA)
(d)	624 pounds of PM_{10} per day	(PSD)
(e)	297 pounds of SO_2 per day	(BACT)

Verification: See verification of Condition 20.

24. Cumulative combined emissions from the Gas Turbines and HRSGs (S-41, S-42, S-43, and S-44), including emissions generated during gas turbine start-ups and shutdowns shall not exceed the following limits during any consecutive twelve-month period:

(a)	174.3 tons of NO_x (as NO_2) per year	(Offsets, PSD)
(b)	259.1 tons of CO per year	(Cumulative Increase)
(c)	46.6 tons of POC (as CH_4) per year	(Offsets)
(d)	112.2 tons of PM_{10} per year	(Offsets, PSD)
(e)	48.5 tons of SO_2 per year	(Cumulative Increase)

Verification: See verification of Condition 20.

25. The maximum projected annual toxic air contaminant emissions (per condition 29) from the Gas Turbines and HRSGs combined (S-41, S-42, S-43, and S-44) shall not exceed the following limits:

4,102 pounds of formaldehyde per year
506 pounds of benzene per year
38 pounds of specified polycyclic aromatic hydrocarbons (PAHs) per year

unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment using the emission rates determined by source test and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. This risk analysis shall be submitted to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will result in a cancer risk of not more than 1.0 in one million, the District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (TRMP)

Verification: Compliance with condition 27 shall be deemed as compliance with this condition. In addition, approval by the District and the CEC CPM of the reports prepared for this condition will constitute a verification of compliance with this condition.

26. The owner/operator shall demonstrate compliance with conditions 14 through 17, 20(a) through 20(d), 21, 23(a), 23(b), 24(a), and 24(b) by using properly operated and maintained continuous monitors (during all hours of operation including equipment Start-up and Shutdown periods) for all of the following parameters:

(a) Firing Hours and Fuel Flow Rates for each of the following sources: S-41 & S-42 combined and S-43 & S-44 combined.
(b) Carbon Dioxide (CO2) or Oxygen (O_2) Concentrations, Nitrogen Oxides (NO_x) Concentrations, and Carbon Monoxide (CO) Concentrations at each of the following exhaust points: P-11 and P-12.
(c) Ammonia injection rate at A-11 and A-13 SCR Systems
(d) Steam injection rate at S-41 & S-43 Gas Turbine Combustors

The owner/operator shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and average hourly pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

(e) Heat Input Rate for each of the following sources: S-41 & S-42 combined and S-43 & S-44 combined.
(f) Corrected NO_x concentrations, NO_x mass emissions (as NO_2), corrected CO concentrations, and CO mass emissions at each of the following exhaust points: P-11 and P-12.

Applicable to emission points P-11 and P-12, the owner/operator shall record the parameters specified in conditions 26(e) and 26(f) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

(g) Total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.

(h) On an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and associated HRSG combined and all four sources (S-41, S-42, S-43, and S-44) combined.

(i) The average NO_x mass emissions (as NO_2), CO mass emissions, and corrected NO_x and CO emission concentrations for every clock hour and for every rolling 3-hour period.

(j) On an hourly basis, the cumulative total NO_x mass emissions (as NO_2) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and associated HRSG combined, and all four sources (S-41, S-42, S-43, and S-44) combined.

(k) For each calendar day, the average hourly Heat Input Rates, Corrected NO_x emission concentrations, NO_x mass emissions (as NO_2), corrected CO emission concentrations, and CO mass emissions for each Gas Turbine and associated HRSG combined.

(l) On a daily basis, the cumulative total NO_x mass emissions (as NO_2) and cumulative total CO mass emissions, for the previous consecutive twelve month period for all four sources (S-41, S-42, S-43, and S-44) combined.

(1-520.1, 9-9-501, BACT, Offsets, NSPS, PSD, Cumulative Increase)

Verification: At least 60 days before the initial operation, the owner/operator shall submit to the CEC CPM a plan on how the measurements and recordings required by this condition will be performed. Submittal of the reports will also provide verification of compliance with this condition.

27. To demonstrate compliance with conditions 20(f), 20(g), 20(h), 21, 27(c) through 27(e), and 24(c) through 24(e), the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM_{10}) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO_2) mass emissions from each power train. The owner/operator shall use the actual Heat Input Rates calculated pursuant to condition 26, actual Gas Turbine Start-up Times, actual Gas Turbine Shutdown Times, and CEC and District-approved emission factors to calculate these emissions. The calculated emissions shall be presented as follows:

(a) For each calendar day, POC, PM_{10}, and SO_2 emissions shall be summarized for: each power train (Gas Turbine and its respective HRSG combined) and all four sources (S-41, S-42, S-43, and S-44) combined.

(b) On a daily basis, the 365 day rolling average cumulative total POC, PM_{10}, and SO_2 mass emissions, for each year for all four sources (S-41, S-42, S-43, and S-44) combined. (Offsets, PSD, Cumulative Increase)

Verification: See verification of Condition 20.

28. To demonstrate compliance with Condition 25, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of:

Formaldehyde, Benzene, and Specified PAHs. Maximum projected annual emissions shall be calculated using the maximum Heat Input Rate of 34,900,000 MM BTU/year and the highest emission factor (pounds of pollutant per MM BTU of Heat Input) determined by any source test of the S-41 & S-43 Gas Turbines and/or S-42 & S-44 Heat Recovery Steam Generators. If this calculation method results in an unrealistic mass emission rate (the highest emission factor occurs at a low firing rate) the applicant may use an alternate calculation, subject to District approval. (TRMP)

Verification: See verification of Condition 20.

29. Within 60 days of start-up of the CCCP UNIT#8, the owner/operator shall conduct a District-approved source test on exhaust point P-11 or P-12 to determine the corrected ammonia (NH_3) emission concentration to determine compliance with condition 20(e). The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-11 or A-13 SCR System ammonia injection rate, and the corresponding NH_3 emission concentration at emission point P-11 or P-12. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to minimum, 70%, 85%, and 100% load) to establish the range of ammonia injection rates necessary to achieve NO_x emission reductions while maintaining ammonia slip levels. Continuing compliance with condition 20(e) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (TRMP)

Verification: Approval of the source test protocols and the source test reports shall be deemed as verification for this condition.

30. Within 60 days of start-up of the CCCP UNIT#8 and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-11 and P-12 while each Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum load (including steam injection power augmentation mode) to determine compliance with Conditions 20(a), (b), (c), (d), (f), (g), and (h), while each Gas Turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with Conditions 20(c) and (d), and to verify the accuracy of the continuous emission monitors required in condition 26. The owner/operator shall test for (as a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO_2), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and particulate matter (PM_{10}) emissions including condensable particulate matter. (BACT, offsets)

Verification: Approval of the source test protocols, as required in condition 31, and the source test reports shall be deemed as verification for this condition. The owner/operator shall notify the District and the CEC CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CEC CPM within 30 days of the date of the tests.

31. The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CEC CPM prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CEC CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the Owner/Operator shall measure the contribution of condensable PM (back half) to the total PM_{10} emissions. However, the Owner/Operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. (BACT)

Verification: Source test results shall be submitted to the District and the CEC CPM within 60 days of conducting the tests.

32. Within 60 days of start-up of the CCPP UNIT#8 and on an biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on exhaust point P-11 or P-12 while the Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with Condition 25. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to condition 28 for any of the compounds listed below are less than the BAAQMD Toxic Risk Management Policy trigger levels shown, then the owner/operator may discontinue future testing for that pollutant:

Benzene	≤	26.8 pounds/year
Formaldehyde	≤	132 pounds/year
Specified PAHs	≤	0.18 pounds/year (TRMP)

Verification: The owner/operator shall notify the District and the CEC CPM within seven (7) working days before the owner/operator plans to conduct source testing as required by this condition. Source test results shall be submitted to the District and the CEC CPM within thirty (30) days of conducting the test.

33. The owner/operator of the CCPP UNIT#8 shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Regulation 2-6-502)

Verification: See verification of Condition 20.

34. The owner/operator of the CCPP UNIT#8 shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and

related incidents. The owner/operator shall make all records and reports available to District and the CEC CPM staff upon request. (Regulation 2-6-501)

Verification: During site inspection, the owner/operator shall make all records and reports available to the District, ARB, EPA and CEC staffs.

35. The owner/operator of the CCPP UNIT#8 shall notify the District and the CEC CPM of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, and the Manual of Procedures. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, or the Manual of Procedures, the owner/operator shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Regulation 2-1-403)

Verification: Submittal of these notifications as required by this condition is the verification of these permit conditions. In addition, as part of the Air Quality Reports, the owner/operator shall include information on the dates when these violations occurred and when the owner/operator notified the District and the CEC CPM.

36. The stack height of emission points P-11 and P-12 shall each be at least 195 feet above grade level at the stack base. (PSD, TRMP)

Verification: 120 days prior to start of construction, the project owner/operator shall provide the District and CEC CPM an "approved for construction" drawing showing the appropriate stack height and location of sampling ports and platforms. The project owner/operator shall make the site available to the District, EPA and CEC staff for inspection.

37. The Owner/Operator of CCPP UNIT#8 shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall be subject to BAAQMD review and approval. (Regulation 1-501)

Verification: See verification of Condition 36.

38. Within 180 days of the issuance of the Authority to Construct for the CCPP UNIT#8, the Owner/Operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous monitors, sampling ports, platforms, and source tests required by conditions 26, 29, 30, and 32. All source testing and monitoring shall be conducted in accordance with the BAAQMD Manual of Procedures. (Regulation 1-501)

Verification: The project owner/operator shall notify the CEC CPM within 7 days of getting District's approval for the source testing and monitoring plan.

39. Prior to the issuance of the BAAQMD Authority to Construct for the CCPP Unit 8, the Owner/Operator shall demonstrate that valid emission reduction credits in the amount of 200.5 tons/year of Nitrogen Oxides, 46.6 tons/year of Precursor Organic

Compounds or equivalent (as defined by District Regulations 2-2-302.1 and 2-2-302.2), and 337 tons of Sulfur Oxides, under their control through enforceable contracts, option to purchase agreements, or equivalent binding legal documents. (Offsets)

Verification: No more than 30 days after the issuance of an Authority to Construct, the Owner/Operator shall provide a copy of the ATC to the CEC CPM.

40. Prior to the start of construction of the CCPP Unit 8, the Owner/Operator shall provide to the District valid emission reduction credit banking certificates in the amount of 200.5 tons/year of Nitrogen Oxides, 46.6 tons/year of Precursor Organic Compounds or equivalent (as defined by District Regulations 2-2-302.1 and 2-2-302.2) and 337 tons of Sulfur Oxides. (Offsets)

Verification: At least 30 days prior to commencement of construction, the project owner/operator shall provide copies of all emission reduction credit certificates to the District and CEC CPM.

41. Pursuant to BAAQMD Regulation 2, Rule 6, section 404.1, the owner/operator of the CCPP UNIT#8 shall submit an application to the BAAQMD for a major facility review permit within 12 months of the issuance of the PSD permit. (Regulation 2-6-404.1)

Verification: The owner/operator shall submit to the CEC CPM copies of the Federal (Title IV) Acid Rain and (Title V) Operating Permit within 30 days after they are issued by the District.

42. Pursuant to 40 CFR Part 72.30(b)(2)(ii) of the Federal Acid Rain Program, the owner/operator of the CCPP Unit 8 shall not operate either of the gas turbines until either: 1) a Title IV Operating Permit has been issued; 2) 24 months after a Title IV Operating Permit Application has been submitted, whichever is earlier. (Regulation 2, Rule 7)

Verification: See verification of Condition 40.

43. The CCPP Unit 8 shall comply with the continuous emission monitoring requirements of 40 CFR Part 75. (Regulation 2, Rule 7)

Verification: At least 45 days prior to commencement of construction, the project owner/operator shall seek approval from the District for an emission monitoring plan.

44. The owner/operator shall take monthly samples of the natural gas combusted at the CCPP Unit#8. The samples shall be analyzed for sulfur content using District-approved laboratory methods or the owner/operator shall obtain certified analytical results from the gas supplier. The sulfur content test results shall be retained on site for a minimum of five years from the test date and shall be utilized to satisfy the requirements of 40 CFR Part 60, subpart GG. If the results from six consecutive monthly samples show results below 0.5 grains per 100 scf, the owner/operator may discontinue the sampling program with District approval. (cumulative increase)

Verification: See verification of Condition 19.

45. The cooling towers shall be properly installed and maintained to minimize drift losses. The cooling towers shall be equipped with high-efficiency mist eliminators with a maximum guaranteed drift rate of 0.0005%. The maximum total dissolved solids (TDS) measured at the base of the cooling towers or at the point of return to the wastewater facility shall not be higher than 5,666 ppmw (mg/l). The owner/operator shall sample the water at least once per day. (PSD)

Verification: At least 60 days prior to commence construction, the project owner/operator shall provide to the District and CEC CPM a copy of the cooling tower manufacturer demonstrating the 0.0005 percent drift rate.

46. The owner/operator shall perform a visual inspection of the cooling tower drift eliminators at least once per calendar year, and repair or replace any drift eliminator components which are broken or missing. Prior to the initial operation of the CCPP Unit 8, the owner/operator shall have the cooling tower vendor's field representative inspect the cooling tower drift eliminators and certify that the installation was performed in a satisfactory manner. The CPM may, in years 5 and 15 of cooling tower operation, require the owner/operator to perform a source test to determine the PM_{10} emission rate from the cooling tower to verify continued compliance with the vendor-guaranteed drift rate specified in condition 45. (PSD)

Verification: The project owner/operator shall keep records of all tower inspection and shall make them available for the District and CEC CPM upon request.

47. The Fuel Gas Preheater (S-45) shall not be operated more than 16 hours in any day. (BACT)

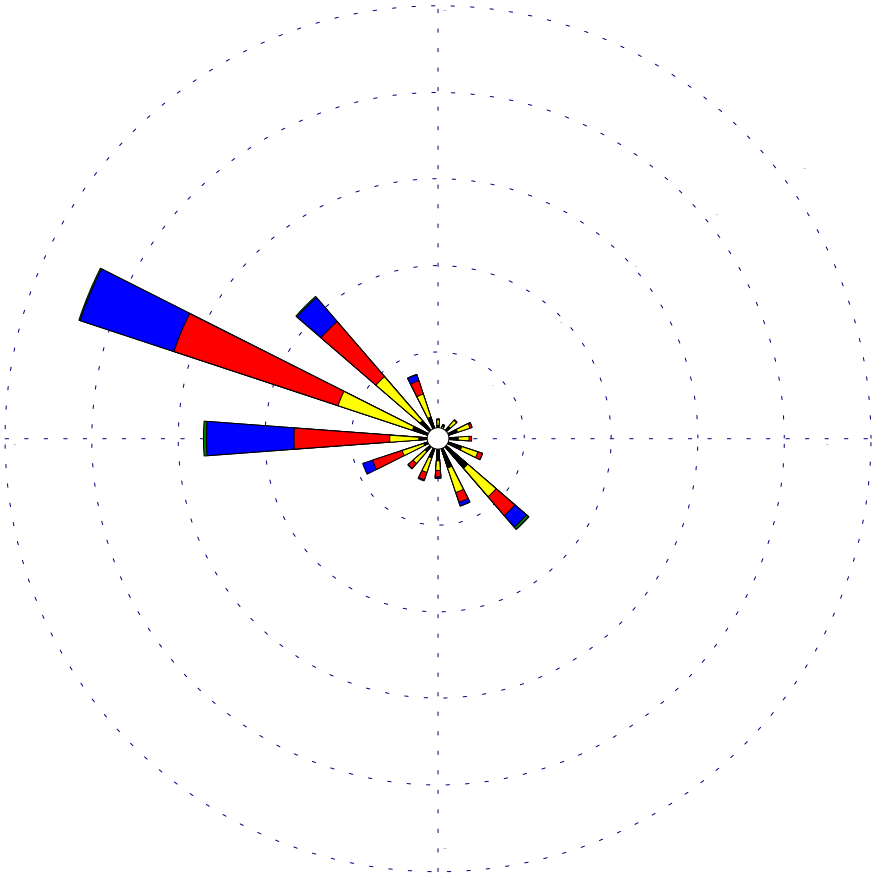
Verification: See Verification of Condition 20.

APPENDIX A

WIND ROSE PATTERN

WIND ROSE PLOT

Station #2804 - , ANNUAL WIND ROSE - PITTSBURG/ANTIOCH - 1998

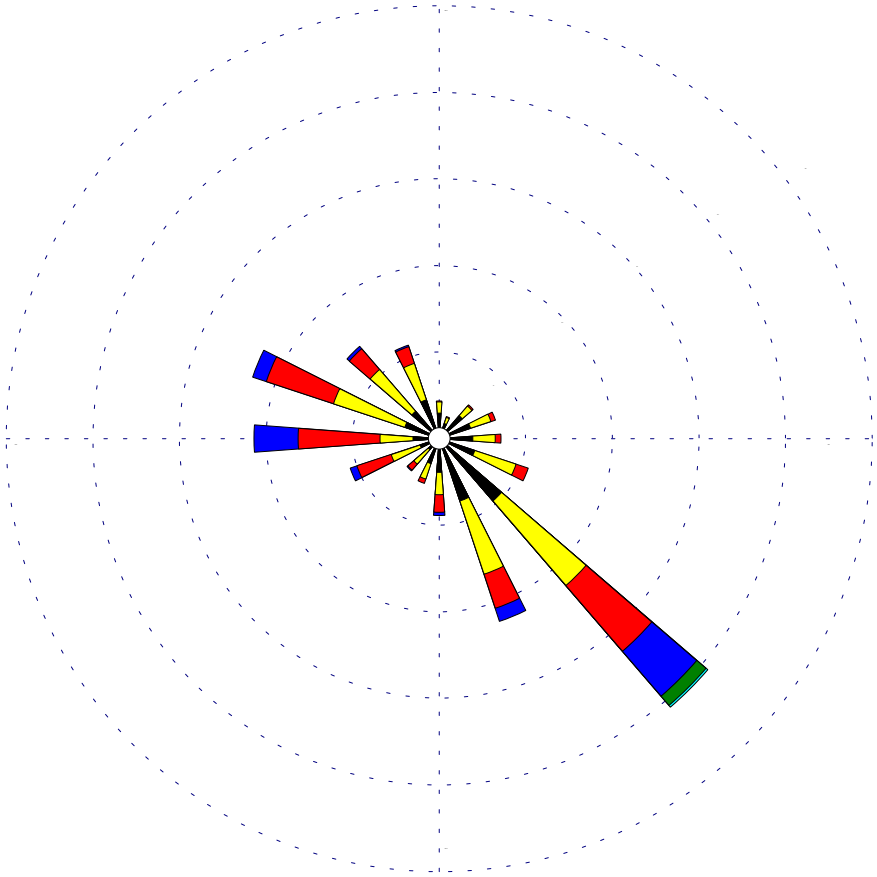


	MODELER	DATE **10/17/00**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **6.86 Knots**	CALM WINDS **0.23%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1998** **Jan 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **ANNUAL WIND ROSE**

WRPLOT View 3.15 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station #2804 - , FIRST QUARTER [JANUARY THROUGH MARCH] WIND ROSE - PITTSBURG/ANTIOCH - 1998

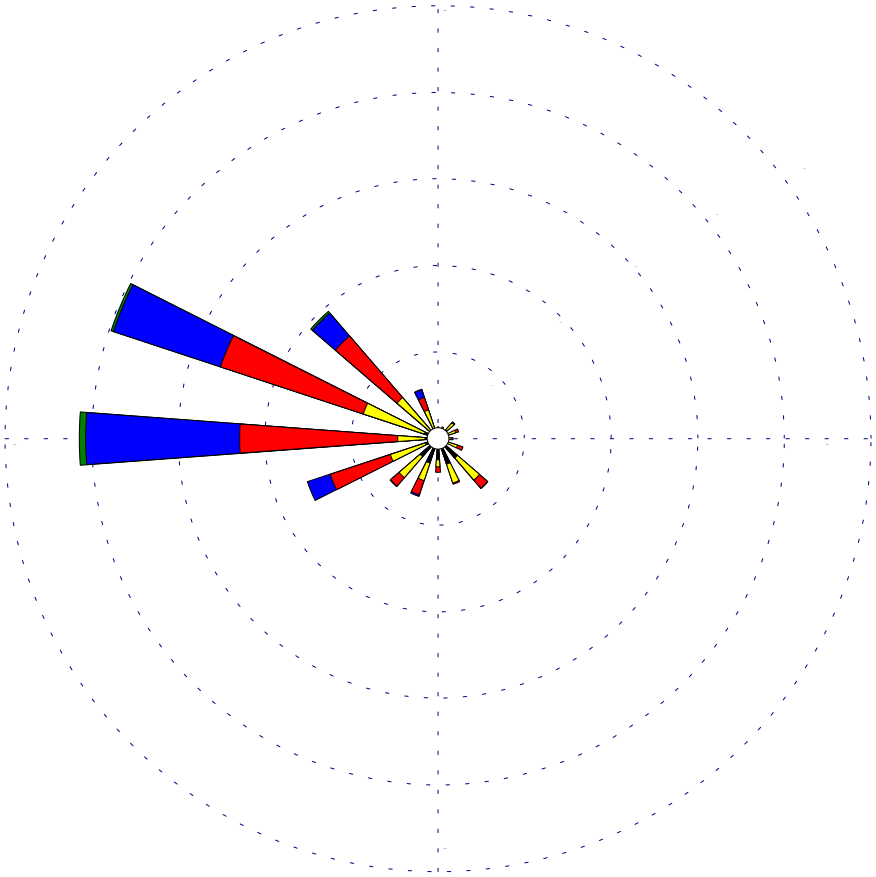


	MODELER	DATE **10/17/00**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **5.64 Knots**	CALM WINDS **0.09%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1998** **Jan 1 - Mar 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **FIRST QUATER WIND ROSE**

WRPLOT View 3.15 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station #2804 - , SECOND QUARTER [APRIL THROUGH JUNE] WIND ROSE - PITTSBURG/ANTIOCH - 1998

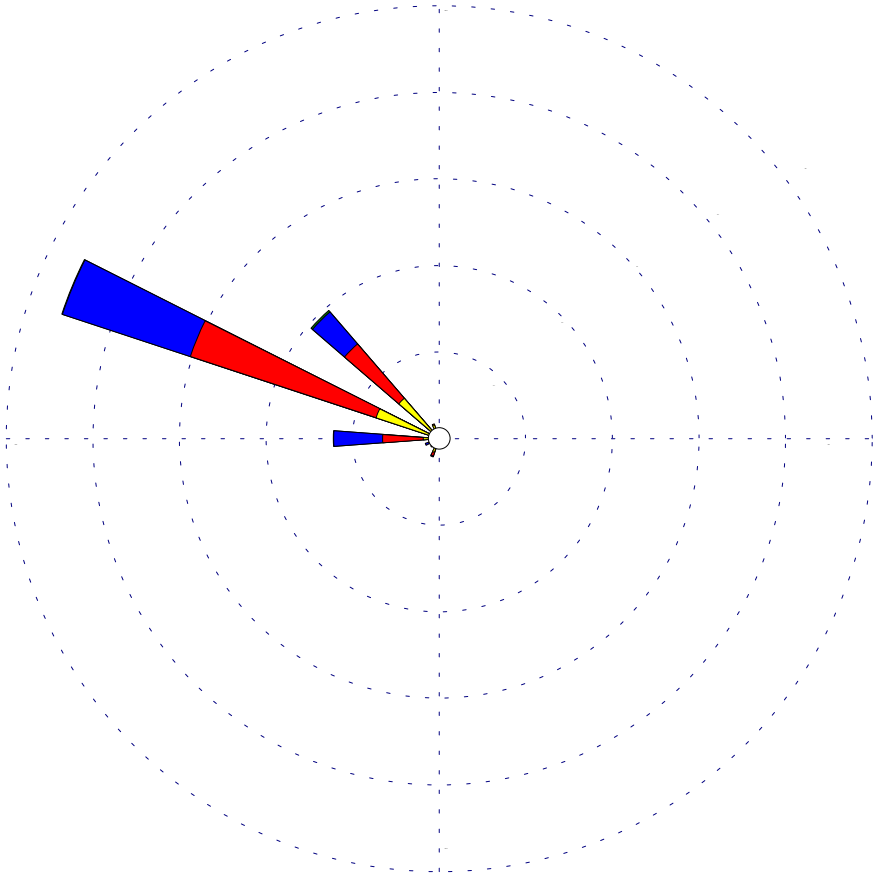


	MODELER	DATE **10/17/00**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **7.69 Knots**	CALM WINDS **0.00%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1998** **Apr 1 - Jun 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **SECOND QUARTER WIND ROSE**

WRPLOT View 3.15 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station #2804 - , THIRD QUARTER [JULY THROUGH SEPTERMBER] WIND ROSE - PITTSBURG/ANTIOCH - 1998

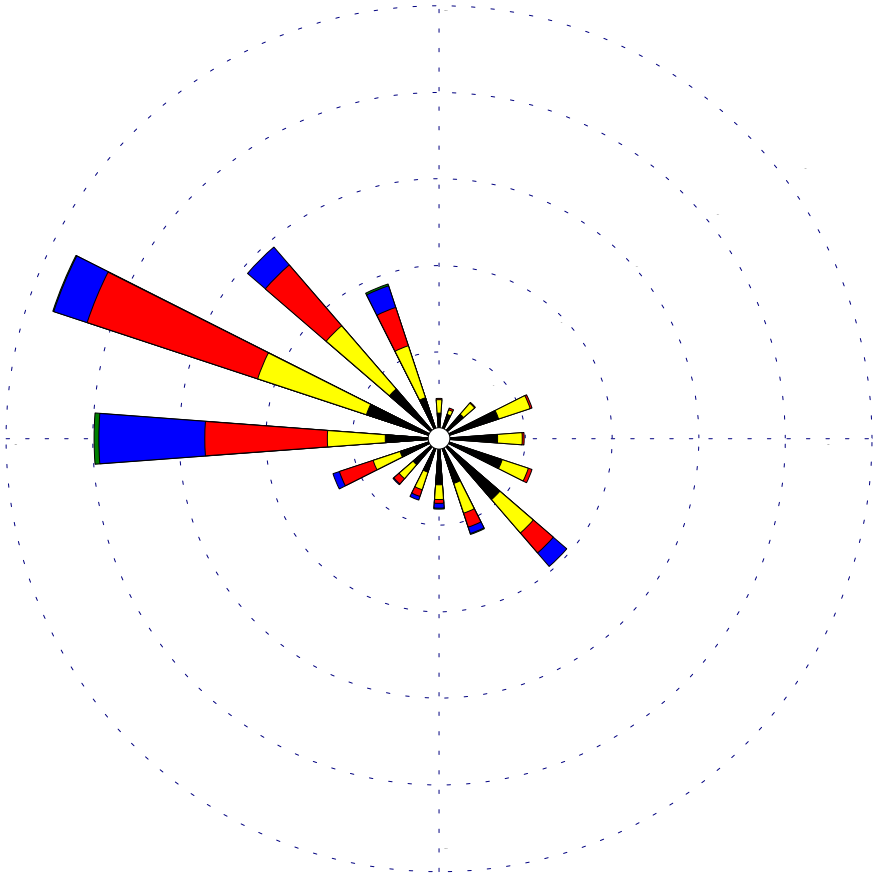


	MODELER	DATE **10/17/00**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **8.43 Knots**	CALM WINDS **0.00%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1998** **Jul 1 - Sep 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **THIRD QUARTER WIND ROSE**

WRPLOT View 3.15 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station #2804 - , FOURTH QUARTER [OCTOBER THROUGH DECEMBER] WIND ROSE - PITTSBURB/ANTIOCH - 1998



	MODELER	DATE **10/17/00**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **5.66 Knots**	CALM WINDS **0.82%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1998** **Oct 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **FOURTH QUARTER WIND ROSE**

WRPLOT View 3.15 by Lakes Environmental Software - www.lakes-environmental.com

REFERENCES

BAAQMD, 1997. Bay Area Clean Air Plan and Triennial Assessment. Bay Area Air Quality Management District.

BAAQMD, 1999. Climate, Physiography, and Air Pollution Potential-Bay Area and Its Subregion. Bay Area Air Quality Management District.

Chow, J.C., D. Fairley, J. Watson, R. DeMandel, E. Fujita, D. Lowenthal, Z. Lu, C. Frazier, G. Long, J. Cordova (1995). "Source Apportionment of Wintertime PM10 at San Jose, California". Journal of Environmental Engineering, 378-387. May 1995.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000d. Compact Disc of Air Quality and Public Health Modeling Files, received in dockets March 31, 2000.

Southern. 2000k. Listing of Future Sources within 10 Miles of Subject Plant from Bay Area Air Quality Management District, received in dockets August 4, 2000.

Southern. 2000o. Data responses to CEC data requests, received in dockets August 18, 2000.

Southern. 2000p. Data responses to CEC data requests, received in dockets October 13, 2000.

Spicer, C.W. Nitrogen Oxide Reactions in the Urban Plume. Science 215:1095-1096. 1982.

PUBLIC HEALTH

Michael Ringer

INTRODUCTION

The purpose of staff's public health analysis is to determine if toxic emissions from the proposed Contra Costa Power Plant (CCPP) Unit 8 Project will cause significant adverse public health impacts or violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section (please see **Public Health** Attachment A for a discussion of the health effects of criteria pollutants). Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

METHOD OF ANALYSIS

The 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 may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no air quality standards have been set are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a process known as health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment procedure consists of the following steps:

1. identifying the types and amounts of hazardous substances that the CCPP UNIT 8 project could emit to the environment;
2. estimating worst-case concentrations of project emissions in the environment using dispersion modeling;
3. estimating amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
4. characterizing 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, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks which are estimated by the screening level 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 levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are calculated to be the highest (point of maximum impact);
- 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 (see CAPCOA, 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 , 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. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those which arise as a result of long term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs (see CAPCOA, p. III-36). RELs 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. RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. The health risk assessment assumes that the effects of each substance are additive, even where there is no evidence that different substances have a combined effect. 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, p. III-37). However, the assumption of additive effects is generally considered appropriate for assessing the risks from multiple substances.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions. In reality, the risk is generally too small to actually be measured. For example, the one in one million risk level represents a one in one million increase in the normal risk of developing cancer over a lifetime, at whatever location is estimated to have the worst-case risk.

Cancer risk is expressed in chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called potency factors, these are published in the CAPCOA 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.

The screening analysis is performed to assess project-related risks to public health at that particular location where such risks are calculated to be the highest (worst-case risks). If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate assessment of potential public health risks.

SIGNIFICANCE CRITERIA

Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. Significance of project health impacts is determined separately for each of the three categories.

ACUTE AND CHRONIC NONCANCER HEALTH EFFECTS

Staff assesses the significance of non-cancer health effects by calculating a "hazard index". A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance which has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels (safe 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 if worst-case toxic emissions from the CCPP project increase anyone's lifetime cancer risk by one chance in one million ($1x10^{-6}$) or less, then the added risk is de minimis, or one that is so small, that it is effectively "no risk". The Federal Food and Drug Administration (FDA) made a similar 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. On average, for example, the lifetime risk of someone developing cancer is around 250,000 in a million (about one of every four people will have some type of cancer in their lifetime). At the one in one million risk level, the FDA noted that "as far as can be determined, in all probability no one will contract cancer." (Id.)

Staff does not believe that mitigation measures to reduce risk to less than one in one million are warranted, since at that level there is effectively no added cancer risk. Similarly, the Bay Area Air Quality Management District (BAAQMD) Risk Management Policy states that a project with an incremental cancer risk of one in one million or less is acceptable without further risk management consideration, and without further toxics reduction measures (BAAQMD 2000a, p. 4). Further, 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).

Staff does not view project-related cancer risks as significant at the de minimus level discussed above, since there is essentially no added risk. Therefore, staff must identify an appropriate level of risk on which to base determinations of significance. Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance to determine a risk significance level. Title 22, California Code of Regulations, § 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of ten in one million, or 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by the BAAQMD Board of Directors pursuant to Health and Safety Code § 44362(b), which requires notification of nearby residents when an air district determines that there is a significant health risk from a facility. In addition, BAAQMD's Risk Management Policy states that a project with an incremental cancer risk of between one and ten in a million is acceptable if best available control technology has been applied to reduce risk (BAAQMD 2000a, p. 4). In general, BAAQMD would not approve a project with a cancer risk exceeding ten in one million.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce risk to insignificance. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following federal, 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.

FEDERAL

CLEAN AIR ACT SECTION 112 (42 U.S. CODE SECTION 7412)

Section 112 requires new sources which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.

STATE

CALIFORNIA HEALTH AND SAFETY CODE SECTION 39650 ET SEQ.

These sections mandate the Air Resources Board and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.

CALIFORNIA HEALTH AND SAFETY CODE SECTION 41700

This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

LOCAL

BAY AREA AIR QUALITY MANAGEMENT DISTRICT RULE 2-1-316

This rule 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. 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 impact include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The proposed site is located in unincorporated Contra Costa County on approximately 20 acres in the northeast corner of the existing 200 acre site. The CCPP site lies about one mile northeast of the City of Antioch on the southern shore of the San Joaquin River. It is relatively flat, with an elevation a few feet above sea level. Currently, the proposed site is within an area zoned for heavy industry, as are lands both to the east and west of the site. The Antioch Regional Shoreline Park is located to the northeast. To the south and west, the site is surrounded by industrial uses, including a power plant to the southeast and a paperboard manufacturing facility to the west. A commercial marina, chemical manufacturer, and open space lie to the east.

As mentioned above, the location of sensitive receptors near a proposed project is an important factor in considering potential public health impacts. The nearest residence is within about 250 feet of the facility fenceline. Ten isolated residences are located within the developed industrial areas surrounding the proposed project site (Southern 2000a, AFC Replacement Figure 8.4-4). At least some of these residences are used for onsite security and management of the marina, and are considered nonconforming uses that predate the Contra Costa zoning ordinance. The nearest residential area is approximately 1000 feet southwest of the site in the community of East Antioch. Within about 3000 feet south of the site, land is designated light industry. Beyond that, medium density residential is planned (Southern 2000a, AFC Replacement Figs. 8.4-1,2).

Sensitive receptors within three miles of the CCPP, including schools, hospitals, daycare facilities, and long-term health care facilities, are shown in AFC Map 8.6-1, and listed in AFC Table 8.12-1. The closest park to the CCPP is Crocker Park, about 2000 feet east of the site. The closest school, Bidwell Elementary School, is located about 1.5 miles to the southwest.

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, when it is at its northernmost position, and results in strong northwesterly air flow and negligible precipitation. During this period, inversions become strong, winds are light, and the pollution potential is high. The Pacific high's influence weakens during the fall and winter when it moves southwestward, which allows storms from the Gulf of Alaska to reach northern California. During the winter, the predominant regional surface winds are light and easterly. On an annual basis, the predominant winds at the project site are

persistent and from the west and west-southwest. Summer precipitation is extremely low due to the strong stationary high-pressure system located off the coast that prevents most weather systems from moving through the area. About 80 percent of the region's annual rainfall occurs between November and March. During the winter, inversions are weak, winds often moderate, and the potential for air pollution is low.

Atmospheric stability is a measure related to atmospheric turbulence and mixing. Greater turbulence results in more mixing and better dispersion of airborne contaminants. Mixing height is the height above ground level through which the air is well mixed through convection and mechanical turbulence, and in which pollutants can be dispersed. Mixing heights 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 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. 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 1998, the background cancer risk calculated by BAAQMD for the Bay area was 199 in one million (BAAQMD 1999, p. 11). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and together accounted for over half of the total. The risk from 1,3-butadiene was about 66 in one million, while the risk from benzene was about 58 in one million. Formaldehyde accounts for about seven percent of the 1998 average calculated cancer risk for the Bay Area, with a risk of about 13 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed project.

The use of reformulated gasoline, as well as other toxics reduction measures, has led to a decrease in cancer risk during the past few years. For example, cancer risk was 342 in one million based on 1992 data, 315 in one million in 1994, and 303 in one million in 1995, and 194 in one million in 1997.

The toxic air monitoring station closest to the CCPP UNIT 8 project is on Tenth Street in Antioch. At that station, 1997 ambient levels of 1,3-butadiene were about twice as high as the Bay area average, while benzene levels were somewhat lower. This led to 1997 cancer risks in Antioch of about 128 and 49 in one million for 1,3-butadiene and benzene, respectively, compared to Bay area averages of 58 and 54 in one million.

SITE CONTAMINATION

Site disturbances will 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.

As discussed in further detail in the **Waste Management** section, Phase I and II Environmental Site Assessments (ESA) were conducted to determine the extent of contamination. Based on environmental and health risk analyses, the Phase II ESA identified groundwater contaminated with petroleum hydrocarbons and arsenic as a remediation issue. However, there were no issues identified with soil contamination. Thus, staff concludes that earth moving activities during construction will not have the potential to significantly impact public health caused by the dispersion of toxic substances in the soil. Please see the **Soil and Water Resources** section for a discussion of groundwater remediation.

IMPACTS

PROJECT SPECIFIC IMPACTS

TOXIC POLLUTANTS

CONSTRUCTION IMPACTS

Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. EPA as hazardous air pollutants and by the Air Resources Board (ARB) as toxic air contaminants. Because of the many constituents in diesel exhaust as well as evidence that the particles themselves may have intrinsic toxic and carcinogenic properties, many researchers have used the particles to quantify exposure to whole diesel exhaust.

Exposure to diesel exhaust causes both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Construction of CCPP UNIT 8 is anticipated to take place over a period of twenty-two months. Since assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a longer time period, typically from seven to seventy years, the construction health effects analysis focuses on the potential for adverse health effects from acute (one-hour) exposure to diesel exhaust.

AFC Appendix C4 lists the diesel-powered equipment that will be used during project construction. Diesel emissions are generated from sources such as trucks, backhoes, loaders, bulldozers, cranes, welding machines, and air compressors. The one-hour PM_{10} maximum impact from this equipment exhaust was modeled to be 219.3 $\mu g/m^3$ (Southern 2000o, Response to data request 24). The location of the maximum impact is on the eastern boundary of the CCPP site, just south of the PG&E switchyard. Potential health effects of this impact are discussed below in the **Noncancer Hazard – Construction** section below.

OPERATION IMPACTS

Emissions Sources

The emissions sources at the proposed CCPP UNIT 8 project include two General Electric Frame 7FA natural gas-fired combustion turbine generators, two supplementally-fired (duct firing) heat recovery steam generators, and a ten cell, mechanical draft cooling tower. During operation, potential public health risks are related to natural gas combustion emissions from the gas turbines and duct burners, and 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 Tables 8.6-2 and 8.6-3 (Southern 2000a) list noncriteria pollutants that may be emitted from project turbines and duct burners as combustion byproducts, along with their anticipated amounts (emission factors). Emission factors are from data compiled by the Ventura County Air Pollution Control District, the California Air Toxics Emission Factors (CATEF) database, and the U.S. EPA. AFC Table 8.6-1 (Southern 2000o, p. PD-16) presents toxicity values used to characterize cancer and noncancer health impacts. 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. **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. CCPP UNIT 8 will use San Joaquin River water for cooling. Table 8.14-5 shows the expected cooling water composition and the constituents

that could be emitted in the drift (Southern 2000o, Response to data request 110). Appendix G (Southern 2000o) lists the maximum cooling tower emission rates for the hazardous constituents. **PUBLIC HEALTH** Table 2 lists these substances and shows how each contributes to the health risk assessment.

PUBLIC HEALTH Table 1
Health Impacts and Exposure Routes
Combustion Emissions

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

Source: Southern 2000o, Appendix H, Revised ACE Model Output, p. 3, “Pollutant-Specific Data”

PUBLIC HEALTH Table 2
Health Impacts and Exposure Routes
Cooling Tower Emissions

Substance	**Cancer (Inhalation)**	**Cancer (Oral)**	**Noncancer (Oral)**	**Noncancer (Chronic-Inhalation)**	**Noncancer (Acute-Inhalation)**
Arsenic	✓	✓	✓	✓	✓
Beryllium	✓			✓	
Cadmium	✓		✓	✓	
Chromium	✓	✓	✓	✓	
Copper				✓	✓
Lead	✓			✓	✓
Manganese				✓	
Mercury			✓	✓	✓
Nickel	✓			✓	✓
Selenium				✓	
Sulfuric Acid					✓
Zinc				✓	

Source: Southern 2000o, Appendix H, Revised ACE Model Output, p. 3, “Pollutant-Specific Data”

Drift Eliminators

The CCPP UNIT 8 project will use high efficiency drift eliminators that limit the amount of drift loss to approximately 0.0005 percent of the circulating water rate, resulting in a drift rate of about 0.625 gallon per minute (Southern 2000a, AFC p. 2-34). This amount of water lost as liquid from the cooling towers is in contrast to the amount of water evaporated as steam, estimated to be approximately 2,500 gallons per minute (Southern 2000a, AFC Table 2.5). Steam emitted from the cooling towers is distilled water, and will not contain contaminants.

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. Staff has proposed a Condition of Certification for the inspection and maintenance of drift eliminators.

Emission Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute (one hour) noncancer health effects, while maximum annual emissions are required to calculate cancer and chronic (long-term) noncancer health effects.

To calculate maximum hourly and annual emissions, the maximum natural gas consumption rate was used. Annual turbine emissions were estimated by assuming that both turbines would operate simultaneously under full load conditions and full duct burner firing rate for the entire year. The turbine exhaust stack parameters used were those that the screening analysis (Southern 2000a, AFC Tables 8.1-13,14) showed to have the highest ground level impact per unit emission rate, regardless of whether those parameters were associated with full load operation of the turbines. Annual cooling tower emissions were estimated by assuming that the cooling tower will operate under full load conditions for the entire year.

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 RELs and cancer unit risk factors, as described above, to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother’s milk.

The above method of assessing health effects is consistent with the California Air Pollution Control Officers Association (CAPCOA) Air Toxics “Hot Spot” Program Revised 1992 Risk Assessment Guidelines (October 1993) referred to earlier, and results in the following health risk estimates.

HEALTH IMPACTS

NONCANCER HAZARD

Construction

As described above, the maximum modeled one-hour PM_{10} impact from diesel-powered equipment is 219.3 $\mu g/m^3$, located on the eastern boundary of the CCPP site. Nine residences are east of the CCPP site boundary within about 1500 feet (see Southern 2000a, AFC Replacement Figure 8.4-4). Because of the proximity of these residences to the maximum impact location, some perspective is necessary regarding the potential for adverse health impacts from diesel exhaust to residents in the area.

Based on a number of studies on the health effects of diesel particulate matter, the Scientific Review Panel on Toxic Air Contaminants (SRP) recommended a chronic (long-term) REL (see the REL discussion in **Method of Analysis** section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ (SRP 1998, p. 6). The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, the ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Since the SRP did not recommend an acute REL for diesel exhaust particulate matter, an acute hazard index cannot be calculated. However, acute RELs are usually at least ten times the chronic REL for the same chemical. Therefore, multiplying the chronic REL by a factor of ten could be considered a conservative, or health protective method of deriving a number for general comparison purposes only. This yields a value of 50 $\mu g/m^3$, significantly less than the modeled maximum of 219.3 $\mu g/m^3$.

As noted earlier, the air dispersion modeling and assumptions that form the basis of screening risk analysis are designed to overestimate public health impacts, and actual risks are likely to be much lower than those calculated. Nonetheless, staff believes that the difference between the modeled maximum impact of 219.3 $\mu g/m^3$ and the derived comparison value of 50 $\mu g/m^3$ indicates a potential for short-term health effects from diesel exhaust to nearby residents during construction. Also, there continues to be exceedances of California's 24-hour PM_{10} standard, indicating the potential for short-term health impacts from additional PM_{10} emissions. Therefore, measures to mitigate PM_{10} emissions and associated health impacts are warranted. As discussed in the **Air Quality** section, staff will recommend the installation of soot filters on all stationary diesel equipment with engines rated 100 horsepower or greater, which includes four hydraulic cranes and two large mast cranes. These catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is in the range of approximately 85-92 percent, which would effectively reduce potential health impacts.

Operation

The screening health risk assessment for the project, including combustion and noncombustion emissions, resulted in a maximum acute hazard index of 0.17 about 4.9 miles northwest of the proposed site across the Sacramento River. The chronic hazard index at the point of maximum impact is 0.04. The location of the maximum chronic hazard is about 1.5 mile east-southeast of the CCPP site (Southern 2000o, Table 8.6-5 and Southern 2000a, Figure 8.1-19). As **PUBLIC HEALTH** Table 3 shows, both acute and chronic hazard indices are under the REL of 1.0, indicating that no short- or long-term adverse health effects are expected.

PUBLIC HEALTH Table 3
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level
ACUTE NONCANCER	0.17	1.0
CHRONIC NONCANCER	0.04	1.0
INDIVIDUAL CANCER	0.86×10^{-6}	1.0×10^{-5}

Source: Southern 2000o, Table 8.6-5

CANCER RISK

PUBLIC HEALTH Table 3 shows an estimated total worst-case individual cancer risk of 0.86 in one million. As discussed earlier, this is the risk at the location where long-term pollutant concentrations are calculated to be the highest, and is at the eastern boundary of the CCPP site. At a level of less than one additional chance of cancer over a lifetime, staff considers this a deminimus impact, or one that is essentially no impact.

CUMULATIVE IMPACTS

As noted earlier, BAAQMD estimated the Bay area average lifetime cancer risk for inhalation of ambient air to be 199 in one million based on 1998 ambient average toxic concentration data (BAAQMD 1999, p. 11). Staff does not expect any significant change in lifetime risk to any person associated with the CCPP UNIT 8 project risk of 0.86 in one million, and the increase does not represent any real contribution to the existing ambient risk of 194 in one million. Modeled CCPP UNIT 8 risks are lower at all other locations, and actual risks are expected to be much lower, since worst-case estimates are based on conservative assumptions, and overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk posed by the CCPP UNIT 8 project to be either significant or cumulatively considerable.

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. In the vicinity of the CCPP site, there are a number of currently operating plants and two recently certified power projects. **PUBLIC HEALTH** Table

4 presents the location of the maximum cancer impact locations from these facilities in relation to the CCPP UNIT 8 project. As shown, only the Dow Chemical plant has significant cancer risk, but that is located 3.5 miles from the CCPP UNIT 8 project.

PUBLIC HEALTH Table 4
Maximum Impacts from Nearby Facilities

Facility	Acute Hazard Index	Chronic Hazard Index	Cancer Risk – Chances per 10^6	Cancer Risk Location
Proposed Contra Costa Unit 8	0.17	0.04	0.86	eastern facility fenceline
CCPP Units 6&7	n/a	n/a	1.2	inside northern fenceline
CCPP Fire Pump	n/a	n/a	0.36	NE corner of CCPP site
Los Medanos Energy Center	0.04	0.02	.05	3.5 miles NNW of CCPP site
Delta Energy Center	0.06	0.04	0.38	2 miles SW of CCPP site
Dow Chemical	n/a	n/a	14.0	3.5 miles W of CCPP site
GWF Power Systems	n/a	n/a	less than 1.0	n/a
Gaylord Container	n/a	n/a	(a)	n/a

n/a: data not available

(a) natural gas-fired cogeneration plant less than 50 megawatts; cancer risk assumed to be less than one in one million.

The worst-case chronic and acute noncancer impacts from the CCPP UNIT 8 project are well below the significance level of 1.0, as are those from the Los Medanos and Delta Energy Centers. The cumulative noncancer impact from these facilities are insignificant, even if they were to occur at the same location. As with cancer risk, the hazard is lower at all other locations, and cumulative impacts at other locations would also be less than significant.

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

The possibility exists that excavation at the site 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 CCPP UNIT 8 project will be in compliance with all applicable LORS regarding long-term and short-term project impacts.

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed potential public health risks associated with construction and operation of the CCPP UNIT 8 project. With implementation of the condition 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 project emissions.

The health risk assessment performed by the applicant has been reviewed by staff found to be in accordance with guidelines adopted by OEHHA, CARB and CAPCOA. The increased carcinogenic risk attributed to this project is considered to be deminimus since it is less than 1.0 in one million. The acute and chronic hazard indices attributed to the emissions of non-carcinogenic air contaminants are not significant since they are less than 1.0.

CONDITIONS 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 PM_{10} 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 quarterly 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.

REFERENCES

BAAQMD. 1993. Bay Area Air Quality Management District. Cumulative Air Toxics Modeling Study. Staff Report. July.

BAAQMD. 1999. Bay Area Air Quality Management District. Toxic Air Contaminant Control Program Annual Report 1998. Vols. I & II. December.

BAAQMD. 2000a. Bay Area Air Quality Management District. Bay Area AQMD Air Toxic Risk Evaluation Procedure and Risk Management Policy. February 3.

CAPCOA. 1993. California Air Pollution Control Officers Association. CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee. October.

FDA. 1985. United States Food and Drug Administration. Federal Register. Vol. 50, No. 243. December 18.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000o. Data responses to CEC data requests, received in dockets August 18, 2000.

SRP. 1998. Scientific Review Panel on Toxic Air Contaminants. Findings of the Scientific Review Panel on The Report On Diesel Exhaust as adopted at the Panel's April 22, 1998 Meeting.

Travis, et al. 1987. Travis, C.C.; Richter, S.A.; Crouch, E.A.C.; Klema, E.D.; Cancer Risk Management. Environ. Sci. Technol. 21:415-420.

ATTACHMENT A - CRITERIA POLLUTANTS

OZONE (O_3)

Ozone is formed when reactive organic gases are mixed with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the summer months. Ozone is a colorless, very reactive gas which oxidizes other materials. Oxidation damages living cells and tissues by altering their protein, lipid, and carbohydrate components or products. Such damage leads to dysfunction and death of cells in the lung and in other internal tissues.

The U.S. EPA revised the federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on new health studies which became available since the standard was last revised in 1979. These new studies showed that adverse health effects occur at lower ambient concentrations over longer exposure times than those reflected in the previous standard, which was based on acute health effects associated with heavy exercise and short-term exposures. The U.S. EPA's proposed ozone rule lists health effects which have been attributed to result from short-term (one to three hours) and prolonged (six to eight hours) exposure to ozone (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard. EPA has asked the U.S. Supreme Court to reconsider that decision.

Acute health effects induced by short-term exposures include transient reductions in pulmonary function, and transient respiratory symptoms including cough, throat irritation, chest pain, nausea, and shortness of breath with associated effects on exercise performance. Other health effects associated with short-term or prolonged O_3 exposures include increased airway responsiveness (a predisposition to bronchoconstriction caused by external stimuli such as pollen and dust), susceptibility to respiratory infection by impairing lung defense mechanisms, increased hospital admissions and emergency room visits, and transient pulmonary inflammation.

Generally, groups considered especially sensitive to the effects of air pollution include persons with existing respiratory diseases, children, pregnant women, and the elderly. However, controlled exposure data on people in clinical settings have indicated that the population at greatest risk of acute effects from ozone exposures are children and adults engaged in physical exercise. Children are most at risk because they are active outside, playing and exercising, during the summer when ozone levels are at their highest. Adults who are outdoors and engaging in activities involving heavy levels of exertion during the summer months are also among those most at risk. Exertion increases the amount of O_3 entering the airways and can cause O_3 to penetrate to peripheral regions of the lung where lung tissue is more likely to be damaged. These individuals, as well as those with respiratory illnesses, such as asthma, can experience a reduction in lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion.

CARBON MONOXIDE (CO)

Carbon monoxide is a colorless, odorless gas which is a product of inefficient combustion. It does not persist in the atmosphere, but is quickly converted to carbon dioxide. However, it can reach high levels in localized areas, or “hot spots”.

CO reduces the oxygen carrying capacity of the blood, thereby disrupting the delivery of oxygen to the body’s organs and tissues. Persons sensitive to the effects of carbon monoxide include those whose oxygen supply or delivery is already compromised. Thus, groups potentially at risk to carbon monoxide exposure include persons with coronary artery disease, congestive heart failure, obstructive lung disease, vascular disease, anemia, the elderly, newborn infants, and fetuses (CARB 1989, p. 9). In particular, people with coronary artery disease were found to be especially at risk from carbon monoxide exposure (CARB 1989, p. 9). Tests conducted on patients with confirmed coronary artery disease indicated that exposure to low levels of carbon monoxide during exercise produced significant cardiac effects. These included earlier onset of chest pain (angina) and electrocardiographic changes indicative of effects on the heart muscle (CARB 1989, p. 6). Such changes can limit the ability of patients with coronary artery disease to exert themselves even moderately. Therefore, the statewide carbon monoxide one hour and eight hour standards were adopted in part to prevent aggravation of chest pain. Additionally, however, the standards are intended to prevent decreased exercise tolerance in persons with peripheral vascular disease and lung disease, impairment of central nervous system functions, and increased risk to fetuses (Cal. Code Regs., tit. 17, . 70200).

PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances which occur as either liquid droplets or small solids over a wide range of sizes. Particles having the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter which may be inhaled and deposited into the deep portions of the lung (PM_{10}). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or may be the result of physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM_{10} includes elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil. The size, chemical composition, and concentration of ambient PM_{10} can vary considerably from area to area and from season to season within the same area.

PM_{10} can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those having a diameter of 2.5 micrometers or less ($PM_{2.5}$), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter ($PM_{10-2.5}$). The following information on PM 2.5 health effects and federal standards is included for

information only. A 1999 federal court ruling blocked implementation of these standards. EPA has asked the U.S. Supreme Court to reconsider that decision.

$PM_{2.5}$ is derived both from combustion by-products which have volatilized and condensed to form primary $PM_{2.5}$ and from precursor gases reacting in the atmosphere to form secondary $PM_{2.5}$. Fine particles include nitrates, organic compounds, sulfates, ammonium, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of fine particles are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow and such particles may have long lifetimes in the atmosphere (days to weeks) and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out in raindrops.

Coarse-mode $PM_{10-2.5}$ is formed by crushing, grinding, and abrasion of surfaces, breaking large pieces of materials into smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel short distances (less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than fine particles.

Because PM_{10} includes many different types of particles with widely divergent chemical characteristics, potential health effects depend upon the constituent make-up of PM_{10} to which persons may be exposed.

The size of the particles inhaled determines where they are deposited in the respiratory system. Coarse particles are deposited most often in the nose and throat. Fine particles are deposited most often in the bronchial tubes and in the air sacs, with the greatest percentage being deposited in the air sacs. Particles deposited in the air sacs are removed more slowly by the body than particles in either the nose and throat or the bronchial tubes. Because of the longer residence time, they have a greater opportunity to cause adverse health effects.

Many epidemiological studies have shown that exposure to particulate matter is associated with a variety of health effects, including premature mortality, aggravation of respiratory and cardiovascular disease, changes in lung function and increased respiratory symptoms, changes to lung tissues and structure, and altered respiratory defense mechanisms. Based on their review of a number of such community epidemiological studies published after 1987 when the federal standards were last revised, the U.S. EPA concluded that then-current standards were not sufficiently stringent to prevent the occurrence of adverse public health effects. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) by adding new annual and 24-hour $PM_{2.5}$ standards to the existing annual and 24-hour PM_{10} standards. The U.S. EPA's review concluded that fine particles were a better surrogate for those components of PM most likely linked to mortality and morbidity effects at levels below the previous standards, while high concentrations of coarse fraction particles are linked to effects such as aggravation

of asthma. Taken together, the new standards are meant to provide increased protection against a wide range of PM-related health effects, including premature mortality and increased hospital admissions and emergency room visits, primarily in the elderly and individuals with cardiopulmonary disease; increased respiratory symptoms and disease in children and individuals with cardiopulmonary disease such as asthma; decreased lung function, particularly in children and individuals with asthma; and alterations in lung tissue and structure and in respiratory tract defense mechanisms.

California has 24-hour and annual standards for PM_{10} only which are based on studies which describe the lowest probable effects levels and which represent the lowest pollution levels at which health effects were investigated (CARB 1982, pp. 81,84). The studies included investigations of increased rates of asthma attack, increased mortality, and changes in the health status of bronchitis patients.

California's 24-hour PM_{10} standard is intended to prevent exacerbation of symptoms in sensitive patients with respiratory disease, declines in pulmonary function (especially in children), and excess mortality from short-term exposure (Cal.. Code Regs., tit. 17, . 70200). The standard is intended to provide a small margin of safety to account for the possibility of effects occurring at lower levels (CARB 1982, p. 84). The state 24 hour PM_{10} standard was set to be more stringent than the national 24 hour PM_{10} standard. At the time of CARB's adoption of the state standard, the U.S. EPA had not set federal 24 hour $PM_{2.5}$ standards, and CARB found that the federal standard did not adequately protect public health (CARB 1991, p. 26).

The annual standard is based on studies which show that long-term exposure to PM_{10} causes decreased breathing capability and increased respiratory illness in susceptible populations such as children (CARB 1991, p. 25). The annual standard is also based on the lifetime risk of cancer from exposure to carcinogenic particles known to be present in this size fraction (CARB 1982, p. 84).

NITROGEN DIOXIDE (NO_2)

Nitrogen dioxide is formed either directly or indirectly when oxygen and nitrogen in the air combine during combustion processes. It is a relatively insoluble gas which is able to penetrate deep into the lungs, its principal site of toxicity. Its toxicity is thought to be due to its capacity to initiate free radical reactions and to oxidize cellular proteins and other biomolecules (CARB 1992, Appendix A, p. 4).

Sublethal exposures in animals produce inflammation and various degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, p. 5). The changes produced by low-level acute or subchronic exposure appear to be reversible when animals are allowed to recover in clean air.

Health effects of particular concern in relation to low-level nitrogen dioxide exposure include: (1) effects of acute exposure on some asthmatics and possibly on some persons with chronic bronchitis, (2) effects on respiratory tract defenses against

infection, (3) effects on the immune system, (4) initiation or facilitation of the development of chronic lung disease, and (5) interaction with other pollutants (CARB 1992, Appendix A, p. 5).

Several groups which may be especially susceptible to nitrogen dioxide related health effects have been identified (CARB 1992, Appendix A, p. 3). These include asthmatics, persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies using controlled brief exposures on sensitive groups have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, and decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyperreactivity (an exaggerated tendency of the airways to constrict) is markedly greater in asthmatics than in nonasthmatics upon exposure to respiratory irritants (CARB 1992a, p. 107). At exposure concentrations relevant to the current one hour ambient standard, there appears to be little, if any, effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

SULFUR DIOXIDE (SO_2)

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO_2 is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to sulfur dioxide can cause changes in lung cell structure and function that adversely affect a major lung defense mechanism known as muco-ciliary transport. This mechanism functions by trapping particles in mucus in the lung and sweeping them out via the cilia (fine hair-like structures) also in the lung. Slowed mucociliary transport is frequently associated with chronic bronchitis.

Exposure to sulfur dioxide can produce both short- and long-term health effects. Therefore, California has established sulfur dioxide standards to reflect both short- and long-term exposure concerns. Based on controlled exposure studies of human volunteers, investigators have found that asthmatics comprise the group most susceptible to adverse health effects from exposure to sulfur dioxide (CARB 1994, p. V-1).

The primary short-term effect is bronchoconstriction, a narrowing of the airways which results in labored breathing, wheezing, and coughing. The short-term (one hour) standard is based on bronchoconstriction and associated symptoms (such as wheezing and shortness of breath) in asthmatics and is designed to protect against adverse effects from five to ten minute exposures. In the opinion of the California Office of Environmental Health Hazard Assessment, the short-term ambient standard is likely to afford adequate protection to asthmatics engaged in short periods of vigorous activity (CARB 1994, Appendix A, p. 16).

Longer-term exposure is associated with an increased incidence of respiratory symptoms (e.g., coughing and wheezing) or respiratory disease, decreases in pulmonary function, and an increased risk of mortality (CARB 1991a, p. 12). The long-term (24 hour) standard is based upon increased incidence of respiratory

disease and excess mortality. The standard includes a margin of safety based on epidemiological studies which have shown adverse respiratory effects at levels slightly above the standard. Some of the studies indicate a sulfur dioxide threshold for effects, whereby “no adverse effects” are expected from exposures to concentrations at the state standard (Ibid.).

REFERENCES

CARB. 1982. California Air Resources Board. California Ambient Air Quality Standard for Particulate Matter (PM_{10}). December.

CARB. 1989. California Air Resources Board. Adequacy of the Statewide Carbon Monoxide Ambient Air Quality Standard: The Impact of Recent Health Effects Studies. Staff Report. December.

CARB. 1991. California Air Resources Board. Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide. April 11.

CARB. 1991a. California Air Resources Board. Amendments to Regulations for the 24-Hour Ambient Air Quality Standard for Sulfur Dioxide. Staff Report. August.

CARB. 1992. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Nitrogen Dioxide. Staff Report. December.

CARB. 1992a. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Nitrogen Dioxide. Technical Support Document. December.

CARB. 1994. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Sulfur Dioxide. Staff Report. December 27.

FDA. 1985. United States Food and Drug Administration. Federal Register. Vol. 50, No. 243. December 18.

Kleinman et al. 1989. Effects on Human Health of Pollutants in the South Coast Air Basin. Final Report to the South Coast Air Quality Management District. June.

WORKER SAFETY AND FIRE PROTECTION

Alvin J. Greenberg, Ph.D. and Rick Tyler

INTRODUCTION

Worker safety and fire protection is legislated by laws, ordinances, regulations, and standards (LORS), and enforced through regulations codified at the Federal, State, and local levels. Worker safety is of utmost priority at the project location and is documented through worker safety practices and training. Industrial workers at the facility operate process equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to either eliminate these hazards or minimize the risk through special training, protective equipment or procedural controls.

The purpose of this analysis is to assess whether the worker safety and fire protection measures proposed by Southern Energy Delta, LLC for the Contra Costa Power Plant (CCPP) Unit 8 are adequate to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide sufficient emergency response procedures.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970 (OSH). This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, § 651 (29 U.S.C. §§ 651 through 678). Implementing regulations are codified at Title 29 of the Code of Federal Regulations, under General Industry Standards §§ 1910.1 - 1910.1500. The regulations clearly define procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. Most of the general industry safety and health standards now in force under OSH represent a compilation of materials from existing federal standards and national consensus standards. These include standards from the voluntary membership organizations of the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA) which publishes the National Fire Codes.

The purpose of the Occupational Safety and Health Act is to “assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources,” (29 USC § 651). The Federal Department of Labor promulgates and enforces safety and health standards that are applicable to all businesses affecting interstate commerce. The Department of

Labor established the Occupational Safety and Health Administration (OSHA) in 1971 to discharge the responsibilities assigned by the Occupational Safety and Health Act.

Applicable Federal requirements include:

- 29 U.S.C. § 651 et seq. (Occupational Safety and Health Act of 1970);
- 29 C.F.R. §1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations);
- 29 C.F.R. §1952.170 – 1952.175 (Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR §1910.1 – 1910.1500).

STATE

California passed the Occupational Safety and Health Act of 1973 ("Cal/OSHA") as published in the California Labor Code § 6300. Regulations promulgated as a result of the Act are codified at Title 8 of the California Code of Regulations, beginning with §337-560 and continuing with §1514 through 8568. The Labor Code requires that the Cal/OSHA Standards Board adopt standards at least as effective as the federal standards (Labor Code § 142.3(a)) and thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. Hence, California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements published at 29 C.F.R. §1910.1 - 1910.1500). The Federal Secretary of Labor, however, continually oversees California's program and will enforce any federal standard for which the State has not adopted a Cal/OSHA counterpart.

The State of California Department of Industrial Relations is charged with responsibility for administering the Cal/OSHA plan. The Department of Industrial Relations is further split into six divisions to oversee, among other activities: industrial accidents, occupational safety and health, labor standards enforcement, statistics and research, and the State Compensation Insurance Fund (workers compensation).

Employers are responsible for informing their employees about workplace hazards, potential exposure, and the work environment (Labor Code § 6408). Cal/OSHA's principal tool in ensuring that workers and the public are informed is the Hazard Communication standard first adopted in 1981 (Cal. Code Regs., tit. 8, §5194). This regulation was promulgated in response to California's Hazardous Substances Information and Training Act of 1980. It was later revised to mirror the Federal Hazard Communication Standard (29 C.F.R. §1910.1200) which established on the federal level an employee's "right to know" about chemical hazards in the workplace, but added the provision of applicability to public sector employers. A major component of this regulation is the required provision of Material Safety Data Sheets (MSDSs) to workers. MSDSs provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

Finally, California Code of Regulations, title 8, section 3203 requires that employers establish and maintain a written Injury and Illness Prevent Program to identify workplace hazards and communicate them to its employees through a formal employee-training program.

Applicable State requirements include:

- Cal. Code Regs., tit. 8, § 339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- Cal. Code Regs., tit. 8, § 337, et seq. Cal/OSHA regulations;
- Cal. Code Regs., Tit. 24 § 3, et seq. - incorporates the current addition of the Uniform Building Code;
- Health and Safety Code § 25500, et seq. - Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at the facility;
- Health and Safety Code § 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

LOCAL

The California Building Standards Code published at Title 24, California Code of Regulations section 3 et seq, is comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The Building Standards Code includes the electrical, mechanical, energy, and fire codes applicable to the project. Local planning/building & safety departments enforce the California Uniform Building Code.

National Fire Protection Association (NFPA) standards are published in the California Fire Code. The fire code contains general provisions for fire safety, including but not restricted to: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code reflects the body of regulations published at Part 9 of Title 24 (H&S Code §18901 et seq.) pertaining to the California Fire Code.

Similarly, the Uniform Fire Code Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

Applicable local (or locally enforced) requirements include:

- 1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9);

- California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.).
- Uniform Fire Code, 1997

SETTING

The CCPP Unit 8 site is located in the northeast portion of the existing CCPP in Contra Costa County. The proposed project will be situated wholly within the confines of an existing and active power generating facility and as such, fire protection systems and worker safety programs already exist and are in place. Current land uses in the site vicinity include mostly industrial with some commercial and open space. Fire support services to the site will be under the jurisdiction of Contra Costa Fire Protection District. The Antioch Fire Department Station No. 81 is three miles away and thus is the closest station to the site. This station is assigned as the off-site first responder to the CCPP.

This fire station does not have first responder HAZMAT capabilities (personal communication with Captain Dave Gehling). The Contra Costa County Hazardous Materials Programs Division has 24-hour response capability out of Martinez - approximately 30 highway miles to the west - and can respond to a spill or release as a backup to the on-site facility response team. Telephone response to a request for assistance can be provided within 5 minutes, on-site consultation can be provided in less than one hour and actual assistance with control and containment can be provided within one to two hours depending upon the traffic (personal communication with Mr. Lou Pascalli, Director).

IMPACTS

PROJECT SPECIFIC IMPACTS

WORKER SAFETY

Industrial environments are potentially dangerous, during both construction and operation of facilities. Workers at the proposed CCPP Unit 8 will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the Contra Costa Power Plant Unit 8 to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

FIRE HAZARDS

During construction and operation of the proposed Contra Costa Power Plant Project there is the potential for both small fires and major structural fires. Electrical sparks combustion of fuel oil, natural gas or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of natural gas or other flammable gasses or liquids. Compliance with all LORS will be adequate to assure protection from all fire hazards.

CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of CCPP Unit 8, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the Contra Costa Fire Protection District.

Projects that could potentially contribute to cumulative impacts are those located in the same geographic area of influence defined as within a 5-mile radius of the proposed power plant. Because there already exists a power generation facility on this site consisting of four active generation units, fire safety has already been addressed for the existing facility and for the surrounding industries. Staff finds that the addition of the proposed Unit 8 to this site would not add significant cumulative impacts to those already encountered and addressed by the existing fire and emergency response entities.

APPLICANT'S PROPOSED MITIGATION

WORKER SAFETY

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 that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

CONSTRUCTION SAFETY AND HEALTH PROGRAM

The CCPP Unit 8 project encompasses construction and operation of a natural gas fired facility with ancillary facilities such as transmission lines and pipelines. Workers will be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility.

Construction Safety Orders are published at Cal. Code Regs., tit. 8, § 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:
Construction Injury and Illness Prevention Program (Cal. Code Regs., tit 8 § 1509);
Construction Fire Protection and Prevention Plan (Cal. Code Regs., tit 8 § 1920); and
Personal Protective Equipment Program (8 CCR §§ 1514 - 1522).

Additional programs under General Industry Safety Orders (Cal. Code Regs., tit. 8 §§ 3200 - 6184), Electrical Safety Orders (Cal. Code Regs., tit 8 §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal. Code Regs., tit. 8 §§ 450 - 544) will include:

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Confined Space Entry Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The AFC includes adequate outlines of each of the above programs. Prior to construction of CCPP Unit 8, detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-1**.

OPERATION SAFETY AND HEALTH PROGRAM

Upon completion of construction and prior to operations at CCPP Unit 8, the Operations Safety and Health Program will be prepared. The Operational Safety Program will include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8 § 3203);
- Emergency Action Plan (Cal Code Regs., tit. 8 § 3220);

- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8 § 3221); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8 §§ 3401-3411).

In addition, the requirements under General Industry Safety Orders (Cal. Code Regs., tit. 8 §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8 §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8 §§ 450 - 544) will be applicable to the project. Written safety programs which the applicant will develop for CCPP Unit 8 will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of each of the above programs. Prior to operation of CCPP Unit 8, detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-2**.

SAFETY AND HEALTH PROGRAM ELEMENTS

Southern provided the proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

Southern 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.

The IIPP will include the following components as presented in the CCPP Unit 8 AFC:

- identity of person(s) with authority and responsibility for implementing the program;
- system ensuring employees comply with safe and healthy work practices;
- system facilitating employer-employee communications;
- procedures identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions;
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- methods of documenting inspections and training and for maintaining records; and
- a training program for:
- introducing the program;
- new, transferred, or promoted employees;

- new processes and equipment;
- supervisors; and
- contractors.

Emergency Action Plan

California regulations require an Emergency Action Plan (Cal. Code Regs., tit. 8 § 3220). The AFC contains a satisfactory outline for an emergency action plan (Table 8.7-3).

The outline lists the following features:

- purpose and Scope of Emergency Action Plan;
- personnel Responsibilities during Emergencies;
- specific Response Procedures;
- evacuation Plan;
- emergency Equipment Locations;
- fire Extinguisher Locations;
- site Security;
- accident Reporting and Investigation;
- lockout/Tagout;
- hazard Communication;
- spill Containment and Reporting;
- first Aid and Medical Response;
- respiratory Protection;
- personal Protective Equipment;
- sanitation; and
- work Site Inspections.

Fire Prevention Plan

California Code of Regulations requires an Operation Fire Prevention Plan (8 CCR § 3221). The AFC describes a proposed fire prevention plan which is acceptable to staff. The plan will include the following topics:

- responsibilities;
- procedures for fire control;
- fixed and Portable fire-fighting equipment;
- housekeeping;
- employee alarm/communication practices;

- servicing and refueling areas;
- training; and
- flammable and combustible liquid storage.

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

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are encountered which, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (8 CCR § 3380-3400). The CCPP Unit 8 operational environment will likely require PPE.

Information provided in the AFC indicates that all employees required to use PPE will be checked for proper fit and to see if they are medically capable of wearing the equipment. All safety equipment will meet NIOSH or ANSI standards and will carry markings, numbers, or certificates of approval. Respirators will meet NIOSH and California Department of Health and Human Services Standards. Each employee will be provided with the following information pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- when the protective clothing and equipment are to be used;
- benefits and limitations; and
- when and how the protective clothing and equipment are to be replaced.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provide employees with the information and training necessary to implement the program. Staff evaluated the applicant's outline and determined that the proposed PPE Program contains the elements that will meet applicable regulations and will significantly reduce the potential impact upon workers.

Operations and Maintenance Written Safety Program

In addition to the specific plans listed above, there are additional LORS applicable to the project, which are called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include the following:

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;

- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

Operations and Maintenance Safety Training Programs

Employees will be trained in the safe work practices described in the above-reference safety programs.

FIRE PROTECTION

Staff reviewed the information provided in the AFC regarding available fire protection services and equipment (Southern 2000; AFC Sections 8.7.5 Fire Protection) to determine if the project would adequately protect workers and if it would affect the fire protection services in the area. The project will rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services including trained firefighters and equipment for a sustained response would be required by the local fire protection service.

The information in the AFC indicates that the project intends to meet the minimum fire protection and suppression requirements. Elements include both fixed and portable fire extinguishing systems. The fire water supply (the San Joaquin River) and pumping system will provide more than an adequate quantity of fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems. The motor driven fire pump will be capable of supplying maximum water demand for any automatic sprinkler system plus water for fire hydrants and hose stations.

A carbon dioxide fire protection system will be provided for the combustion turbine and accessory equipment. Fire detection sensors will also be installed.

Fire hydrants and hose stations will be connected to the existing CCPP system already in operation. Hydrants or hose stations will be placed at approximately 300 -foot intervals around the perimeter of the proposed facility.

A sprinkler system will be installed in common service buildings.

In addition to the fixed fire protection system, smoke detectors, combustible gas detectors, and portable extinguishers will be located throughout the plant with size, rating, and spacing in accordance with the Uniform Fire Code.

The applicant will be required to provide the final Fire Protection and Prevention Program to staff and to the Contra Costa Fire Protection District, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

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 the applicant provides a Project Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program 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. Staff also concludes that the proposed plant will not have significant impacts on local fire protection services. The proposed facility is located within an existing power plant facility that is currently served by the local fire department. The fire risks of the existing facility are similar and thus pose no new or added demands on local fire protection services.

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 Construction Injury and Illness Prevention Program and the Operations Safety and Health Program proposed by Southern 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 Injury and Illness Prevention Program, containing the following:

- Construction Safety Program;
- Construction Personal Protective Equipment Program;
- Construction Exposure Monitoring Program;
- Construction Emergency Action Plan; and
- Construction Fire Protection and Prevention Plan.

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the Contra Costa Fire Protection District for review and comment prior to submittal to the CPM.

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 for review and approval a copy of the Project Construction Injury and Illness Prevention Program. The project owner shall provide a letter from the Contra Costa Fire Protection District stating that they have reviewed and commented on the Construction Fire Protection and Prevention Plan Emergency Action 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;
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the and 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 fire protection agency serving the project 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.

REFERENCES

1998 California Fire Code. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

1997 Uniform Fire Code, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

Southern Energy Delta, LLC. 2000. Contra Costa Power Plant Unit 8 Project. Application for Certification (00-AFC-1 prepared Dames & Moore. Submitted to the California Energy Commission, January 2000.

TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam, Ph.D.

INTRODUCTION

The energy from the proposed Contra Costa Power Plant (CCPP) Unit 8 will first be delivered to a new on-site switchyard from where it will be transmitted to the Pacific Gas and Electric (PG&E) 230 kV power grid via PG&E's 230 kV Contra Costa Switchyard also at the CCPP site. As noted by the applicant - Southern Company (Southern 2000a, page 2-1, 2000o, page 25-1) - the proposed transmission to the PG&E switchyard will be through an overhead 3,809-foot 230 kV line whose route will lie entirely within the CCPP site. This PG&E switchyard presently serves to transmit the power from the producing members of Units 1-7 of CCPP to the PG&E power grid. Since this PG&E switchyard is located within the CCPP site, no new connecting transmission lines would be built because of the proposed Unit 8 project. The purpose of this staff analysis is to assess the proposed on-site connection line for compliance with existing laws, ordinances, regulations, and standards (LORS). The assessment will evaluate the following issues that relate primarily to the physical presence of the lines, or secondarily to the physical interactions of their electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Discussed below by subject area are design-related LORS applicable to the physical impacts of the proposed connection lines and the existing PG&E transmission system into which power from Unit 8 will be transmitted. The impacts of concern are addressed through specific federal or state regulations or through established industry standards and practices. There presently are no local laws or regulations specifically aimed at the physical structure or dimensions of electric power lines to limit the impacts noted above.

AVIATION SAFETY

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

FEDERAL

- 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

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, that 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. The level of interference is influenced independently by factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal

level, line configuration, and weather conditions. Therefore, numerical interference limits are not specified as design criteria for modern transmission lines as sited in all geographic areas. The FCC requires instead that each line operator 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.

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.

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.

AUDIBLE NOISE

INDUSTRY STANDARDS

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 such as the ones within the area's PG&E transmission system and the ones proposed for CCPP. 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.

NUISANCE SHOCKS

INDUSTRY STANDARDS

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 electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields. 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 the proposed and existing PG&E lines, the owner is responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. Staff usually recommends specific conditions of certification to ensure that both the applicant and property owners make such grounding within the right-of-way.

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 and other combustible objects.

STATE

- 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, California Code of Regulations. Section 1250, "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.

FEDERAL

- 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.

STATE

- 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, Sections 2700-2974 "High Voltage Electric Safety Orders." These safety orders establish essential requirements and minimum standards for safely installing, operating, and maintaining electrical installations and equipment.

ELECTRIC AND MAGNETIC FIELD EXPOSURE

The possibility of health effects from exposure to electric and magnetic fields has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of considering exposure to both as EMF exposure. 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 where feasible. The challenge has been to establish when and how far to reduce them. Several regulations have been established to control human exposure.

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.

FEDERAL

No federal regulations have been established specifying environmental limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Minnesota, Florida, New York, Montana, and 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 note 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.

STATE

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 each utility within its jurisdiction to establish EMF-reducing design guidelines for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Utilities not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013 of 1989.

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 is therefore up to each applicant to ensure that such measures are applied 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, in the case of electric fields, on line voltage, 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 each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, their fields are required under existing CPUC policies to be similar to fields from similar lines in that service area. A condition of certification is proposed by staff to verify implementation of the reduction measures necessary. The applicable condition for this project is TLSN-2.

SETTING

According to information from the applicant (Southern 2000a, pages 8.4-3, 8.4-12 and 8.6-2), the proposed Unit 8 project will be located on a previously developed portion of the existing Contra Costa Power Plant. The immediate vicinity is zoned for industrial and commercial uses while the area beyond is mostly rural. The nearest rural residence is about 250 feet from the property line (Southern 2000a, page 2-52). This means that the long-term residential magnetic field of the present concern would be insignificant for the proposed line. The other lines at the site are used to transmit the power from the existing CCPP units to the PG&E power grid through the same on-site PG&E switchyard to be used for Unit 8. Since the project site is not open to the general public, the only exposure of potential significance would be the short-term exposure of utility and non-utility workers at the site. No new major industrial, commercial, or residential projects are planned for the immediate project area.

PROJECT DESCRIPTION

The proposed transmission line is a single-circuit, 3,809-foot 230 kV overhead line to be located entirely within CCPP property. The conductors will be carried on tubular steel structures, providing a minimum ground clearance of between 16 feet and 32 feet depending on closeness to the exiting on-site lines. The applicant (Southern 2000a, pages 2-48 through 2-53) has provided the details of the pole design. Since the line is proposed for PG&E's service area, its conductors will, in keeping with present CPUC requirements, be arranged on their support structures according to PG&E's field reduction guidelines.

IMPACTS

GENERAL IMPACTS

As noted in the LORS section, GO-95 and Title 8, CCR Section 2700 et seq. provide the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks and aviation hazards. Of secondary concern are the field-related impacts manifesting as nuisance shocks, radio noise, communications interference and human field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since the field-reducing measures can affect line operations, the extent of their implementation, together with related field strengths, will vary according to environmental and other local conditions bearing on line safety, efficiency, reliability, and maintainability. They will, therefore,

vary from one service area to the other according to prevailing conditions. Each project proponent will apply such measures to the extent appropriate for the geographic area involved. The potential for all these impacts is assessed separately for each proposed project.

PROJECT SPECIFIC IMPACTS

AVIATION SAFETY

There are no major airports in the immediate vicinity of the proposed Unit 8 project. Since (a) the proposed lines will be designed according to PG&E guidelines relative to aviation and the other safety hazards and, (b) the system's PG&E lines have not posed a significant hazard to area aviation, staff does not expect these proposed lines to pose a significant hazard to area aviation. An FAA "Notice of Construction or Alteration" will not be required, according to existing regulatory criteria. However, owners of transmission lines generally inform the FAA about such lines before construction, even when the FAA notice is not required. The applicant intends to appropriately inform the FAA with respect to the proposed line.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other irregularities around the conductor surface. The applicant's intended use of a low-corona conductor design, as PG&E requires, would minimize the potential for such interference, which is usually of concern only for lines of 345 kV and above. No significant communications interference is expected, as with the nearby 230 kV PG&E lines designed according to related PG&E guidelines. 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. Since the proposed line is to be located onsite, away from area residences, staff does not consider the communication interference issue as significant in this case.

AUDIBLE NOISE

As with radio noise, the low-corona conductor proposed for this Unit 8-related line (and currently used in the area's 230 kV PG&E lines) will minimize the potential for audible noise. This means, as reflected in the applicant's analysis (Southern 2000a, page 2-52), that the proposed line will not add significantly to background noise levels. For an assessment of the noise impacts from all phases of the proposed power plant and related facilities, please refer to staff's analysis in the **Noise** section.

FIRE HAZARDS

Since the proposed line will be located entirely within the CCPP site and operated in keeping with PG&E's fire prevention guidelines, staff does not expect it to pose a fire hazard during operations.

HAZARDOUS SHOCKS

As with all PG&E transmission lines, the proposed connection line will be designed according to GO-95 requirements against hazardous shocks from direct or indirect human contact with the overhead energized line. Therefore, staff does not expect it to pose a shock hazard on site.

NUISANCE SHOCKS

Since the proposed line will be grounded according to PG&E requirements, staff does not expect it to pose a significant nuisance shock along its on-site route. Ensuring GO-95-required ground clearance, as with all PG&E lines, will minimize the potential for the electrical charging for which such grounding would be necessary.

ELECTRIC AND MAGNETIC FIELD EXPOSURE

The proposed lines will be designed in compliance with PG&E's EMF reduction requirements arising from CPUC Decision 93-11-013 of 1989. The applicant calculated the maximum strengths during operations as 2.97 kV/m directly underneath, diminishing to 1.49 kV/m at the CCPP property boundary and 0.04 kV/m at the nearest residence 250 feet away. These are as staff expects for PG&E lines of the same voltage.

The maximum magnetic field level underneath the proposed line was calculated as 193.0 mG directly underneath, 135.0 mG at the property boundary and 5.2 mG at the nearest residence. These field strengths are similar to PG&E lines of the same voltage and current-carrying capacity. Staff has established the appropriateness of the applicant's calculation approach with respect to parameters bearing on field strength and dissipation, and exposure levels. These field strengths are less at the property boundary than at the edges of rights-of-way for similar fields in states with regulatory limits, which range from 200 mG in New York to 150 mG in Florida.

CUMULATIVE IMPACTS

The strengths of electric and magnetic fields from the proposed line were calculated (and will be required to be measured) to factor the interactive effects of all area lines. These calculated field strength values, therefore, reflect the cumulative exposure of an individual to fields from the nearby lines as used in connection with the other CCPP Units. They reflect implementation of the field-reducing measures incorporated into PG&E's field designs as currently required by the CPUC.

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. Since the line will be designed according to PG&E's field reduction requirements, its fields will be similar in magnitude to those of PG&E lines of the

same voltage and current-carrying capacity. This similarity is reflected in the field strength values calculated by the applicant for specific locations around the line. Since the line will be entirely located within the CCPP site of limited public access, the long-term residential exposures of the present concern would be relatively insignificant. The possible short-term worker exposures would be at levels associated with similar PG&E lines. Such exposures are well understood and have not been associated with specific health effects. Any nuisance shocks from the line will be minimized through grounding and other measures to be implemented by the project owner in compliance with GO-95, Title 8, Section 2700 et seq. of the California Code of Regulations, and PG&E guidelines. Since the line will be located away from area airports, any hazard to area aviation will be small, as with the nearby PG&E lines. The use of low-corona conductors together with an appropriate line maintenance program (as is PG&E practice), will minimize the potential for interference with radio-frequency communication.

RECOMMENDATIONS

Since the proposed 230 kV transmission line will be designed according to the applicable PG&E safety and field-reducing guidelines, and routed within the CCPP property lines in the vicinity of other PG&E lines, staff recommends its approval for the route proposed. 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 by the applicant for the line design.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission line according to the requirements of GO-95, GO-52, Title 8 California Code of Regulations Sections 2700-2974, and PG&E's EMF-reduction guidelines arising from CPUC Decision 93-11-013. The line shall also be grounded according to current PG&E practices.

Verification: Thirty days before start of transmission line construction, the project owner shall submit to the Energy 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-50, Title 8, California Code of Regulations Sections 2700-2974, and PG&E's EMF reduction guidelines arising from CPUC Decision 93-11-013. The letter shall also affirm that the line will be grounded according to current PG&E practices.

TLSN-2 The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields along the 3,809-foot route, before and after it is energized. Measurements should be made at the same point of maximum levels, the CCPP property line, and the nearest residence, for which the applicant presented field strength values.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements. These measurements shall be completed within 6 months of the start of operations.

REFERENCES

Electric Power Research Institute (EPRI). 1982. Transmission Line Reference Book: 345 kV and Above. Second Edition, 625p.

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.

Southern 2000a. Application for Certification, for the Contra Costa Power Plant Unit 8 Project (00-AFC). Submitted to the California Energy Commission, January 1, 2000.

Southern 2000o. Data responses to CEC data requests, received on August 18, 2000.

HAZARDOUS MATERIALS MANAGEMENT

Alvin J. Greenberg, Ph.D. and Rick Tyler

INTRODUCTION

The purpose of this Preliminary Staff Analysis is to determine if the proposed Contra Costa Power Plant (CCPP8) Unit 8 has the potential to cause 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 on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and thus employees accept a higher level of risk than the general public as a condition of employment. Workers are thus not afforded the same level of protection normally provided to the public. Further, workers can be provided with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. Staff's **Worker Safety and Fire Protection** analysis also describes the requirements applicable to the protection of workers from such risks.

The only hazardous material stored at the CCPP Unit 8 in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), is aqueous ammonia (29 percent ammonia in aqueous solution; see Tables 8-12.2, 8.12-3 and 8.12-4 of the Application for Certification [AFC]). The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more economical anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the more hazardous anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release which can rapidly introduce large quantities of the material to the ambient air, where it can be transported in the atmosphere and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain and emissions are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, will be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/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 some risk of both fire and explosion, however, the gas line will not be lengthy and will be attached to an existing on-site main. Thus, off-site gas pipeline construction will not be required and the pipeline design is addressed in staff's **Facility Design** analysis.

The CCPP Unit 8 will also require the transportation of aqueous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed below.

LAWS, ORDINANCES, REGULATIONS, STANDARDS AND POLICIES

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.), contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III). The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CCA section on Risk Management Plans - codified in 42 USC §112(r) - requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531 et seq. Due to the high volume of petroleum-containing hazardous materials already in use on this site, a Spill Prevention Control and Countermeasure Plan (SPCC) is required by Federal Regulations (Hazardous Waste Contingency Plan Title 40, Part 112.7).

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).

Title 8, California Code of Regulations, Section 5189, requires facility owners to develop and implement effective safety management plans to insure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

Title 8, California Code of Regulations, Section 458 and Sections 500 – 515, set forth requirements for design, construction and operation of vessels and equipment used to store and transfer anhydrous ammonia. These sections generally codify the

requirements of several industry codes, including the ASME Pressure Vessel Code, ANSI K61.1 and the National Boiler and Pressure Vessel Inspection Code. While these codes apply to anhydrous ammonia, they may also be used to design storage facilities for aqueous ammonia.

California Health and Safety Code, section 41700, requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials in Articles 79 and 80. The latest revision to Article 80 was in 1997 (Uniform Fire Code, 1997) and includes minimum setback requirements for outdoor storage of ammonia.

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.

The Contra Costa County Zoning Ordinance 98-48 requires a Safety Plan and a Risk management Plan to be prepared and submitted to the County Planning Department. In regards to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials must conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the Contra Costa County Building Code.

SETTING

The proposed project is located in an unincorporated area of Contra Costa County but within the Sphere of Influence of the City of Antioch. The site is located within the existing Contra Costa Power Plant and borders industrial areas to the south and west. To the north is the San Joaquin River and Delta. Mixed land uses lie to the east and include a marina, park, a chemical manufacturer, and open space. A residential neighborhood lies to the southwest. Hazardous materials use and transportation are associated with many of the commercial and industrial activities in the area. Thus, hazardous materials are commonly transported, stored, and used in the project vicinity.

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:

- local meteorology;

- terrain characteristics; and
- location of population centers and sensitive receptors relative to the project.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the 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 (Southern 2000a, AFC Chapter 8.1). This data indicates that wind speeds below one meter per second and temperatures exceeding 80°F occur in the project area, albeit rarely owing to the temperate nature of the Delta microclimate. Therefore, staff agrees with the applicant that use of F stability (stagnated air, very little mixing), one meter/second wind speed, and an ambient temperature of 106.7^{o} F in its modeling analysis of an accidental release is an extremely conservative scenario and thus reflects worst case atmospheric conditions. Staff also believes that the Applicant's Alternative Scenario modeling input parameters (see Table 8.12-5 of the AFC) presents a more reasonable scenario of the dispersion of an accidental release.

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. Modeling of an accidental release of aqueous ammonia at the proposed facility indicates that significant concentrations would be confined to the facility property and that off-site concentrations – even at elevated locations – would be so low as to pose no hazard to the public. Besides, the project site and immediate vicinity is mostly level terrain and the nearest significantly elevated locations are more than one mile distant. Thus, elevated terrain is not an important factor affecting the modeled results of accidental releases of aqueous ammonia at this site.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Figure 8.6-1 (Southern 2000a) shows the locations of both populated areas and sensitive receptors in the project vicinity. The nearest sensitive receptor is a residence located 1440 feet to the east of the site (Southern 2000b. AFC errata page 8.12-14). The nearest public receptor is an office building 1,100 feet to the east and the nearest school is located more than 2 miles to the southwest.

ENVIRONMENTAL IMPACTS

Staff thoroughly reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated.

METHODOLOGY

In order to assess the potential for released hazardous materials to travel off-site, and impact on the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some chemicals must be used that are toxic. Therefore, staff conducted its analysis by examining the need for hazardous materials, the choice of chemical to be used and its amount, the manner in which the applicant will use the chemical, the manner it will be transported to the facility and transferred to facility storage tanks, and the way the applicant chooses to store the material on-site. Staff reviewed the applicant's proposed engineering controls and administrative controls concerning hazardous materials usage. Engineering controls are those physical or mechanical systems (such as storage tanks or automatic shut-off valves) which can prevent a spill of hazardous material from occurring or which can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that will help to prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and causing harm to people.

Staff conducted a thorough review and evaluation of the applicant's proposed use of hazardous materials as described by the applicant in the AFC (Section 8.12) and in data responses. Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and the amounts currently on-site or proposed for use as listed in Tables 8.12-2, 8.12-3, and 8.12-4 of the AFC and determined the need and appropriateness of their use. If less toxic materials are available, staff suggested their use instead. [Table 8.12-2 lists those materials currently on-site, Table 8.12-3 lists petroleum-containing hazardous materials such as diesel fuel, and Table 8.12-4 lists the additional hazardous materials proposed for use on the site.]
- Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.

- Step 5: Staff then analyzed the theoretical impacts on the public worst-case spill of hazardous materials even with the mitigation measures proposed by the Applicant. If the mitigation methods proposed by the applicant were found to be sufficient, no further mitigation would be required. If the proposed mitigation proposed by the Applicant were found to be insufficient to reduce the potential for adverse impacts to an insignificant level, staff would then propose additional prevention and response controls until the potential for causing harm to the public was reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

PROJECT IMPACTS

As proposed, the facility will cause no significant risk of off-site impacts. Thus, the direct impacts of the project will not add to any existing accidental release risks.

SMALL QUANTITY HAZARDOUS MATERIALS

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for off-site impacts as they will be stored in a solid form or in smaller quantities or have very low toxicity. These hazardous materials were thus removed from further assessment. For example, one such group of chemicals are the scale inhibitors chosen for use at the site. Scale inhibitors are used to control and reduce the potential for scale and corrosion to form within the pipeline system. This group of chemicals includes the NALCO series of solutions, trisodium phosphate, nitrite or molybdate inhibitors, and sodium bisulfite. These chemicals are safer to use than others often used at other facilities for this purpose, such as hydrazine, and the applicant has thus chosen the most appropriate substitute. Staff has determined that the potential for impacts on the public are insignificant if the applicant uses those scale inhibitors and corrosion controllers that contain only the active ingredients on the list. See Appendix C for a list of chemicals that will be used at the power plant.

During the construction phase of the project, the only hazardous materials proposed for use include phosphate or nitrate cleaning solutions, cleaning solvents, antifreeze, and pesticides. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved and thus no further analysis of construction phase activities appears warranted.

The existing use of a small quantity of hydrogen gas (237 lbs.) poses a risk of explosion. However, the small quantity present and the results of previous modeling of the blast effects of a hydrogen tank explosion demonstrate that any blast effect will be confined to the site and not impact off-site. The Applicant indicates that the hydrogen cylinders will be stored in an area isolated from potential ignition sources.

After removing from consideration those chemicals that fit into Steps 1 and 2, staff continued with Steps 4 and 5 to review the only remaining hazardous materials:

sodium hydroxide, sulfuric acid, sodium hypochlorite, petroleum fuels, natural gas, and aqueous ammonia.

LARGE QUANTITY HAZARDOUS MATERIALS

According to Southern, more than 15,000 gallons of Sodium Hydroxide and 12,000 lb. If 92 percent Sulfuric acid will be used and stored on-site. These materials do not pose a risk of off – site. These materials do not pose a risk of off – site impacts, because they have relatively low vapor pressures and thus spills would be confined to the site. Because of public concern at another proposed energy facility in 1995, staff conducted a quantitative assessment of the potential for impact associated with sulfuric acid use, storage, and transportation. Staff found no hazard would be posed to the public. However, in order to protect against risk of fire, an additional Condition of Certification (see condition of Certification HAZ-5) will require that the project owner shall ensure that no combustible or flammable material is stored, used, or transported within 100 feet of the sulfuric acid tank.

The aqueous mixture of sodium hypochlorite will likewise have a low potential to affect the off-site public because its vapor pressure is also low and the concentration of hypochlorite is low (12.5 percent). In fact, hypochlorite is used at many such facilities as a substitute for chlorine gas, which is much more toxic and much more likely to migrate off-site because it is a gas and is stored in concentrated form. Thus, the use of a water solution of sodium hypochlorite is much safer to use than the alternative: chlorine gas. However, accidental mixing of sodium hypochlorite with acids or aqueous ammonia could result in toxic gases. Given the large volumes of both aqueous ammonia (60,000 gals) and sodium hypochlorite (7610 gals) proposed for storage at this facility, the chances for accidental mixing of the two - particularly during transfer from delivery vehicles to storage tanks - should be reduced as much as possible. Thus, measures to prevent such mixing are extremely important and will be required as an additional section within the required Safety Management Plan for delivery of aqueous ammonia (see Condition of Certification HAZ-3).

Large quantities (>100M gals) of petroleum-containing hazardous materials are presently used on this site. Fuels such as fuel oil #6, mineral oil, lube oil, and diesel fuel are all of very low volatility and impacts of spills are expected to remain on-site. A Spill Prevention Control and Countermeasure Plan (SPCC) is required by Federal Regulations (see LORS above) and has already been prepared for these petroleum-containing hazardous materials.

NATURAL GAS

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed of mostly methane but also contains ethane, propane, nitrogen, butane, isobutane and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is ninety percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or explosions if a release were to occur. However, it should be noted that, due to its tendency to disperse rapidly (Lees

1983), natural gas is less likely to cause explosions than many other fuel gases, such as propane or liquefied petroleum gas. While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. In particular, gas explosions can occur in the Heat Recovery Steam Generator (HRSG) and during start-up. The National Fire Protection Association (NFPA 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 gas-fired equipment. Additionally, start-up procedures will require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture. The safety management plan proposed by the applicant will address the handling and use of natural gas and significantly reduce the potential for equipment failure due to improper maintenance or human error. Since the proposed facility will not require the installation of any new gas pipelines off-site, impacts from a break in the pipeline are limited to the existing pipelines already in use in the area or in the new pipeline (approximately 1500 feet) to be installed on-site. The design of the natural gas pipeline is governed by laws and regulations discussed in staff's **Facility Design** analysis. Thus, the only new gas pipelines installed for the proposed project will be placed on-site where the risk of natural gas accidents can be better controlled and minimized. Therefore, the use of natural gas at the proposed facility will not result in adverse off-site impacts.

AQUEOUS AMMONIA

Based on the screening analysis discussed above, aqueous ammonia is the only hazardous material that may pose a risk of off-site impacts. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its relatively high vapor pressure and the large amounts of aqueous ammonia which will be used and stored on-site. However, as with aqueous hypochlorite, the use of aqueous ammonia instead of the much more hazardous anhydrous ammonia (i.e. ammonia that is not diluted with water) is far safer and results in less of an impact.

Aqueous ammonia will be used in controlling the emission of oxides of nitrogen (NO_x) from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in hazardous down-wind concentrations of ammonia gas. Three 20,000 gallon tanks will be used to store the proposed 148,000 lbs. of 29.4 percent aqueous ammonia (20,000 gallons in each tank).

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 (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) level 2 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 a 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 potential exposure associated with a potential release exceeds 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.

The AFC (section 8-12.2.2.2) provided the results of modeling for a worst case and alternative case accidental release of aqueous ammonia. The worst-case release consisted of two scenarios: one is associated with a postulated spontaneous catastrophic failure of the entire 20,000 gals contents of one of the three storage tanks while the other consists of a spontaneous failure of the largest rail tank car spilling its entire contents (26,000 gals of aqueous ammonia). In conducting these two scenario analyses, it was assumed that spilled material would be contained in the covered basin below the storage vessel, below the tanker truck pad, and below the drain in the rail car pad and that winds of 1.0 meters per second and category F stability would exist at the time of the accidental release. The US EPA SCREEN3 air dispersion model was used to estimate airborne concentrations of ammonia. These analyses were designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport.

The alternative analysis consists of the accidental release of aqueous ammonia from either a tanker truck or rail car during transfer to the storage tanks. The spilled ammonia would flow to the same covered collection sump as in the worst-case scenarios but more realistic meteorological conditions were used as inputs to the SCREEN 3-air dispersion model. Atmospheric Stability Class D (instead of the more conservative F) was used, a lower ambient temperature was assumed (61.7º F vs. 106.7º F), and a wind speed of 3 m/s uses assumed instead of 1 m/s.

The results indicated that concentrations exceeding 75 PPM would be confined to the project site (less than 666 feet from the storage tanks for the worst-case and less than 272 feet for the alternative scenario).

SEISMIC ISSUES

Concern exists over the possibility that an earthquake would cause the failure of a hazardous materials storage tank. The quake could also cause the failure of the secondary containment system (berms and dikes) as well as electrically controlled valves, pumps, neutralization systems and the foam vapor suppression system. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the residents and workers in the surrounding community. This concern over earthquake safety is heightened by the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan in January 1995.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage - including seam leakage - were older tanks while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards, which should be followed in adequately designing and building storage tanks and containment areas to withstand a large earthquake. Referring to the sections on GEOLOGIC HAZARDS and FACILITY DESIGN in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of the Uniform Building Code for Seismic Zone 4.

CUMULATIVE IMPACTS

Staff reviewed the potential for the operation of the Contra Costa Power Plant Unit 8 combined with existing industrial facilities to result in cumulative impacts on the population within the area. Projects that could potentially contribute to cumulative impacts are those located in the same geographic area of influence defined as within a 5-mile radius of the proposed power plant. Because there already exists a power generation facility on this site consisting of four active generation units, the risks and hazards surrounding the transportation and use of hazardous materials has already been addressed for the existing facility and for the surrounding industries. Staff finds that the addition of the proposed Unit 8 to this site would not add significant cumulative impacts to those already encountered and addressed. Staff finds that the facility, as proposed by the Applicant and with the additional mitigation measures proposed by the Staff, poses a minimal risk of accidental release which could result in off-site impacts. Therefore, the direct impacts of the project will not add to any existing risk of accidental release.

APPLICANT'S PROPOSED MITIGATION

The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Administrative controls include the development and implementation of a Safety Management Plan. Elements of facility controls and the safety management plan are summarized below.

ENGINEERING CONTROLS

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineered safety features proposed by the applicant for use at this facility include:

- construction of dikes, berms, and/or catchment basins in the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;

- physical separation of stored chemicals in separate containment areas in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes;
- a 2,992 square foot containment area which will surround the three 20,000 gal aqueous ammonia storage tanks;
- a sloped containment pad that will drain into a subsurface covered sump placed beneath both the rail tank car and tanker truck aqueous ammonia delivering area; and
- process protective systems including automatic shut-off valves, relief valves check valves, double-wall piping, and fire protection systems.

ADMINISTRATIVE CONTROLS

Administrative controls also help to prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs and process safety management programs and by complying with all applicable health and safety laws, ordinances and standards.

The worker health and safety program proposed by the Applicant for use at this facility will include (but is not limited to) the following elements:

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- the proper use of personal protective equipment;
- safety operating procedures for operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At the facility, the project owner will designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety professional oversees the health and safety program and has the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community or in the event that the health and safety program is violated.

The facility Process Safety Management Program includes a program for the regular inspection and maintenance of equipment, valves, piping, and appurtenances. Additionally, the process safety management program requires that only trained facility personnel are assigned to the transfer and handling of hazardous chemicals.

ON-SITE SPILL RESPONSE

In order to address the issue of spill response, the facility will prepare and implement an Emergency Response Plan which includes information on: hazardous materials contingency and emergency response procedures, spill containment and

prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

STAFF MITIGATION

The worst-case accidental release scenario evaluated by Dames and Moore for Southern in the AFC assumed that accidental spills would occur from the storage vessel into the basin below the storage vessel or from a rail car into the same catchment system. Staff believes that the most likely event resulting in a spill would be during transfer from the rail car or delivery tanker to the storage tank. Staff therefore proposes a condition requiring development of a safety management plan for the delivery of aqueous ammonia. The development of a Safety Management Plan addressing delivery of ammonia will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required Risk Management Plan (RMP).

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 Environmental Health Department, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state or local agencies until the cost can be recovered from the responsible parties (O.E.S. 1990).

CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose no potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop an RMP. The RMP will be submitted to EPA, Contra Costa County, and staff for evaluation. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by EPA, Contra Costa County and staff. In addition, staff's proposed conditions of certification also require Contra Costa County's acceptance of the RMP and staff's approval of the RMP prior to delivery of any hazardous materials to the facility. With adoption of staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section

41700, and it will not pose any potential for significant impacts to the public from hazardous materials releases.

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, C.F.R. Part 355, Subpart J, section 355.50, not listed in Appendix C, below, or in greater quantities than those identified by chemical name in Appendix C, below, unless approved in advance by Contra Costa County and the CPM.

Verification: The project owner shall provide to the Compliance Project Manager (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 to Contra Costa County and the CPM for review at the time the plans are first submitted to the U.S. Environmental Protection Agency (EPA). The project owner shall include all recommendations of Contra Costa County and the CPM in the final document. A copy of the final plans, including all comments, shall be provided to Contra Costa County and the CPM once approved by EPA.

Verification: At least sixty (60) days prior to the delivery of aqueous ammonia the project owner shall provide the final plans listed above and accepted by Contra Costa County to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of ammonia. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of aqueous ammonia with incompatible hazardous materials.

Verification: At least sixty days prior to the delivery of aqueous ammonia to the CCPP facility, the project owner shall provide a safety management plan as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 150% of the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm.

Verification: At least sixty days prior to delivery of aqueous ammonia to the CCPP, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall ensure that no combustible or flammable material is stored, used, or transported within 100 feet of the sulfuric acid tank.

Verification: At least sixty (60) days prior to receipt of sulfuric acid on-site, the Project Owner shall provide copies of the facility design drawings showing the location of the sulfuric acid storage tank and the location of any tanks, drums, or piping containing any combustible or flammable material and the route by which such materials will be transported through the facility.

REFERENCES

AIChE (American Institute of Chemical Engineers). 1989. Guidelines for Technical Management of Chemical Process Safety, AIChE, New York, NY 10017.

AIChE (American Institute of Chemical Engineers). 1994. Guidelines for Implementing Process Safety Management Systems, AIChE, New York, NY 10017.

API (American Petroleum Institute). 1990. Management of Process Hazards, API Recommended Practice 750; American Petroleum Institute, First Edition, Washington, DC, 1990.

Baldcock, P.J. (date unknown). Accidental Releases of Ammonia: An Analysis of Reported Incidents. (unknown source).

EPA (Environmental Protection Agency). 1987. Technical Guidance for Hazards Analysis, Environmental Protection Agency, Washington, DC, 1987.

EPA (Environmental Protection Agency). 1988. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Environmental Protection Agency, Research Triangle Park, NC, 1988.

FEMA (Federal Emergency Management Agency). 1989. Handbook of Chemical Hazard Analysis Procedures, Federal Emergency Management Agency, Washington, DC, 1989.

Lees, F.P. 1998). Loss Prevention in the Process Industries, Vols. I, II and III. Second Edition, Butterworths.

NFPA (National Fire Protection Association). 1987. NFPA 85A, Prevention of Furnace Explosions in Fuel Oil and Natural Gas Fired Single Burner Boiler Furnaces, National Fire Protection Association, Batterymarch Park, Quincy, MA, 1987.

NRC (National Research Council). 1979. Ammonia. Subcommittee on Ammonia. Committee on Medical and Biologic Effects of Environmental Pollutants. Division of Medical Sciences, Assembly of Life Sciences, National Research Council (NRC), Baltimore, Maryland, University Park Press (NTIS No. PB 278-027).

Perry. 1973. Perry's Chemical Engineers' Handbook, Sixth Edition, McGraw-Hill, USA.

Southern 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Submitted to the California Energy Commission, January 31, 2000.

Southern 2000b. Errata to the Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Submitted to the California Energy Commission, April 14, 2000.

Uniform Fire Code (UFC) 1997. International Fire Code Institute, Whittier, Ca.

USOSHA (United States Occupational Safety and Health Administration). 1993. Process Safety Management / Process Safety Management Guidelines For Compliance. U.S. Department of Labor, Washington, DC.

APPENDIX A

HAZARDOUS MATERIAL MANAGEMENT

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

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

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

staff considered in arriving at the decision to use the 75-ppm STPEL. Appendix B provides a summary of adverse effects which might be expected to occur at various airborne concentrations of ammonia.

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 protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	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 for Appendix A, Table 1

AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

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.

NRC. 1972. Guideline for short-term Exposure of The Public To Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

WHO. 1986. World health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

Abbreviations for Appendix A, Table 1

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

APPENDIX B

SUMMARY OF ADVERSE HEALTH EFFECTS OF AMMONIA

638 PPM

WITHIN SECONDS:

- significant adverse health effects;
- might interfere with capability to self rescue;
- reversible effects such as severe eye, nose and throat irritation.

AFTER 30 MINUTES:

- persistent nose and throat irritation even after exposure stopped;
- irreversible or long-lasting effects possible: lung injury;
- sensitive people such as the elderly, infants, and those with breathing problems (asthma) experience difficulty in breathing;
- asthmatics will experience a worsening of their condition and a decrease in breathing ability, which might impair their ability to move out of area.

266 PPM

WITHIN SECONDS:

- adverse health effects;
- very strong odor of ammonia;
- reversible moderate eye, nose and throat irritation.

AFTER 30 MINUTES:

- some decrease in breathing ability but doubtful that any effect would persist after exposure stopped;
- sensitive persons: experience difficulty in breathing;
- asthmatics: may have a worsening condition and decreased breathing ability, which might impair their ability to move out of the area.

64 PPM

WITHIN SECONDS:

- most people would notice a strong odor;
- tearing of the eyes would occur;
- odor would be very noticeable and uncomfortable.
- sensitive people could experience more irritation but it would be unlikely that breathing would be impaired to the point of interfering with capability of self rescue
- mild eye, nose, or throat irritation
- eye, ear, & throat irritation in sensitive people
- asthmatics might have breathing difficulties but would not impair capability of self rescue

22 OR 27 PPM

WITHIN SECONDS:

- most people would notice an odor;
- no tearing of the eyes would occur;
- odor might be uncomfortable for some;
- sensitive people may experience some irritation but ability to leave area would not be impaired;
- slight irritation after 10 minutes in some people.

4.0, 2.2, OR 1.6 PPM

- No adverse effects would be expected to occur;
- doubtful that anyone would notice any ammonia (odor threshold 5 - 20 ppm);
- some people might experience irritation after 1 hr.

APPENDIX C

[Attach AFC Tables 8.12-2, 8.12-3, and 8.12-4]

WASTE MANAGEMENT

Michael Ringer

INTRODUCTION

This analysis presents an assessment of issues associated with managing wastes generated from constructing and operating the Contra Costa Power Plant Unit 8 Project (CCPP Unit 8). 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 our 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; and
- 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 6901 ET SEQ.)

The Act, known as RCRA, sets forth standards for the management of hazardous solid wastes. The U.S. Environmental Protection Agency (EPA) may administer the provisions of RCRA in each state. However, the law allows EPA to delegate the administration of RCRA to the various states. When a state receives final EPA authorization, its regulations have the force and effect of federal law. EPA grants final authorization when a state program is shown to be equivalent to the federal requirements. The Department of Toxic Substances Control in California received final authorization on August 1, 1992.

RCRA establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922

requires generators of hazardous waste to comply with requirements regarding:

- 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.

RCRA also establishes requirements applicable to hazardous waste transporters, including record keeping, compliance with the manifest system, and transportation only to permitted facilities.

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 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 Contra Costa Power Plant Unit 8 project is a nominal 530 megawatt natural gas-fired combined cycle generating facility comprised of two combustion turbine generators and heat recovery steam generator trains, a single steam turbine generator, and a ten cell cooling tower system. The proposed project would be located on about twenty acres in the northeast corner of the existing 200 acre Contra Costa Power Plant site (formerly owned by PG&E) about one mile northeast of the City of Antioch in Contra Costa County.

In order to assess the potential for on-site contamination, then-owner PG&E commissioned a Phase I Environmental Site Assessment (ESA) by Camp Dresser & McKee Inc. in 1996 and 1997 (Southern 2000a, AFC Appendix K). The Phase I ESA was performed in accordance with American Society for Testing and Materials practice E 1527-94. The purpose of an ESA is to determine the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions that may indicate a release or threat of a release from present or past activities.

The work performed for the study consisted of the following:

- A records review of the site and surrounding properties, including PG&E permits, programs, plans, and files, and regulatory agency databases and files;
- A site walkthrough to visually observe the site and adjoining properties and to assess the use, storage, and disposal of hazardous materials and hazardous waste at the site and at adjoining properties;
- Interviews with those familiar with the site and the past and present operation of the plant, including plant operating staff, and officials from the Central Valley Regional Water Quality Control Board and the Bay Area Air Quality Management District.

The ESA covered the entire 198 acre parcel upon which the Contra Costa Power Plant is located, and for reporting purposes, segregated the property into four areas: the fuel tank farm, the switchyard, the non-operational area, and the power generation and operations area. The location of the Unit 8 project is on about 20 acres in the northeast corner of the parcel, and a construction laydown area is located directly south of the proposed project area.

The project and laydown areas are located within the non-operational area and power generation and operations areas as defined in the ESA (see Southern 2000a, AFC fig. 2-2 and Appendix K fig. 3-3). Site features within the non-operational area to be occupied by the Unit 8 project include:

- Elevated parking area – sand excavated during construction of the plant is stored in a mound along the east side of the plant. The top is used for parking and the pile is covered with asphalt pavement on the top and sides.
- Employee recreation area – the area surrounding the discharge channel in the northeast corner of the plant is maintained as a recreational area, which includes recreational vehicle parking and picnic facilities.

The portion of the power generation and operations area where the Unit 8 project would be located includes the construction yard, located directly east of existing units six and seven. Various buildings there are used for equipment storage and offices. The construction laydown area is located in the raw water clarifier sludge storage area. Clarifier sludge is generated from the backwashing of sand filters used to filter raw river water prior to processing for use as boiler make-up. This material is considered to be nonhazardous and, under Regional Water Quality Control Board Waste Discharge Requirements, was disposed of in an open field in the southeast corner of the plant.

The Phase I ESA found several recognized environmental conditions at the site and concluded that there is a potential for soil and groundwater contamination. In order to further characterize the site and investigate issues identified in the Phase I ESA, PG&E retained Fluor Daniel GTI to conduct a Phase II ESA (Southern 2000c). The Phase II ESA involved subsurface testing of soil and groundwater and evaluation of data collected to determine if the soil or groundwater would require remediation to protect human health and the environment or to comply with environmental laws and regulations.

The Phase II investigations showed that several contaminants exist in soil and groundwater at the proposed site, including volatile organic compounds, polynuclear aromatic hydrocarbons, metals, and polychlorinated biphenyls.

To determine the extent to which the site would need to be cleaned up, the Phase II ESA presented results of a baseline health risk assessment and a review of cleanup levels that could be applicable to the project. The purpose of the risk assessment was to determine if concentrations of chemicals detected in soil and groundwater present an unacceptable risk to human health and the environment. Health risks were calculated for current and future onsite workers, current and future construction workers, and the current groundskeeper in the recreation area. The acceptable risk level for cancer-causing chemicals was assumed to be ten in one million, and for all others, a hazard index of one (please see the **Public Health** section for a discussion of risk levels and hazard indices). The risk assessment showed there to be no unacceptable risks due to current conditions at the site.

A review of cleanup levels established by regulatory agencies showed that maximum contaminant levels for drinking water would apply to groundwater beneath the site, and that treatment of petroleum hydrocarbons in soil and groundwater to levels of 300 milligrams per kilogram and 100 micrograms per liter, respectively, would likely be required.

The Phase II ESA shows areas where regulatory agencies would likely require remediation of soil and groundwater (Southern 2000c, Plate 5-1). In the area of the proposed CCPP Unit 8 Project, there are no soil remediation issues. At the northern end of the proposed site, there is an area containing elevated levels of petroleum hydrocarbons in groundwater. In the construction laydown area, towards the southern part of the site, there is one small area with elevated levels of petroleum hydrocarbons in water and a larger area containing arsenic in groundwater. Please refer to the **Soil and Water Resources** section of this document for a further discussion of water contamination issues.

IMPACTS

PROJECT SPECIFIC IMPACTS

CONSTRUCTION

Project site preparation and facility construction will generate both nonhazardous and hazardous wastes.

Site preparation will include the removal of several small structures currently located on the proposed site. These include two wood storage buildings on slabs, shipping containers, and three mobile homes. These structures were used primarily as temporary offices for field personnel and for turbine rotor and cable/wire storage. In addition, a welding shop and tech shop, used for repair of instrumentation, are located in the construction yard. Hazardous materials were not known to be used or stored in these structures (Southern 2000o, Response to data request 101). Where possible, the structures to be removed will be salvaged and sold. Residual demolition waste will be transported to an approved construction waste landfill (Southern 2000a, AFC p. 2-53).

Based on results of the Phase II ESA, contaminated soil encountered during excavation at the proposed CCPP Unit 8 site will not be a likely source of significant quantities of hazardous waste. The Phase II ESA included 34 exploratory borings within the limits of the proposed site. Ten of these were in the footprint of the powerblock, where the deepest foundation excavation would occur. Of 21 samples analyzed, only one, about 50 feet from the planned excavation, showed an elevated level of total petroleum hydrocarbons, although at levels below those of concern based on the risk assessment (see above). No other chemical constituents were identified at elevated levels in these borings (Southern 2000o, Response to data request 102). Soil from the existing fill pile, which will be used to prepare the site, was also sampled and analyzed during the Phase II ESA, and was determined not to be contaminated (Southern 2000c, Table 3-1a).

Nonhazardous wastes include debris requiring removal during site grading and excavation, excess lumber and concrete, scrap metal from welding and cutting operations, insulation, empty chemical containers, and paper, wood, glass, and plastic from packing materials. Southern estimates that about 150 tons of these wastes would be generated (Southern 2000a, AFC p. 8.13-2). In addition, about

100 tons of concrete waste and 50 tons of scrap metal would be generated during construction (Southern 2000a, AFC p. 8.13-2). Concrete waste would be used onsite to the extent possible as fill material, and the majority of metal would be recycled.

Construction-related solid waste would be temporarily stored in onsite dumpsters and picked up for disposal by Pittsburg Disposal Services, Inc. (PDI). The waste would be taken to PDI's transfer station, where recyclable materials would be removed and the residue transported to an approved landfill.

Hazardous wastes, likely to be generated during construction, include waste oil and grease, paint, spent solvent, mercury, and cleanup materials from spills of hazardous substances. AFC Table 8.13-3 lists hazardous wastes expected to be generated, their approximate quantities, and management methods. Hazardous wastes will be collected in hazardous waste accumulation containers near the point of generation. The containers will be taken to the construction contractor's hazardous waste storage area and within 90 days will either be recycled or transported by a licensed hauler to licensed hazardous waste treatment and disposal facilities, as appropriate (Southern 2000a, AFC p. 8.13-4).

OPERATION

The proposed facility will generate both nonhazardous and hazardous wastes under normal operating conditions.

Nonhazardous wastes generated during plant operation include trash, office wastes, empty containers, broken or used parts, used packing material, used filters, and cooling tower basin sludge. On a daily basis, the quantities of nonhazardous wastes generated from similar gas-fired facilities are typically minor, on the order of a few cubic yards or less, with some of the material being recyclable. Nonhazardous waste will be recycled where practical and the remainder transported to a Class III (nonhazardous) landfill (Southern 2000a, AFC p. 8.13-4).

Hazardous wastes generated during routine project operation include cleaning solutions, spent air pollution control catalyst, used oil, used cleaning solvents, waste paint, contaminated cleanup materials, and empty chemical containers. Southern estimates that about 90 tons of solid hazardous waste would be generated annually, with about 60 tons of this being recyclable and 30 tons requiring offsite disposal (Southern 2000a, AFC p. 8.13-5). AFC Table 8.13-3 shows the types, quantities, and management methods of hazardous wastes that would be generated during facility operation.

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 and treated or disposed of offsite (Southern 2000a, AFC p. 2-38).

The oxidation catalyst, used for CO emissions control, and the selective catalytic reduction catalyst, used for NOx emissions control, must be replaced as they

become contaminated, typically after several years' service. Classified as hazardous due to heavy metals content, about 25 tons per year will be returned to the manufacturer for reclamation or disposal at a Class I (hazardous) landfill (Southern 2000a, AFC p. 8.13-5).

Used lubricating fluids, such as turbine lube oil, will be periodically generated during operation and maintenance activities. These will be collected and stored temporarily onsite and will be recycled by approved contractors in compliance with applicable regulations (Southern 2000a, AFC p. 2-35).

Used containers of hazardous substances, such as chemical containers or oil filters may be classified as hazardous wastes. However, if managed according to certain regulatory guidelines, such containers may be managed as nonhazardous (Cal. Code Regs., tit. 22, §66261.7, 66266.130).

Hazardous wastes will be properly manifested, picked up only by licensed hazardous waste haulers, and transported to permitted facilities (Southern 2000a, AFC p. 8.13-10).

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

AFC Table 8.13-1 lists disposal facilities that can be used for wastes generated by the Unit 8 Project. Nonhazardous wastes could be taken to one of four landfills in the area. Although the Keller Canyon landfill is closest to the project, PDI is currently transporting waste to the Potrero Hills landfill in Suisun City. That landfill is currently operating at over 800,000 cubic yards annually and has a remaining life of 40 years. Even discounting the effects of recycling on the total amount of non-hazardous wastes destined for landfilling, the amount of nonhazardous waste generated during project construction and operation are insignificant (less than one percent) relative to existing disposal capacity, and would not meaningfully impact the landfill's capacity or operating life.

Three Class I landfills in California, at Kettleman Hills in King's County, Buttonwillow in Kern County, and Westmoreland in Imperial County, are permitted to accept hazardous waste (SED 2000, AFC Table 8.13-1). There is a combined total in excess of twenty million cubic yards of remaining hazardous waste disposal capacity at these facilities with remaining lifetimes as long as 50 years. The amount of hazardous waste being transported to these landfills has decreased in recent years due to source reduction efforts by generators, and the transport of waste out of state that is hazardous under California law, but not federal law.

Much of the hazardous waste generated during facility construction and operation will be recycled, such as used oil and spent air pollution control 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, Southern 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 (Southern 2000a, AFC p. 8.13-11).

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

Energy Commission staff concludes that Southern will 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, Southern must maintain an EPA identification number as a hazardous waste generator. The existing EPA identification number for CCPP (CAT080011489) was transferred on April 16, 1999 (Southern 2000o, Response to data request 98). Accordingly, Southern 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

Southern intends to implement the following mitigation measures during construction and operation of the proposed project (Southern 2000a, AFC p. 8.13-8):

- Source reduction – substituting less hazardous or nonhazardous materials for facility processes or operations or reducing the amount of waste generated
- Recycling – converting wastes to new materials
- Treatment – reducing the hazardous nature or quantity of waste

Energy Commission staff has examined the mitigation measures proposed by Southern 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

Management of the wastes generated during construction and operation of the CCPP Unit 8 Project will not result in any significant adverse impacts if Southern implements the mitigation measures proposed in the Application for Certification (00-AFC-1), 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, Southern 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, Southern should also contact representatives of the Contra Costa County Health Services Department and the Berkeley Field Office 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 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator 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. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-3 Prior to the start of both construction and operation, the project owner shall prepare and submit to the CEC CPM, for review and comment, a waste management plan 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 The project owner shall have an environmental professional available for consultation during soil excavation and grading activities. The environmental professional shall be given full authority to oversee any earth moving activities that have the potential to disturb contaminated soil. The environmental professional shall meet the qualifications of such as defined by the American Society for Testing and Materials designation E 1527-97 Standard Practice for Phase I Environmental Site Assessments as evidenced by one of the following or similar credentials: (1) Certified Industrial Hygienist with experience in worker exposure monitoring, (2) Qualified Environmental Professional certification, (3) Registered Environmental Assessor II, or (4) Registered Professional Engineer with experience in remedial investigation and feasibility studies.

Verification: At least 30 days prior to the start of construction, the project owner shall submit the qualifications and experience of the environmental professional to the CPM for approval.

WASTE-5 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the environmental professional 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 and CPM stating the recommended course of action. Depending on the nature and extent of contamination, the environmental professional shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the environmental professional, significant remediation may be required, the project owner shall contact representatives of the Santa Clara County Department of Environmental Health and the Berkeley Field Office of the California Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the environmental professional to the CPM within 5 days of their receipt.

REFERENCES

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000c. Phase II Environmental Site Assessment, received in dockets February 29, 2000 (dated June, 1998).

Southern. 2000o. Data responses to CEC data requests, received in dockets August 18, 2000.

LAND USE

Jon Davidson, AICP

INTRODUCTION

The Contra Costa Power Plant CCPP Unit 8 Project entails the construction and operation of a 530 net megawatt (MW) combined cycle power generation unit at the CCPP in unincorporated Contra Costa County near the City of Antioch, California. The land use analysis of the CCPP Unit 8 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 power generation project can be incompatible with existing and planned land uses when it creates unmitigated noise, dust, public health 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 project site is located in an unincorporated area of Contra Costa County and within the Sphere of Influence of the City of Antioch. Staff reviewed land use planning documents for Contra Costa County and the City of Antioch for goals, policies, and regulations relevant to the CCPP Unit 8 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 section entitled **COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS**.

CONTRA COSTA COUNTY GENERAL PLAN

The Contra Costa County General Plan (1995 – 2010) was adopted in 1996. The purpose of the County General Plan is to express the broad goals and policies, and specific implementation measures, which will guide the County's decisions on future

LAND USE Figure 1
Jurisdictional Boundaries in the Area Surrounding the Project Site

growth, development, and the conservation of resources through the year 2010. In addition to the seven mandatory elements prescribed by the State, the Contra Costa County General Plan includes a Growth Management Element and Public Facilities/Services Element.

The General Plan establishes a “65/35 Land Preservation Standard” and other growth management provisions in accordance with Measure C, a series of two countywide ballot measures approved in 1988 and 1990. The 65/35 Land Preservation Standard limits urban development through at least the horizon of the General Plan to no more than 35 percent of the land in the County, and requires that at least 65 percent of all land in the County be preserved for agriculture, open space, wetlands, parks, and other non-urban uses. The standard operates on a countywide basis and therefore includes urban and non-urban land uses within cities as well as unincorporated areas.

CITY OF ANTIOCH GENERAL PLAN

The 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 required open space, conservation, and noise elements have been combined within a consolidated element entitled Resources Management.

CONTRA COSTA COUNTY ZONING ORDINANCE

The Contra Costa County zoning ordinance (Title 8 of the Contra Costa County Code) establishes zoning districts and contains regulations governing the use of land and improvement of real property within zoning districts.

ENVIRONMENTAL SETTING

Southern Energy Delta (Southern) operates the existing CCPP in northeastern Contra Costa County, California, immediately to the north and east of the City of Antioch. The CCPP is situated on approximately 200 acres of land located about one-third of a mile west of State Route 160 and bounded by the San Joaquin River to the north and Wilbur Avenue to the south. Land use in the immediate vicinity of the CCPP consists primarily of industrial facilities, remnant agricultural areas south of Wilbur Avenue, and small yacht clubs and marinas along the riverbank to the east (refer to **LAND USE Figure 2**).

SITE AND VICINITY DESCRIPTION

The CCPP currently consists of seven generating units. Units 1-3 have been retired; Units 4-5 operate as synchronous condensers for support of the regional transmission system, and Units 6 and 7 produce electricity for distribution through the grid. The proposed Unit 8 would be a 530 net megawatt combined cycle power generation unit. In addition to the generation units, nine exhaust stacks, seven storage tanks, and other warehouse and office buildings are located on the existing site. No new offsite linear facilities (electrical transmission lines, natural gas pipelines, water pipelines) would be constructed to serve the CCPP. Since the new

LAND USE Figure 2
Existing Land Uses in the Area Surrounding the Project Site

unit is to be constructed within the site of the existing CCPP, it will rely on many of the existing plant's systems, such as plant process make-up water supply, wastewater treatment system, cooling water supply, fire water supply, ammonia supply, and other ancillary systems.

The proposed Unit 8 comprises a number of facilities, including two combustion turbine generators and heat recovery steam generator trains, and a single steam turbine generator. The proposed site of CCPP UNIT 8 consists of approximately 20 acres in the northeast portion of the existing CCPP site. Therefore, immediately adjacent areas to the west, southwest, and south of the proposed CCPP UNIT 8 site contain the existing CCPP facilities described above.

The CCPP is located in a predominantly industrial area, with various types of manufacturing, processing, fabricating, and storage uses located in close proximity to the west and south, primarily along the Wilbur Avenue corridor. Significant industrial uses in the immediate vicinity include the Gaylord California Mill and Western Steel & Tinplate (both located to the west) and Dupont's Oakley Site located to the east. Other industrial uses in the area include construction contractor yards, welding and machine shops, sheet metal fabrication facilities, contractor supply businesses, sand and gravel operations, and concrete batch plants.

The nearest offsite uses to the proposed CCPP UNIT 8 site are located immediately to the east. The properties to the east contain several small commercial yacht clubs and marinas along the south bank of the San Joaquin River. This area also contains a few isolated residential units, some of which appear to be caretaker residences associated with the primary commercial uses. There is also a public access marina at Shoreline Park at the base of the Antioch Bridge.

South of Wilbur Avenue, small agricultural uses are interspersed among other uses, primarily vineyards and orchards. These appear to be remnants of a previous era when agriculture was the predominant land use in the area. Some of the vineyards are still in active cultivation, but others appear to have been abandoned.

While properties along Wilbur Avenue are dominated by industrial uses, the land use pattern becomes more mixed further south. At the Bridgehead Avenue interchange, located about one-half mile southeast of the existing CCPP site, there is a concentration of retail commercial uses, including gas stations, fast food restaurants, and a K-Mart store. Less concentrated commercial development also extends further east and west (along East 18th Street). There are also several residential areas located south of Wilbur Avenue. The closest residential neighborhood to the existing CCPP site is located less than a quarter-mile to the southwest (about two-thirds of a mile from the proposed CCPP UNIT 8 site). There is also a large single-family residential neighborhood located about three-quarters of a mile south of the proposed project site, south of East 18th Street, as well as some scattered residential areas nearly a mile southwest of the proposed project site, between State Route 4 and Neroly Road.

The Contra Costa County General Plan designates the proposed project site and surrounding lands for Heavy Industry (refer to **LAND USE Figure 3**). Consistent

with this designation, the proposed project site, along with lands to the east and the west, is zoned H-I (Heavy Industrial) (refer to **LAND USE Figure 4**). Most of the nearby land south of Wilbur Ave is zoned for light industrial uses (L-I, Light Industry). The City of Antioch intends to maintain industrial land uses along the Wilbur Avenue corridor into the future (Albro, pers. comm., 2000; City of Antioch, 1994).

ENVIRONMENTAL 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:

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

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 precludes or unduly restricts existing or planned future uses.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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, Energy Commission staff 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 land use laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the CCPP UNIT 8 is consistent or at variance with each requirement or standard.

THE DELTA PROTECTION ACT OF 1992

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

LAND USE Figure 3
General Plan Designations in the Area Surrounding the Project Site

LAND USE Figure 4
Zoning in the Area Surrounding the Project Site

CONTRA COSTA COUNTY GENERAL PLAN

LAND USE ELEMENT, SECTION 3.7 LAND USE DESIGNATIONS – RESIDENTIAL DENSITY AND LAND USE INTENSITY

The Heavy Industry designation "allows activities requiring large areas of land with convenient truck and rail access. These uses are typically not compatible with residential uses in close proximity and the operations conducted may be characterized by noise or other conditions requiring spatial separation. Uses may include metal working, chemical or petroleum product processing and refining, heavy equipment operation and similar activities." The following standards apply to development in areas designated Heavy Industry:

1. Maximum site coverage: 30 percent
2. Maximum floor area ratio: 0.67 percent
3. Average employees per gross acre: 45

As cited above, the maximum site coverage standard indicates than no more than 30 percent of the total site area shall be covered by buildings and structures. The maximum floor area ratio standard indicates that the total amount of building floor area constructed shall not exceed 67 percent of the total land area of the site. Although specific lot coverage and floor area figures were not provided in the AFC, a review of the project site plan confirms that the proposed project falls well within the specified standards, whether considering the total CCPP site or the CCPP UNIT 8 site alone. The current CCPP operation employs a total of 53 workers, and the proposed CCPP UNIT 8 would add 10 more employees to the total. With a total site area of approximately 200 acres, the employee density with the proposed project would be less than one employee per acre and, therefore, would comply with the specified standard of no more than 45 employees per acre.

LAND USE ELEMENT, SECTION 3.8 LAND USE GOALS, POLICIES AND IMPLEMENTATION MEASURES

<u>Countywide Policy 3-2</u> states that "job infill shall be supported and stimulated where the jobs/housing ratio shows an overabundance of housing to jobs."

According to the Planning Framework Chapter of the General Plan, so much new housing is planned in the East County "that employment will continue to lag far behind" population growth. Therefore, employment-generating commercial and industrial uses are considered beneficial to the overall jobs/housing ratio. As a result, the proposed project is supportive of Countywide Policy 3-2.

<u>Countywide Policy 3-5</u> states that "new development within unincorporated area of the County may be approved, providing growth management standards and criteria are met or can be assured to being met prior to the issuance of building permits in accordance with growth management."

Countywide Policy 3-6 states that "development of all urban uses shall be coordinated with provision of essential Community services or facilities including, but not limited to, roads, law enforcement and fire protection services, schools, parks, sanitary facilities, water and flood control."

Countywide Policy 3-7 states that "the location, timing and extent of growth shall be guided through capital improvements programming and financing (i.e., a capital improvement program, assessment districts, impact fees, and developer contributions) to prevent infrastructure, facility and service deficiencies."

Countywide Policy 3-8 states that "infilling of already developed areas shall be encouraged. Proposals that would prematurely extend development into areas lacking requisite services, facilities and infrastructure shall be opposed. In accommodating new development, preference shall generally be given to vacant or under-used sites within urbanized areas, which have necessary utilities installed with available remaining capacity, before undeveloped suburban lands are utilized."

The proposed project site is located in an established industrial area and the proposed project constitutes an "infilling" of a previously developed area. The site is located within the boundaries of an Urban Limit Line established by the County and is fully served by existing services, utilities, and infrastructure. Therefore, the project conforms to growth management standards and criteria and is consistent with Countywide Policies 3-5 through 3-8.

Countywide Policy 3-11 states that "urban uses shall be expanded only within an Urban Limit Line where conflicts with the agricultural economy will be minimal."

The proposed project would be located on an existing industrial site and would result in no direct change to any agricultural activity. Although agricultural lands (vineyards) exist within one mile of the project site, the proposed project would not conflict with these existing agricultural operations. The proposed project is therefore consistent with Countywide Policy 3-11.

Countywide Policy 3-19 states that "buffers shall be provided between new industrial developments and residential areas by establishing setbacks, and park-like landscaping or other appropriate mechanisms."

Countywide Policy 3-19 attempts to minimize incompatibilities between industrial uses and residential uses. The proposed project site is not located adjacent to a residential area, although a few isolated nonconforming residences exist in the marina and yacht club area immediately to the east, and there are 8-10 boats docked in the nearby marina that serve as "live-aboard" residences. As a result, the applicability of this policy is questionable. However, Southern plans to install landscaping as a buffer along the eastern perimeter of the site, which would provide basic compliance with this policy. Additionally, staff has assessed the potential visual impacts of the project and has proposed several mitigation measures, including establishment of a vegetative buffer along the perimeter of the site, to help screen views of CCPP UNIT 8 from adjacent areas. Please refer to the **VISUAL RESOURCES** section of the Preliminary Staff Assessment (PSA) for discussion of

potential impacts to views and visual resources and measures proposed to mitigate those impacts.

Countywide Policy 3-43 states that "industrial development shall be concentrated in select locations adjacent to existing major transportation corridors and facilities."

Countywide Policy 3-43 is intended to ensure that industrial facilities are located in proximity to essential transportation facilities. The project site is located in an area served by major transportation corridors, including State Routes 4 and 160 and a nearby freight rail line. Therefore, the location of the project site is appropriate with regard to its proximity to existing transportation facilities and is consistent with this policy.

Countywide Policy 3-44 states that "industrial employment centers shall be designed to be unobtrusive and harmonious with adjacent areas and development."

Countywide Policy 3-44 addresses basic compatibility with adjacent areas. Although the proposed project is appropriately sited in a heavy industrial area, the **VISUAL RESOURCES** section of the PSA indicates that the project would be visually obtrusive to the adjacent yacht clubs and marinas to the east, resulting in a significant visual impact. This visual impact would remain significant even with the implementation of the mitigation measures proposed by staff. Therefore, the project would not be compliant with Countywide Policy 3-44.

Implementation Measure 3-b requires "that proposed uses on the edges of land use designations be evaluated to ensure compatibility with adjacent planned uses" during project review.

The proposed project site is not located on the edge of a mapped land use designation. The project site and adjacent areas are designated Heavy Industry by both the Contra Costa and Antioch general plans. Therefore, no specific evaluation of compatibility with adjacent uses is triggered by Implementation Measure 3-b.

CONTRA COSTA COUNTY ZONING ORDINANCE

CHAPTER 84-62: REGULATIONS FOR HEAVY INDUSTRIAL DISTRICT (H-I)

Section 84-62.402 indicates that all land within the H-I heavy industrial district may be used for heavy industrial manufacturing uses of all kinds, including, but not limited to, the manufacturing or processing of petroleum, lumber, steel, chemicals, explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products.

Section 84-62.602 states that there are no lot area, height, or side yard regulations or limitations in the H-I district.

The County's H-I zoning district permits heavy industrial uses of all kinds. A power plant is considered a permissible use in the H-I district, although it may require a Land Use Permit for the storage and use of hazardous substances (see below).

Because there are no lot size, building height, setback, or other specific development regulations for the H-I district, there are no local development standards of this type applicable to the proposed project.

CHAPTER 84-63: LAND USE PERMITS FOR DEVELOPMENT PROJECTS INVOLVING HAZARDOUS WASTE OR HAZARDOUS MATERIAL

Section 84-63.202 indicates that the purpose of this chapter is to promote the health, safety and general welfare of residents and persons in the county by encouraging businesses and other entities, in planning and developing projects involving hazardous material or hazardous waste, to consider factors which involve potential health and safety risks to the surrounding community, and by requiring land use permits for development projects which could significantly and adversely affect public health, safety and the environment.

Section 84-63.1002 indicates that unless otherwise exempt, a land use permit is required for any development project proposed for the management of hazardous material and/or hazardous waste if the development project obtains a hazard score of 80 or more pursuant to the formula set forth in Section 84-63.1004.

Because the issuance of a certificate by the Energy Commission is in lieu of any local permit (Pub. Resources Code, § 25500), a local land use permit for the storage and use of hazardous substances will not be required. Please refer to the **HAZARDOUS MATERIALS MANAGEMENT** section of the PSA for discussion of potential impacts associated with the storage and use of hazardous substances and measures proposed to mitigate those impacts.

CHAPTER 82-16: REGULATIONS FOR OFF-STREET PARKING

Section 82-18.012 (1)-(12) specifies requirements for parking design and layout. Indicated measures aim to ensure maximum utilization of space, sufficient traffic flow and general safety, including, but not limited to, proper parking space dimensions, maneuvering and vehicular access areas, drainage, landscaping, lighting, and access to public parking areas.

Section 82-16.018 states requirements for the number of off-street parking spaces to be provided by different types of uses. A specification for a power plant or a heavy industrial use does not exist. Section 82-18.018(20) refers unspecified uses to requirements for the most similar specified use.

The proposed power plant is most similar to Section 82-18.018(16), which requires warehouses and other storage buildings to provide a minimum of one space for each one thousand square feet of gross floor area. Staff has proposed a condition of certification (**LAND-1**) requiring the project to provide sufficient parking in conformance with the Contra Costa County zoning ordinance.

CHAPTER 88-6: OUTDOOR ADVERTISING

Section 88-6.204 declares the County's policy that outdoor advertising, while useful and necessary to business and essential to the economic health of the County, may

be detrimental to the public welfare when carried out in improper places and to an excessive extent.

Article 88-6.6 presents standards for five types (I-V) of outdoor signs. A business may erect any of these types of signs in accordance with the standards specified in the article. Articles 88-6.8 and 88-6.10 specify regulations pertaining to special signs and illuminated signs, respectively.

The applicant has not specifically proposed the erection of any signs that would violate the provisions of the County's outdoor advertising regulations. To ensure compliance, staff has proposed a condition of certification (**LAND-2**) requiring that all signs and outdoor advertising structures comply with the requirements of the Contra Costa County zoning ordinance.

CITY OF ANTIOCH GENERAL PLAN

According to the Land Use Element of the Antioch General Plan, the Heavy Industrial land use designation "is intended for uses with potential for impacts which for reasons of health, safety, environmental effects, or welfare, are best segregated from other uses. Extractive and primary processing industries are typical of this category. The Heavy Industrial designation is the appropriate category for solid waste transfer and processing stations." The General Plan anticipates that "the best available control technology and other mitigation measures and design features would be incorporated into all new developments in this designation in order to minimize any potential negative impacts to the community." The General Plan indicates that the Heavy Industrial designation is applied only to areas where heavy industrial uses are currently predominant.

The only industrial land use policies of the General Plan applicable to the proposed project are the following:

- Industrial development within the community should be limited to those areas and uses that are provided with adequate transportation access, utilities and services, are compatible with adjacent residential communities, and meet the overall environmental goals of the Plan, and which do not generate nuisances.
- Strict environmental performance standards (i.e., for smoke, noise, odor, etc.) should be developed to ensure that industrial plants do not cause undue impacts to residential and commercial facilities in the immediate vicinity or community as a whole.

The Antioch General Plan is supportive of the establishment of new industrial uses, both to help balance the jobs/housing ratio and promote the economic development of the community. The General Plan identifies over 1,000 acres of vacant land available for the development of industrial and employment-generating uses. The General Plan indicates that more land is designated for industrial and employment-generating uses than demand projections indicate can be absorbed during the planning period, in accordance with a declared intent by the City to reserve land for future economic activities that would generate employment. Consistent with this goal, the Economic Development goals and policies presented in the Land Use Element of the General Plan promote industrial expansion and the preservation of

local jobs. CCPP UNIT 8 is appropriately located in an area designated for heavy industrial uses by the Antioch General Plan.

The proposed project's impacts related to smoke, noise, and odor are evaluated in the **AIR QUALITY** and **NOISE** sections of the PSA. Staff has determined that such potential impacts can be effectively mitigated to less-than-significant levels, thereby providing compliance equivalent to strict performance standards cited in the policy presented above.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

The CCPP UNIT 8 would be located at the site of the existing Contra Costa Power Plant. The proposed CCPP UNIT 8 project represents further development of a site already committed to industrial use, rather than the introduction of a new industrial facility into a non-industrial area. The project site is located in an area designated Heavy Industry by both the Contra Costa County General Plan and City of Antioch General Plan. The CCPP UNIT 8 is consistent with this land use designation and would not constitute a change in the planned development pattern of the area as established by the County and City general plans. The project is compatible with the industrial character of the area, which currently includes a variety of manufacturing, fabricating, batch plant, and storage uses.

The construction laydown area for CCPP UNIT 8 would be located immediately south of the proposed project site, within the boundaries of the Contra Costa Power Plant site, and therefore would not conflict with existing or planned land uses. Temporary construction impacts, such as increased dust and noise, may affect adjacent land uses to the east. With mitigation, these construction impacts are not expected to be significant. Please see the **AIR QUALITY** and **NOISE** sections for discussions of the mitigation measures proposed by staff.

Staff has found that operation of the CCPP UNIT 8 would not cause significant, unmitigated adverse noise, dust, public health hazard or nuisance, or traffic impacts on nearby land uses. However, staff has identified a significant, unavoidable adverse visual impact on the adjacent yacht clubs and marinas to the east of the project site. As a result, the proposed project in not considered fully compatible with existing land uses in the area. Please refer to the **VISUAL RESOURCES** section of the PSA for a more detailed discussion of the visual impacts of the project and measures proposed to reduce those impacts. Please refer to the **NOISE**, **AIR QUALITY**, **PUBLIC HEALTH**, and **TRAFFIC AND TRANSPORTATION** sections of the PSA for further information on impacts from the operation of CCPP UNIT 8.

The CCPP UNIT 8 would not require construction of new offsite linear facilities (e.g., power transmission lines, natural gas pipelines, water supply lines). Since it would be located entirely within the boundaries of the existing Contra Costa Power Plant, the CCPP UNIT 8 project would not disrupt or physically divide an established community, nor convert agricultural land to a non-agricultural use. Similarly, the CCPP UNIT 8 project would not preclude or unduly restrict any planned uses in the vicinity.

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. No related projects have been identified in the vicinity of the CCPP UNIT 8 site; therefore, there is no potential for cumulative effects due to the construction of other new industrial or commercial projects in the area. In addition, the proposed project does not appear to make a significant contribution to regional impacts related to new development and growth, such as population inmigration, increased demand for public services, expansion of public infrastructure, or loss of open space.

FACILITY CLOSURE

At some time 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 planned lifetime of the CCPP UNIT 8 is 40 years (Southern, 2000a). At least twelve months prior to the initiation of decommissioning, Southern will prepare a Facility Closure Plan for Energy Commission review and approval. At the time of closure, all applicable LORS will be identified and the closure plan will discuss conformance of decommissioning activities with these LORS.

There are at least two other circumstances under which a facility closure can occur, unexpected temporary closure and unexpected permanent closure. Staff has not identified any LORS from a land use perspective for which the applicant would have to comply in the event of unexpected temporary closure or unexpected permanent closure of the CCPP UNIT 8.

MITIGATION

The proposed project appears to be in compliance with provisions of the Contra Costa and Antioch General Plans and the Contra Costa Zoning Ordinance. Staff has proposed conditions of certification to ensure compliance with the Contra Costa County Zoning Ordinance requirements for parking and signs.

CONCLUSIONS AND RECOMMENDATION

CONCLUSIONS

At this time, staff cannot conclude that the CCPP UNIT 8 project would fully comply with applicable LORS (laws, ordinances, regulations and standards) related to land use. Due to a significant visual impact on adjacent land uses to the east, staff is not able to conclude that the project would comply with Countywide Policy 3-44, which requires that “industrial employment centers shall be designed to be unobtrusive

and harmonious with adjacent areas and development." The proposed project complies with all other applicable LORS related to land use.

Due to the visual impact described above, staff cannot conclude that the CCPP UNIT 8 project would be fully compatible with existing land uses. However, the project would be compatible with the planned land uses because: 1) it is consistent with the current general plan and zoning designations in effect for the site; 2) it is compatible with the existing heavy industrial character of the area; 3) the site does not abut any residentially designated areas; 4) it would not result in significant, unmitigated noise, air quality, public health or nuisance, or traffic impacts that would adversely affect planned uses in the vicinity; 5) it would not physically divide an established community; and 6) it would not preclude or unduly restrict planned land uses. Furthermore, staff does not anticipate any significant cumulative impacts on land use.

RECOMMENDATION

If the Energy Commission certifies the CCPP UNIT 8 project, staff recommends that the Commission adopt the following conditions of certification.

CONDITIONS OF CERTIFICATION

LAND-1 The project owner shall comply with the parking standards established by the Contra Costa County Zoning Ordinance (Title 8, Chapter 82-16).

Verification: At least 30 days prior to construction of the CCPP UNIT 8, the project owner shall submit written evidence to the Energy Commission Compliance Project Manager (CPM) that the project conforms to all applicable parking standards as established by the Contra Costa County zoning ordinance (Title 8, Chapter 82-16). The submittal to the CPM shall include evidence of review by the County.

LAND-2 The project owner shall ensure that any signs erected (either permanent or for construction only) comply with the outdoor advertising regulations established by the Contra Costa County zoning ordinance (Title 8, Chapter 88-6).

Verification: At least 30 days prior to construction of the CCPP UNIT 8, the project owner shall submit written evidence to the CPM that both permanent and temporary signs will conform to the Contra Costa County zoning ordinance (Title 8, Chapter 88-6). The submittal to the CPM shall include evidence of review by the County.

REFERENCES

Albro, Frank, 2000. Associate Planner, Department of Community Development, Land Planning Services, City of Antioch. Personal Conversation with Marcus Lane of Aspen Environmental Group, June 13, 2000.

City of Antioch, 1988. Antioch General Plan 1998 – 2000.

City of Antioch, 1994. Antioch Zoning Ordinance.

Contra Costa County, 1996a. Contra Costa County General Plan.

Contra Costa County, 1996b. Contra Costa County Zoning Ordinance.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

TRAFFIC AND TRANSPORTATION

Steven J. Brown, P.E.

INTRODUCTION

The Traffic and Transportation section of the Preliminary Staff Assessment addresses the extent to which the project may impact the transportation system within the vicinity of its proposed location. This section analyzes the potential traffic and transportation impacts associated with construction and operation of the Contra Costa Power Plant (CCPP) Unit 8 and its ancillary systems.

This analysis includes an evaluation of the influx of large numbers of construction workers, and how, over the course of the construction phase, the movement of these workers can increase roadway congestion and also affect traffic flow. There are no permanent changes proposed by Southern Energy Delta, LLC (Southern or applicant) to the existing transportation network after completion of construction. On-going (post construction) operations and maintenance traffic will represent a negligible increase over current conditions; however, it will include an increase in the transportation of hazardous materials to the project site. The transportation of hazardous materials will need to comply with federal and state laws.

Staff has analyzed the information provided in the AFC and from other sources to determine the potential for the CCPP Unit 8 to have significant traffic and transportation impacts, and has assessed the availability of mitigation measures that could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to ensure that the project complies with the applicable Laws, Ordinances, Regulations, and Standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

- Title 49, Code of Federal Regulations, Sections 171-177, governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, Sections 350-399, and Appendices A-G, Federal Motor Carrier Safety 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 rights-of-way. In addition, the California Health and Safety Code addresses the transportation of hazardous materials.

Provisions within the California Vehicle Code are as follows:

- Section 353 defines hazardous materials.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of inhalation hazards and poisonous gases.
- Sections 34000-34121 establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5 and 34510-11 regulate the safe operation of vehicles, including those which are used for the transportation of hazardous materials.
- Section 25160 et seq. address the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives.
- Sections 13369, 15275, and 15278 address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. These sections also require certificates permitting the operation of vehicles transporting hazardous materials.

- California Streets and Highways Code, Sections 117 and 660-72, and California Vehicle Code, Section 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Street and Highways Code, Sections 660, 670, 1450, 1460, 1470, and 1480, regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.

All construction within the public right-of-way will need to comply with the “Manual of Traffic Controls for Construction and Maintenance of Work Zones” (Caltrans, 1996).

LOCAL

The Contra Costa Transportation Authority (CCTA) serves as the principal transportation agency in the region. In November 1988, Contra Costa County voters approved Measure C, a one-half percent sales tax for transportation improvements and an innovative Growth Management Program (GMP). The CCTA was established to implement Measure C and its goals, which include:

- Relieving existing congestion created by past development through road and transit improvements funded by the sales tax increase; and

- Preventing future development from creating new traffic congestion or deteriorating service levels for fire, police, parks, and other public services in the County.

The CCTA produced a collection of *Implementation Documents* and supporting Technical Materials, adopted in 1990, which include an approach and policy direction for establishing level of service (LOS) standards and Action Plans for Routes of Regional Significance developed cooperatively with local Contra Costa County communities and their respective Regional Transportation Planning Committees (RTPCs). The proposed CCPP Unit 8 is situated within the Eastern Contra Costa County section (East County) and therefore would fall under the guidelines of the East County Action Plan (July 1997). Action Plans are typically comprised of:

- overall policy goals establish by the CCTA;
- Traffic Service Objectives (TSOs) for each route, developed cooperatively at the RTPC level, that define quantifiable measures of effectiveness (such as a delay index or a "not to exceed a level of service D" standard) that can be used to monitor progress in meeting the TSOs; and
- actions, adopted by the RTPC, to be implemented by participating jurisdictions. Actions include capital improvements, transit improvements, traffic operations strategies, land use policies, demand management strategies, or other local projects and programs intended to meet adopted TSOs.

SETTING

REGIONAL DESCRIPTION

The CCPP is located in a section of unincorporated Contra Costa County, California adjacent to the City of Antioch. It is bordered on the west and south by industrial uses, on the east by a commercial marina, industrial uses, and open spaces, and on the north by the San Joaquin River. The proposed CCPP Unit 8 is located on Wilbur Avenue approximately one-half mile west of SR 160 and is to be constructed wholly within the site of the existing CCPP (Southern 2000a). Descriptions of some of the critical roads and highways in the study area are provided below. Traffic and Transportation Figure 1 illustrates the major roads, potential access roads, and highways in the project area.

STATE HIGHWAYS AND LOCAL ROADWAYS

State Route (SR) 4 and SR 160 are the two major highways in the area of the project site. Project traffic would utilize these two state highways and the interchange at SR 160 and Wilbur Avenue. Therefore, Wilbur Avenue would be the only county-maintained roadway affected by the proposed project. This local road primarily serves traffic related to the mix of industrial land uses and open space surrounding the CCPP in a low-density portion of the County.

Wilbur Avenue extends from just east of the SR 160 interchange to A Street in Antioch. Near the site, Wilbur Avenue is approximately 42 feet wide (edge of pavement to edge of pavement) with no paved shoulders. Near the proposed project, this facility has a posted speed of 45 mph and carries approximately 7,000 vehicles per day. The CCPP provides an access road at Wilbur Avenue approximately 43 feet wide with two outbound lanes (an exclusive left-turn lane and an exclusive right-turn lane) and one inbound lane. A guard station on the CCPP access road is located approximately 1,000 feet from the Wilbur Road intersection and controls entry to the power plant using electronic passes.

SR 4 provides access to the site via its connection to SR 160 and the Wilbur Road interchange. SR 4 directly connects to SR 160 at the East 18th Street/Main Street interchange (refer to Figure 1). SR 4 traverses most of the State of California from Alpine County to the Cities of Pinole and Martinez in Contra Costa County and is maintained by the California Department of Transportation (Caltrans). In the vicinity of the CCPP, SR 4 consists of two to four lanes. At its junction with SR 160, SR 4 carries approximately 40,000 vehicles per day and over 70,000 vehicles per day near the A Street interchange.

SR 160 also provides access to the project site via Wilbur Road. SR160 extends from the City of Sacramento to its terminus at its junction with SR 4 just south of the Antioch Bridge (at the East 18th Street/Main Street interchange) in Contra Costa County. In the vicinity of the project, SR 160 consists of four lanes (two lanes per direction) and carries an average daily volume of approximately 11,000 vehicles with approximately 870 vehicles during the peak hour (Caltrans, 1999).

ACCIDENT HISTORY

For roadway segments, accident rates are computed as the number of accidents per million vehicle-miles of travel (MVM) over a three-year period. SR 160 had an accident rate of 1.23 accidents per million vehicle-miles traveled between SR 4 and the Contra Costa County line based on information provided by Caltrans. SR 4 had an accident rate of 1.43 accidents per MVM between Hillcrest Avenue and SR 160 over the past three years (Southern 2000p). Statewide average accident rates for similar facilities range from 0.71 for freeways and 2.27 for conventional multilane roads (Western MSCC AFC, 1999).

Wilbur Avenue had an accident rate of approximately 1.5 accidents per year over a period ranging from January 1996 through January 1998. The AFC also indicates that there have been three accidents at the Wilbur Avenue/SR 160 interchange within the last two years. Staff is continuing its research into accident rates on Wilbur Avenue to reflect data over the past three years. This accident data will be discussed in the Final Staff Assessment.

RAILWAYS

The Atchison Topeka & Santa Fe Railroad mainline runs alongside Wilbur Avenue in the vicinity of the proposed project. This mainline crosses Wilbur Avenue at a grade-separated crossing near Apollo Court in the City of Antioch. However, various spur lines off the mainline cross Wilbur Avenue at-grade near the project

site including a line running parallel to the existing CCPP access road. Field observations indicate that these spur lines are not currently utilized and appear unsuitable for use.

Railroad crossings within the commercial section of Antioch have railroad grade crossing warning equipment, including warning gates. Railroad crossings closer to the project site (i.e., spur line crossings) near the more industrial section of the City lack gates but display the legally required warning signs.

PUBLIC TRANSPORTATION

The principal transit service provider for the Eastern Contra Costa communities including Pittsburg, Antioch, Brentwood and Oakley is Tri Delta Transit. This service provides 10 separate routes and two lines offering weekend service. Two transit lines also run along Wilbur Avenue; however, these lines terminate west of the power plant at Minaker Drive. No transit lines directly serve the CCPP facility location.

BART (Bay Area Rapid Transit) is the rail transit service provider for the Bay Area. A Pittsburg/Bay Point station was recently opened that connects the Eastern Contra Costa communities with the rest of the Bay Area including Contra Costa communities such as Concord, Walnut Creek and Lafayette. BART also serves downtown Oakland and San Francisco (Southern 2000a).

PLANNED ROADWAY IMPROVEMENTS BY OTHERS

The primary roadway improvement within the study area relates to the widening of SR 4 to eight lanes (4 each direction) including 3 mixed-flow lanes and one High Occupancy Vehicle (HOV) lane in each direction, as well as a median for with sufficient width to accommodate a future BART extension. The widening of SR 4 from Bailey Road to Railroad Avenue is currently under construction and is scheduled for completion in July 2001, shortly after construction of the CCPP Unit 8 Project commences. The design for the widening of SR 4 between Railroad Avenue and Loveridge Road is underway and is scheduled for completion in the Fall of 2003 (CCTA 2000a).

TRUCK TRAFFIC

According to the Contra Costa County Permit Center, the section of Wilbur Avenue near the project does not have any specific truck load limits. Therefore, the California Vehicle Code limits apply to Wilbur Avenue, SR 4, and SR 160 (which are under Caltrans jurisdiction). These limits are 20,000 pounds per axle and 10,500 per wheel or wheels on one end of the axle.

CURRENT ROADWAY AND INTERSECTION OPERATING CONDITIONS

The operating conditions of a roadway system are described using the term “level of service”. Level of service (LOS) is a description of a driver’s experience at an intersection or roadway based on the level of congestion or delay. However, it is not a measure of safety or accident potential. Intersection and roadway LOS can

range from “A”, representing free-flow conditions with little or no delay, to “F”, representing saturated conditions with substantial delay.

LOS standards in Contra Costa County vary depending on the xroadway facility and the particular section of the county in question. The proposed CCPP Unit 8 is located in the Eastern Contra Costa County section (East County). For roadway facilities identified as Routes of Regional Significance that carry a significant amount of traffic, a Traffic Service Objective (TSO) is applied as a measure of effectiveness to evaluate traffic impacts. SR 4 has been identified as a Route of Regional Significance within East County, while SR 160 and Wilbur Avenue have not.

The TSO for Routes of Regional Significance within East Contra Costa County (including SR 4) is based on calculation of a Delay Index. A delay index is defined as a ratio of the peak hour travel time divided by the free-flow travel time for a given facility. For example, if it takes 12.0 minutes to traverse a certain route during the peak hour, and 5.0 minutes during free-flow conditions, the Delay Index is considered to be 12.0/5.0 or 2.4. According to the East County Action Plan, the delay index for any Route of Regional Significance should be no greater than 2.5 (TRANSPLAN 2000a).

Although an impact to Routes of Regional Significance facilities is typically identified if a project results in a delay index of 2.5 or greater, construction of the proposed CCPP Unit 8 would create only temporary impacts (Korve 2000a). Furthermore, SR 4 currently operates within the acceptable standards of the Action Plan, which states that all of East County’s Regional Routes are well within their Delay Index objectives, except for Buchanan Road (Southern 2000p).

Since Wilbur Avenue is not identified as a Route of Regional Significance in the East Contra Costa County section, LOS C is considered the acceptable standard (Southern 2000a).

The following roadway segments affected by CCPP Project traffic operate at acceptable levels of service (LOS C or better) during the p.m. peak hour under existing conditions (Southern 2000p):

- SR 4 (A Street to SR 160) – LOS A;
- SR 160 (SR 4 to Wilbur Avenue) – LOS B;
- SR 160 (Wilbur Avenue to Antioch Regional Shoreline) – LOS C; and
- Wilbur Avenue (SR 160 to San Joaquin Harbor Road) – LOS B.

The following intersections operate at an acceptable LOS B during both a.m. and p.m. peak hours under existing conditions:

- Wilbur Avenue/SR 160 southbound off-ramp; and
- Wilbur Avenue/SR 160 northbound off-ramp.

IMPACTS

PROJECT-SPECIFIC IMPACTS

CONSTRUCTION PHASE

Traffic impacts from the CCPP Unit 8 associated with the p.m. peak hour of a peak construction day of the project were evaluated to provide a conservative (i.e., worst case) analysis.

COMMUTE TRAFFIC

According to the Data Request Responses, construction of the proposed CCPP Unit 8 is expected to last a total of 22 months, with the peak construction period taking place during the 12th through the 17th month (Southern 2000a). Trip generation for the CCPP Unit 8 project provided by Southern Energy of California (SECAL) was based on trip generation for similar projects at similar facilities. Table 8.10-3 of the AFC indicates that the CCPP Unit 8 project will generate 150 average daily construction personnel trips and 275 peak daily construction personnel trips.

An estimate of the number of trips by construction workers is based upon a conservative assumption that 100 percent of the workers are driving alone (i.e., no carpooling assumed) to/from the site during the peak hour (Southern 2000p).

According to the AFC, approximately 80 percent of the construction trips will originate from within Contra Costa County and arrive via SR 4. The remainder of the trips to the proposed CCPP Unit 8 are assumed to originate in Solano County and will arrive via SR 160. The analysis assumes a 70 percent-30 percent arrival/departure split during the a.m. peak hour and a 30 percent-70 percent arrival/departure split during the p.m. peak hour (Southern 2000a).

Parking for the CCPP currently exists on-site and Wilbur Avenue contains soft shoulders and ample space should off-site parking be needed.

TRUCK TRAFFIC

Construction traffic will also consist of 5 delivery truck and 5 heavy vehicle truck trips per day during an average construction period. The project is expected to generate 10 delivery truck and 15 heavy vehicle truck trips per day during the peak construction period. The AFC assumes the same distribution of truck trips as the commute construction trips (i.e., 80 percent would utilize SR 4, and 20 percent would utilize SR 160).

Construction of the CCPP Unit 8 will generate hazardous wastes consisting primarily of batteries, mercury (in switches and lights), asbestos-containing materials, and various liquid wastes (e.g., cleaning solutions, solvents, paint and antifreeze).

Licensed hazardous waste transporters will have direct access to the CCPP Unit 8 via Wilbur Avenue. The close proximity of the CCPP Unit 8 to SR 160 and SR 4 eliminates the need to carry any hazardous wastes along residential streets. Routes for offsite removal of hazardous wastes would consist of SR 4 to Stockton with a connection to either I-5 or SR 99 to reach any of California's three Class I hazardous waste facilities (located in Kern, Imperial and Kings Counties).

The transportation and handling of hazardous substances associated with the CCPP Unit 8 can increase roadway hazard potential. The handling and disposal of hazardous substances are addressed in the **WASTE MANAGEMENT** and the **HAZARDOUS MATERIALS HANDLING** sections of the Preliminary Staff Assessment. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate the transportation of hazardous substances. Conditions of certification that ensure this compliance are discussed later in this analysis.

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

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally important to ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol. For an in-depth description of the amount and type of hazardous materials that will be used during the construction of the facility, see the **WASTE MANAGEMENT** and **HAZARDOUS MATERIALS HANDLING** sections of the Preliminary Staff Assessment.

Transportation of equipment exceeding the load size and weight limits of any roadways will require special permits. The procedures and processes for obtaining such permits are fairly straightforward. Mitigation measures and conditions of certification that ensure this compliance are discussed later in this section.

TOTAL PROJECT CONSTRUCTION TRAFFIC

Product deliveries via truck traffic will contribute, along with other CCPP Project-generated traffic, to create localized impacts to roadway performance. During an average construction period, the CCPP Unit 8 Project will generate 150 commute trips per day and approximately 10 delivery truck/heavy vehicle truck trips per day for a total of 160 trips per day.

During the peak construction period, the CCPP Project will generate 275 commute trips and approximately 25 delivery truck/heavy vehicle truck trips per day. The total number of peak daily construction trips (i.e., 300 trips) was assumed for peak hour

analysis. The Contra Costa Transportation Authority (CCTA) does not require a traffic impact study for projects that do not generate more that 100 peak hour trips (CCTA 2000c).

The analysis assumed that half the traffic generated by peak construction of the proposed project will arrive during the a.m. peak hour while the other half will arrive during the p.m. peak hour. Since construction activities and heavy vehicle/truck deliveries would likely occur throughout the day (i.e., during both peak and off-peak hours) these assumptions generate a conservative estimate of traffic impacts (Southern 2000a).

ROADWAY AND INTERSECTION OPERATING CONDITIONS

The combination of commute, truck, and visitor traffic associated with the construction phase of the CCPP Unit 8 Project will increase the volume of traffic in the local area. However, the level of service will not change between existing and 'existing plus project' conditions on affected road segments with the addition of project construction traffic during the p.m. peak hour of a peak construction workday (Southern 2000p). The following roadway segments will remain at acceptable levels of service:

- SR 4 (A Street to SR 160) – LOS A;
- SR 160 (SR 4 to Wilbur Avenue) – LOS B;
- SR 160 (Wilbur Avenue to Antioch Regional Shoreline) – LOS C; and
- Wilbur Avenue (SR 160 to San Joaquin Harbor Road) – LOS B.

Although project traffic will increase vehicle delay, the following intersections will continue to operate acceptably at LOS B under 'existing plus project' conditions:

- Wilbur Avenue/SR 160 southbound off-ramp; and
- Wilbur Avenue/SR 160 northbound off-ramp.

Compliance with the provisions of the transportation permits required from Caltrans would be necessary to ensure that any potential safety impacts on roadways with significantly high accident rates are also minimized. Mitigation measures and conditions of certification that ensure compliance with these provisions are discussed later in this section.

Traffic count data from Caltrans will be requested to provide further evaluation of state highways during off-peak hours and any potential traffic impacts related to the construction of the CCPP Unit 8 Project. Staff is continuing its research into off-peak period traffic volumes in the area of the proposed project. This information will be discussed in the Final Staff Assessment.

The pavement section of Wilbur Avenue fronting the existing CCPP access road is approximately 42 feet wide with two 21-foot travel lanes (edge of pavement to edge of pavement) and no paved shoulder. No left-turn lane is provided for eastbound vehicles turning from Wilbur Avenue into the CCPP access road. This could cause

potential delays for eastbound vehicles travelling on Wilbur Road. However, the existing average daily traffic on this local roadway is relatively low and therefore, no significant traffic impacts (i.e., congestion and/or delay) are expected on Wilbur Avenue.

The proposed addition of an access road along the east side of the proposed CCPP Unit 8 site should provide adequate pavement for truck turning radii for vehicles in order to help facilitate truck-turning movements. Mitigation measures and conditions of certification that ensure this compliance are discussed later in this section.

RAILWAYS

Although the AFC indicates that freight rail service currently supplies the various industrial uses in proximity to the CCPP (Southern 2000a), no indication is given that the proposed CCPP Unit 8 Project will utilize the nearby rail facilities. No significant traffic impacts related to the existing railway facilities are anticipated with the addition of the proposed project since all railroad crossings on Wilbur Avenue are located east of the existing CCPP access road. All CCPP Unit 8-generated traffic is expected to arrive via Wilbur Avenue from SR 160. Therefore, CCPP Unit 8 traffic would not conflict with any of the existing railroad crossings. Furthermore, none of the existing railroad spur lines that cross Wilbur Avenue appear to be utilized or operable.

LINEAR FACILITIES

The Land Use section of the AFC indicates that no additional construction for linear facilities is necessary for the CCPP Unit 8 Project as the CCPP is expected to rely on many of the existing plant's systems. Therefore, no traffic impacts to the local roadway or state highway system serving the project are identified with regards to the construction of linear facilities for this project.

OPERATIONAL PHASE

COMMUTE AND VISITOR TRAFFIC

The operational phase of the CCPP Unit 8 generating plant will require the addition of 10 full-time employees. Adequate parking will be available for these employees on site. The existing state highway and county roadway system will not be impacted by any increase in commute traffic associated with the operation of the CCPP Unit 8; therefore, the commuter and visitor traffic associated with the operational phase of the project is not expected to cause any significant traffic impacts.

TRUCK TRAFFIC

The transportation and handling of hazardous substances associated with the CCPP Unit 8 can increase roadway hazard potential. According to the AFC, operation of the project will require approximately one delivery per week of aqueous ammonia solution. (Southern 2000a).

Direct access to the CCPP Unit 8 by licensed hazardous waste transporters will be via Wilbur Avenue. The close proximity of the CCPP to SR 160 and SR 4 precludes the need to carry any hazardous wastes along residential streets. Routes for offsite removal of hazardous wastes would consist of SR 4 to Stockton with a connection to either I-5 or SR 99 to reach any of California's three Class I hazardous waste facilities (located in Kern, Imperial and Kings Counties).

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally important to ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol. For an in-depth description of the amount and type of hazardous materials that will be used during the operation of the facility, see the **WASTE MANAGEMENT** and **HAZARDOUS MATERIALS HANDLING** sections of the Preliminary Staff Assessment.

The existing state highway and county roadway system will not be significantly impacted by any increase in truck traffic associated with the operation of the CCPP Unit 8 project.
Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with Federal and State standards established to regulate the transportation of hazardous substances. Mitigation measures and conditions of certification that ensure this compliance are discussed later in this analysis.

LINEAR FACILITIES

The operation of linear facilities that would serve both the existing CCPP and the proposed CCPP Unit 8 is not expected to have any impacts on area roadways except for short-term maintenance or unplanned difficulties. In either case, the impacts create traffic flow difficulties that are typically limited in duration and are not expected to cause any significant traffic impacts.

CUMULATIVE IMPACTS

The CCPP Unit 8 site is situated in a predominantly industrial land use area on the periphery of the City of Antioch. Combined with the relatively low density of other surrounding land uses, the addition of only 10 full-time employees, and the adequate roadway capacity on Wilbur Avenue, the CCPP Unit 8 is not expected to have any significant cumulative impacts (Southern 2000a). The applicant has not identified any additional projects planned in the area that could potentially cause traffic impacts on the local roadways or state highways affected by this project under cumulative conditions.

The regional area will likely continue to experience development and traffic volume growth. Consequently, traffic volumes on the regional roadway system will likely increase. The project's level of traffic generation will diminish between the construction and operational phases such that an increase in background traffic should not be problematic.

Mitigation to minimize any potential traffic impacts under cumulative conditions on the affected state highways can be accomplished through the implementation of transportation demand strategies that limit all commute and truck traffic related to the construction of the CCPP Project to off-peak hours as part of a construction traffic control and implementation plan (to be coordinated with Contra Costa County). Mitigation measures and conditions of certification that ensure this compliance are discussed later in this section.

FACILITY CLOSURE

The planned life of the generation facility is forty years (Southern 2000a). At least twelve months prior to the proposed decommissioning, the applicant shall prepare a Decommissioning Plan for submission to the Energy Commission for review and action. 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. The effects of CCPP Project closure on traffic and transportation will be similar to those discussed for the project itself. Closure will create traffic levels that are similar in intensity and duration to those expected during facility construction. The removal of waste and other materials will produce impacts from truck traffic. At this time, no specific conclusions can be drawn on the effects of project closure on traffic and transportation.

MITIGATION

The applicant has indicated their intention to comply with all LORS relating to the transport of hazardous materials. The applicant should also implement the following traffic and transportation mitigation measures:

- Enforce a policy that all project-related parking occurs in designated parking areas;
- Obtain and comply with all necessary encroachment and transportation permits from Caltrans and all other jurisdictions regarding the transportation of heavy equipment and hazardous materials and any construction activity within the public right-of-way;
- Repair any damages to Wilbur Avenue incurred during CCPP Unit 8 construction to the road's pre-project construction condition;
- Prepare a construction traffic control plan and transportation demand implementation program that limits construction-period truck and commute traffic to off-peak periods, to the satisfaction of Contra Costa County and Caltrans. These plans and programs should establish schedules for major shifts outside of the ambient street traffic peak periods and timing of heavy vehicle equipment and building materials deliveries.
- Provide sufficient pavement for the additional access road proposed along the east side of the Unit 8 site to provide adequate truck turning radii in order to help facilitate truck-turning movements safely.

COMPLIANCE WITH LORS

CCPP has stated their intention to comply with all federal, state, and local LORS. A condition to ensure compliance is proposed below. Therefore, the project is considered consistent with identified federal, state and local LORS.

CONCLUSIONS AND RECOMMENDATIONS

1. During the construction phase, increased roadway demand resulting from the daily movement of workers and materials will slightly increase congestion and delay, although the level of service on each of the studied state highway segments and intersections would be unchanged.
2. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be negligible.
3. All transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal, state, and local standards and permits established to regulate the transportation of hazardous substances.
4. The owner should also obtain and comply with all necessary encroachment permits from Caltrans and all other jurisdictions related to any construction within the public right-of-way.
5. Construction activities have the potential to damage local roadways. The applicant should be required to repair damaged roadways to their original condition.
6. The AFC indicates that parking for the construction workforce will be provided in an area on or adjacent to the project site. The applicant is expected to enforce a policy that all project-related parking occurs in designated parking areas; therefore, construction-period parking is not considered a significant project impact.
7. The addition of CCPP Unit 8 construction traffic to the local roadways and state highways under cumulative conditions is not expected to have any significant cumulative impacts. The project's level of traffic generation will diminish between the construction and operational phases such that an increase in background traffic should not be problematic.

As stated previously, staff is continuing its research into off-peak period traffic volumes in the area of the proposed project in order to evaluate the potential impacts of shifting construction related traffic to off-peak periods. This information will be discussed in the Final Staff Assessment.

The conditions of certification proposed below are those that staff has identified as necessary to mitigate project impacts based on the information available to date. Staff expects to make some changes to this analysis and possibly the proposed conditions of certification in the Final Staff Assessment, based on the analysis of the additional information described above (e.g., off-peak traffic volumes on affected state highways and accident data), as well as comments received on the Preliminary Staff Assessment.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall comply with California Department of Transportation (Caltrans) and Contra Costa County limitations on vehicle sizes and weights. In addition, the project owner or their contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for both rail and 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-2 The project owner or their contractor shall comply with California Department of Transportation (Caltrans) and Contra Costa County limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any encroachment 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 shall ensure that all federal and state regulations for the transport of hazardous materials are observed.

Verification: The project owner shall include in its Monthly Compliance Reports copies of all permits and licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous materials.

TRANS-4 Following completion of project construction of the power plant and all related facilities, the project owner shall repair Wilbur Avenue to its pre-construction condition.

Protocol: Prior to start of site preparation or earth moving activities, the project owner shall photograph, videotape or digitally record images of Wilbur Avenue from SR 160 to the project access road. The project owner shall provide the CEC Compliance Project Manager (CPM), Contra Costa County and Caltrans (as necessary) with a copy of these images. At least 60 days prior to start of site preparation or earth moving activities, the project owner shall also notify Caltrans about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction related activities associated with other projects.

Verification: Within 30 days after completion of project construction, the project owner shall meet with the CPM, Contra Costa County and Caltrans (as needed) to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to original or as near original condition as possible. The project owner shall provide to the CPM a letter from Contra Costa County stating their satisfaction with the road improvements.

TRANS-5 During construction of the power plant and all related facilities, the project owner shall enforce a policy that all project-related parking occurs in designated parking areas.

Verification: At least 60 days prior to start of site preparation or earth moving activities, the project owner shall submit a parking and staging plan for all phases of project construction to Contra Costa County for review and comment, and to the CPM for review and approval.

TRANS-6 The project owner shall develop a construction traffic control and transportation demand implementation program that limits construction-period truck and commute traffic to off-peak periods in coordination with Contra Costa County and Caltrans. Specifically, this plan shall include the following restrictions on construction traffic addressing the following issues for power plant construction:

- provide sufficient pavement of the additional access road proposed along the east side of the Unit 8 site to provide adequate truck turning radii in order to help facilitate truck turning movements.
- establish construction work hours outside of the peak traffic periods to ensure that construction workforce traffic occurs during off-peak hours.
- schedule of heavy vehicle equipment and building materials deliveries to occur during off-peak hours.
- maintain access to adjacent residential and commercial properties.

Verification: At least 30 days prior to start of site preparation or earth moving activities, the project owner shall provide to Contra Costa County and Caltrans for review and comment, and to the CPM for review and approval, a copy of their construction traffic control plan and transportation demand implementation program.

REFERENCES

California Department of Transportation (Caltrans), 1998 Traffic Volumes on California State Highways, June 1999.

Contra Costa County Permit Center, Telephone Conversation with Bob Hendry on August 21, 2000 concerning truck weight or load limits on roadways in an unincorporated section of Contra Costa County.

Contra Costa Transportation Authority (CCTA) 2000a. Summary of Route 4 East Improvement Projects, August 17, 2000.

Contra Costa Transportation Authority (CCTA) 2000b. Telephone Conversation with Brad Beck, Senior Planner, on October 5, 2000 concerning Traffic Service Objectives specified in the East County Action Plan.

Contra Costa Transportation Authority (CCTA) 2000c. Technical Procedures, September 17, 1997.

Korve Engineering (Korve 2000a) Memorandum – Teleconference Outcome, September 11, 2000.

Midway (Western Midway Sunset Co) 1999a. Application for Certification. Submitted to the California Energy Commission/Smith on December 22, 1999.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project. Submitted to the California Energy Commission/Lewis on January 31, 2000.

Southern. 2000p. Data Requests Responses 119-167. Submitted to the California Energy Commission/Lewis on October 13, 2000.

TRANSPLAN, (2000a). Action Plan For Routes of Regional Significance-Eastern Contra Costa County. June 2000.

TRANSPLAN, (2000b). Telephone Conversation with John Greitzer, on October 5, 2000 concerning temporary versus permanent impacts relative to the East County Action Plan.

NOISE

Thomas M. Murphy

INTRODUCTION

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

- The purpose of this analysis is to identify and examine the likely noise impacts from the construction and operation of the Contra Costa Power Plant Unit (CCPP) Unit 8, and to recommend procedures to ensure that the resulting noise impacts would be adequately mitigated to comply with applicable laws, ordinances regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time to which the worker is exposed (see **Noise: Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves: monitoring the noise to which workers are exposed; assuring that workers are made aware of overexposure to noise; and periodically testing the workers' hearing to detect any degradation.

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

STATE

California Government Code Section 65302(f) encourages each local government entity to perform noise studies and implement a noise element as part of their General Plan. In addition, California Code of Regulations, Title 4, has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in Table 1.

Table 1 Land Use Compatibility for Community Noise Environment

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

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Other State LORS include the California Environmental Quality Act (CEQA) and the California Occupational Safety and Health Administration (Cal-OSHA) regulations.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth

some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

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; or

d) a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project…."

CAL-OSHA

Cal-OSHA has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (**see NOISE: Appendix A, Table A4**).

LOCAL

CONTRA COSTA COUNTY GENERAL PLAN NOISE ELEMENT

Contra Costa County has adopted the State of California land use compatibility guidelines (shown above in Table 1) in their general plan (Contra Costa County 1996). The noise levels considered generally acceptable and conditionally acceptable for single-family residences are 60 dBA CNEL and 70 dBA CNEL, respectively. Several policies in the Contra Costa County General Plan Noise Element are applicable to construction and operation of the proposed project (Contra Costa County 1996). These policies are as follows:

- Policy 11-1 – Requires new projects to meet acceptable exterior noise level standards (see Table 1).
- Policy 11-8 – Requires construction activities to be concentrated during normal daytime work hours.

It should be noted that there are no current noise ordinances in Contra Costa County.

CITY OF ANTIOCH NOISE ORDINANCES

Two noise ordinances in the City of Antioch Code of Ordinances are applicable to construction and operation of the proposed project (City of Antioch 2000). Ordinances § 5-17.04 and § 5-17.05 regulate heavy construction equipment noise

and construction activity noise. These regulations limit heavy construction equipment operation and construction activity to the following hours:

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

SETTING

PROJECT BACKGROUND

The CCPP UNIT 8 Project involves the construction and operation of a new nominal 530 MW natural gas-fired combined cycle power plant adjacent to the existing CCPP facility in northeastern Contra Costa County. The proposed plant is conceptualized as two advanced “F” class combustion turbine generators and associated heat recovery steam generators (HRSGs). The HRSGs would be installed as a two-on-one configuration. The two HRSGs will raise steam to drive one reheat/condensing steam turbine generator.

The project’s natural gas fuel requirements would be supplied by a pipe tie-in to an existing natural gas pipeline (PG&E Line 400) that currently traverses the eastern boundary of the existing CCPP facility. The project’s electrical transmission will be accomplished through interconnection, by a new 230-kV tie-in, with the on-site PG&E Contra Costa Switchyard. The project’s water requirements will be met by connection with existing on-site treated and untreated water resources (demineralized water, filtered water, and raw water), interconnection with the on-site City of Antioch water pipeline (potable water), connection with permitted NPDES outfalls into the San Joaquin River (cooling tower blowdown, boiler blowdown, boiler washwater, demineralizer/neutralization system wastewater), and connection with the three existing leach fields (domestic wastewater). Other proposed construction activities include a tie-in to existing stormwater facilities and the demolition and removal of existing structures.

EXISTING LAND USE

POWER PLANT SITE

The CCPP Unit 8 would be located in northeastern Contra Costa County, approximately 1 mile northeast of the city center of Antioch, California. The project site is within the existing CCPP Unit 8 facility located on the southern banks of the San Joaquin River. The project site is zoned for heavy industry (“H-1”). The San Joaquin River borders the project site to the north, undeveloped land within the CCPP facility borders the project site to the south, the existing CCPP powerhouses and ancillary transmission facilities border the project site to the west and the San Joaquin Yacht Harbor borders the project site to the east.

Sensitive receptors are located in several different areas within the one-mile study area of the CCPP Unit 8 site. The closest sensitive receptors are a couple of residences located approximately 350 feet east of the project site in the San Joaquin Yacht Harbor (Southern 2000a, AFC § 8.5 and Table 8.5-6). Additional residences are located further east in the San Joaquin Yacht Harbor. Other residential areas are located approximately 4,000 feet southwest of the project site, 4,000 feet south of the project site, and 4,500 feet south-southwest of the project site.

LINEAR FACILITIES

The CCPP UNIT 8 will be directly interconnected, by a 230-kV tie, to PG&E's Contra Costa Switchyard that is located within the property boundary of the CCPP site (Southern 2000a, AFC §§ 2.2.13, 5.0). The 230-kV lines will be connected through the Unit 4 and Unit 5 bays. These two bays formerly served CCPP Units 4 and 5. Switching equipment on these two switchyard bays will be upgraded/replaced, as necessary. From the switchyard, CCPP Unit 8 will utilize PG&E's existing high voltage transmission system; therefore, no off-site linear facility construction is required for this project. The construction of the on-site tie-in lines will affect the same receptors as identified above for the power plant site.

The CCPP Unit 8 will tie into natural gas and potable water supply pipelines that are located within the property boundary of the CCPP site (Southern 2000a, AFC §§ 2.2.14.1, 6.0). Therefore, no off-site pipeline construction is required for this project. The construction of the on-site tie-in lines will affect the same receptors as identified above for the power plant site.

EXISTING NOISE LEVELS

In order to predict the likely noise effects of the proposed project on adjacent sensitive receptors, Southern Energy Delta, LLC (Southern or applicant) commissioned an ambient noise survey of the area. The survey was conducted, at various hourly time intervals, at four locations on September 23 and 24, 1999; and at an additional fifth location on January 17 and 18, 2000. The noise survey was conducted using two Larson Davis Model 712 American National Standards Institute (ANSI) Type 2 Integrated Sound Level Meters mounted approximately five feet above ground level to simulate the average height of the human ear (Southern 2000a, AFC § 8.5.1).

The applicant's noise survey monitored noise levels at the following five locations:

1) 25 consecutive 1-hour measurements were taken approximately 100 feet north of the intersection of 18th Street and Wightman Avenue (Off-site Measurement Location 1 [OML1]), which is approximately 4,000 feet south of the project site boundary and 2,500 feet south of the CCPP facility fence line.
2) Three 1-hour measurements, one each during the day, evening, and nighttime periods, were taken approximately 50 feet from the intersection of Wilson Street and Smoke Tree Street (OML2), which is approximately 4,500 feet south-

southwest of the project site boundary and 2,800 feet south of the CCPP facility fence line.

3) Three 1-hour measurements, one each during the day, evening, and nighttime periods, were taken at 1958 Santa Fe Avenue (OML3), which is approximately 3,800 feet southwest of the project site boundary and approximately 1,100 feet west-southwest of the CCPP facility fence line.
4) Three 1-hour measurements, one each during the day, evening, and nighttime periods, were taken adjacent to the south CCPP property line 50 feet south of Wilbur Avenue (OML4), which is approximately 2,000 feet southwest of the project site boundary.
5) Eight 1-hour measurements, during the day, evening, and nighttime periods, were taken at a residence in the San Joaquin Yacht Harbor (OML5) approximately 350 feet east of the project site boundary and the CCPP facility fence line.

The average ambient noise level recorded at OML1 was 65.5 dBA L_{eq}. The monitor recorded a relatively steady-state noise level of 50.0 to 52.0 dBA L_{90} during the hours of 10 p.m. to 4 a.m., and a noise range of 51.8 to 55.9 dBA L_{90} from 4 a.m. to 10 p.m. (Southern 2000a, AFC § 8.5 Table 8.5-1; 2000f). The primary noise source in the area was vehicle traffic along 18th Street. The existing CCPP is faintly audible from this location, during lulls in the traffic along 18th Street.

Noise results for OML2 averaged 47.2 dBA L_{90} for the three hours monitored. The monitored values ranged between 45.8 dBA and 48.7 dBA L_{90}, with the highest value occurring during 9:00 a.m. to 10:00 a.m. (Southern 2000a, AFC § 8.5 Table 8.5-2; 2000f). The primary noise sources identified during the survey were from nearby roads and industrial facilities. The existing CCPP is not normally audible from this location.

The ambient noise level readings for OML3 averaged 45.8 dBA L_{90} for the three hours monitored. The monitored values ranged between 44.9 dBA and 47.0 dBA L_{90}, with the highest value occurring during 8:00 p.m. to 9:00 p.m. (Southern 2000a, AFC § 8.5 Table 8.5-2; 2000f). The primary noise sources identified during the survey were from nearby industrial facilities. The existing CCPP is not normally audible from this location. This location is adjacent to an active railroad line and experiences very high short-term noise events during the passing of freight trains.

The ambient noise level readings for OML4 averaged 55.7 dBA L_{90} for the three hours monitored. The monitored values ranged between 53.2 dBA and 58.2 dBA L_{90}, with the highest value occurring during 12:00 p.m. to 1:00 p.m. (Southern 2000a, AFC § 8.5 Table 8.5-2; 2000f). The primary noise source identified during the survey was traffic on Wilbur Avenue. The existing CCPP is audible from this location, as are the overhead high voltage lines.

The ambient noise level readings for OML5 averaged 61.9 dBA L_{90} for the eight hours monitored. The monitored values ranged between 60.4 dBA and 65.4 dBA L_{90}, with the highest value occurring during 7:00 a.m. to 8:00 a.m. (Southern 2000a, AFC § 8.5 Table 8.5-2; 2000f). The primary noise source identified during the survey was the existing CCPP.

IMPACTS

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

PROJECT SPECIFIC IMPACTS — CONSTRUCTION

COMMUNITY EFFECTS

Construction noise is a temporary phenomenon; the construction period for the CCPP UNIT 8 is scheduled to last for 22 months (Southern 2000a, AFC § 2.2.14). Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours is commonly exempt from enforcement by local ordinances. As identified in the LORS, the City of Antioch regulates the permissible hours of construction, but does not have any specific noise limits within the hours during which construction is allowed.

The applicant has not predicted the potential noise impact of project construction on the nearest sensitive receptors (Southern 2000a, AFC § 8.5.2.2). However, the applicant states that the construction noise levels will be slightly higher than existing monitored power plant noise levels; therefore, they do not believe that there will be a significant increase in ambient sound level at any receptor (Southern 2000a, AFC § 8.5.2.2).

Other power plant construction projects have estimated sound levels at 50 feet from the acoustic center of the construction to range from 85 to 90 dBA (WMSCC 1999). Using this range of values, the sound levels at the closest residence (350 feet from the construction site) are projected to reach about 68 to 73 dBA for most work; at the residences 4000 feet from the construction site (1958 Santa Fe Avenue), they are projected to reach about 47 to 52 dBA. Ambient background sound levels at these two locations were only monitored for a single hour each during the daylight hours where construction is allowable under City of Antioch Municipal Codes. The monitored values for these two locations were 61.9 dBA and 45.8 dBA L_{90}, respectively. The construction sound levels at these two locations would be slightly higher than the ambient conditions. Therefore, staff has recommended the inclusion of three Conditions of Certification (**NOISE-1**, **NOISE-2**, and **NOISE-8**) to monitor and mitigate potential construction noise impacts.

Because construction activity and related traffic are scheduled during the daytime hours in compliance with City of Antioch Municipal Code requirements, potential construction impacts to receptors in the CCPP proposed project area are considered to be less than significant (Southern 2000a, AFC § 8.5.2.2).

STEAM BLOWS

Typically, the steam blows create the loudest noise encountered during construction. Steam blows are necessary after erection and assembly of the feedwater and steam systems because the piping and tubing that comprises the steam path accumulate dirt, rust, scale and construction debris such as weld

spatter, dropped welding rods and the like. If the plant were to start up without thoroughly cleaning out the piping and tubing, 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 effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

Typically, steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. This would attenuate to approximately 119 dBA, which is an exceedingly disturbing level, at the nearest residence (350 feet in distance), and to approximately 98 dBA at the residences located 4000 feet from the project site. In order to minimize disturbance from steam blows, the steam blow piping can be equipped with a silencer that would reduce noise levels by 20 to 30 dBA, or to a level ranging from 89 to 99 dBA at the nearest residence, and to 68 to 78 dBA at the residences located 4000 feet from the project site.

Alternatively, Southern may elect to employ a new, quieter steam blow process, referred to as QuietBlow™ or Silentsteam™. This method utilizes lower pressure steam over a continuous period of approximately 36 hours. Resulting noise levels reach approximately 82 dBA at 100 feet. Through the implementation of this technology, noise levels at the nearest residence would be approximately 71 dBA, and 50 dBA at the residences located 4000 feet from the project site. These noise levels would be higher than ambient background daytime noise levels.

The applicant has not proposed to mitigate the noise generated from steam blows. Because this undertaking will produce an extremely high noise level at residential receptors, staff proposes that any high pressure steam blows be muffled with an appropriate silencer and be performed only during restricted daytime hours in order to minimize annoyance to residents (see proposed Condition of Certification **NOISE-4** below).

Regardless of which steam blow process the applicant selects, staff proposes a notification process to make neighbors aware of scheduled steam blows (see proposed Condition of Certification **NOISE-5** below), and proposes that the applicant distribute, or make available at no charge, hearing protection devices to residents within one-quarter mile of the proposed project site. This should help ensure that the steam blow process is at least tolerable to nearby residents.

LINEAR FACILITIES

No new off-site linear facilities are proposed as part of this project. The construction of the on-site 230-kV tie-in line and switchyard equipment replacement, and onsite

water and natural gas tie-in pipelines, are included in the on-site construction noise impacts discussed in the "Community Effects" section.

WORKER EFFECTS

Southern does not specifically acknowledge the need to protect construction workers from noise hazards. The applicant does, however, recognize those applicable LORS that would protect construction workers, and commits in general to complying with them (Southern 2000a, AFC § 8.5.2.1). To ensure that construction workers are, in fact, adequately protected, Energy Commission staff has proposed a Condition of Certification (**NOISE-3**, below).

PROJECT SPECIFIC IMPACTS — OPERATION

COMMUNITY EFFECTS

The applicant has incorporated noise reduction measures into the design of the project to ensure that noise levels at the nearest receptor (350 feet in distance) would not increase substantially. The local planning policy guidelines for Contra Costa County require new projects to meet acceptable exterior noise level standards as established in the State of California land use compatibility guidelines (see Table 1), and note that the standard for outdoor noise levels in residential areas is 60 dBA DNL. However, these guidelines also indicate that 60 dBA may not be achievable in all residential areas. The staff's impact analysis indicates that the project sound level impacts will be no higher than 41 dBA at any residential receptor, except for the closest receptor located adjacent to the project site in the San Joaquin Yacht Harbor. These residences, which are a non-conforming land use in an area zoned for heavy industry, have existing sound levels that are already above the county guidelines.

Generally, a change in level of at least 5 dBA is required before any noticeable change in community response would be expected, and a 3-dBA change is considered a barely noticeable difference (Kryter 1970). It should be noted that the change in sound level resulting from project operations is forecast to be less than 5 dBA. As a result, it is anticipated that the project would not cause any impacts to the local community. Condition of Certification **NOISE-6** would ensure that no significant impacts would occur from this project.

POWER PLANT OPERATION

During its operating life, CCPP Unit 8 represents essentially a steady, continuous noise source day and night. Occasional short-term increases in noise levels would 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 would decrease.

The primary noise sources anticipated from the proposed facility include the steam turbine generator, gas turbine generators, heat recovery steam generators, transformers, cooling tower, boiler feed pumps, and the circulating water pumps.

Secondary noise sources are anticipated to include pumps, ventilation fans and compressors. The noise emitted by power plants during normal operations is generally broadband, steady state in nature.

It should be noted that the proposed power plant is located adjacent to and east of the existing CCPP site. As described previously, the closest sensitive receptor is located at a distance approximately 350 feet east of the project site, with a somewhat limited line of sight between the source (i.e., power plant) and the receiver (sensitive receptor) due to an earthen berm that has been constructed on the eastern boundary of the CCPP property. In addition, it is assumed that the noise generated from the existing power plant would be slightly shielded or masked by the new power plant. The primary noise experienced by the sensitive receptor is currently, and will continue to be, noise from the CCPP facility.

Southern performed acoustical calculations to determine the facility noise emissions. The calculations conservatively assumed that all equipment was located as a single point source. The cumulative steady state sound level was calculated to be 58 dBA at 400 feet. The calculations were based on standard manufacturer performance data for the major equipment planned for the proposed facility (Southern 2000a, AFC § 8.5 and Table 8.5-5). The modeled sound level at the closest residential receptor was determined by the applicant to be 59 dBA, which is below the existing ambient noise conditions, and would cause a cumulative noise increase of 1 to 2 dBA depending on the time of day. The modeled noise level at the 1958 Santa Fe Avenue residential location was determined by the applicant to be 48 dBA, and would cause a cumulative noise increase of 2 to 3 dBA depending on the time of day.

Staff performed acoustical calculations to confirm the results provided by the applicant. The results of the staff calculations are different than those provided by the applicant. Using the equipment specific sound level data provided by the applicant, the cumulative steady state sound level for the project was calculated to be 61 dBA at 400 feet. The modeled sound level at the closest residential receptor was determined by staff to be 62 dBA, which is slightly above existing nighttime ambient noise conditions, and would cause a cumulative noise increase of 1 to 3 dBA, depending on the time of day. Staff also found that the distance to receptor locations provided by the applicant for receptor locations OML1, OML2 and OML3 where underestimated. The modeled noise level at the1958 Santa Fe Avenue residential location was determined by staff to be 41 dBA, which is below monitored ambient noise conditions, and would cause a cumulative noise increase of less than 1 dBA.

As a result of these analyses, staff believes that no significant adverse noise impacts are likely to occur due to the operation of the project. It should be noted that the proposed Condition of Certification **NOISE-6** would ensure that the noise level at the closest residential receptor (i.e., San Joaquin Yacht Harbor) would not increase by more than 5 dBA L_{90}.

TONAL AND INTERMITTENT NOISES

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds that, while not louder than permissible levels, stand out in sound quality. The applicant has stated that no strong tonal noises will be generated during the operation of the proposed project. The applicant has also stated that mufflers will be installed on steam vents to mitigate the intermittent noise from pressure relief valves. To ensure that no strong tonal noises are present and that intermittent noises are mitigated, staff has proposed a Condition of Certification (**NOISE-6**, below), which requires the applicant to measure octave band pressure levels during a typical power plant operational period and requires the applicant to mitigate the noise from steam relief valves.

LINEAR FACILITIES

No new off-site linear facilities are proposed as part of this project. In addition, the operation of the power plant will not create any incremental increase in noise levels from the PG&E's high voltage transmission system. As a result, no impacts are assumed to occur from linear facilities.

WORKER EFFECTS

The applicant recognizes the need to protect plant operating and maintenance personnel from noise hazards, and has committed to comply with applicable LORS (Southern 2000a, AFC § 8.5.2.1). Areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing) would be posted and hearing protection would be required. The applicant would implement a comprehensive hearing conservation program. To ensure that construction workers are, in fact, adequately protected, staff has proposed a Condition of Certification (**NOISE-7**, below).

CUMULATIVE IMPACTS

Section 15130 of the *CEQA Guidelines* (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The *CEQA Guidelines* require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the proposed project alone.

One of the mandated approaches in the *CEQA Guidelines* is to summarize growth projections in an adopted general plan or in a prior certified environmental document. The second method involves compilation of a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this Staff Assessment.

There are no other existing noise sources or planned projects that could contribute to cumulative noise impacts in the project study area identified in the AFC (Southern 2000a, AFC §§ 8.5.3 and Appendix H; 2000f).

FACILITY CLOSURE

In the future, upon closure of the proposed CCPP Unit 8, all operational noise from this part of the entire CCPP site would cease and no further adverse impacts from operation of the CCPP Unit 8 would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction of the CCPP Unit 8, it can be treated similarly. That is, noisy work can be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that are 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 CCPP Unit 8 would likely be built and operated to comply with all applicable noise laws, ordinances, regulations, and standards. Staff further concludes that if the proposed CCPP Unit 8 facility were designed as described above, and further mitigated as described below in the proposed conditions of certification, it would likely not produce significant adverse noise impacts.

RECOMMENDATIONS

Staff recommends that the following proposed Conditions of Certification be adopted to ensure compliance with all applicable noise LORS.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of project-related ground disturbing activities, 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 Energy Commission Compliance Project Manager (CPM) in the first Monthly Construction Report following the start of project-related ground disturbing activities, 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 Exhibit 1), 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 the 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 Contra Costa County Community Development Department, 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-3 Prior to the start of project-related ground disturbing activities, 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 project-related ground disturbing activities, 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 a.m. to 5 p.m., unless the CPM agrees to longer hours based on a demonstration by the project owner that off-site noise impacts will not cause annoyance. If a low-pressure continuous steam blow process is employed, the project owner shall submit a description of this process, with expected noise levels and projected hours of execution, to the CPM.

Verification: At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule. At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

NOISE-5 At least 15 days prior to the first steam blow(s), the project owner shall notify all residents within one mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations. Additionally, at a minimum, the project owner will make available at no charge hearing protection devices (such as foam ear plugs) to all residents located within one-quarter mile of the project location during the period of high-pressure steam blow operations.

Verification: Within 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. Additionally, the project owner will provide a description of the hearing protection measures made available to residents located within one-quarter mile of the project location.

NOISE-6 Prior to initiating construction, the project owner will conduct a 25-hour community noise survey, at the closest residential receptor (applicant's OML5 location). Within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an additional 25-hour community noise survey, utilizing the same monitoring site employed in the pre-project ambient noise survey as a minimum. The survey during power plant operations 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 source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints. If the results from the two surveys (pre-construction vs. operations) indicate that the noise levels at the nearest receptor have

increased more than 5 dBA L_{90} for any given hour during the 25-hour period, 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 Contra Costa County Community Development Department, and to 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 Within 30 days after the facility is in full operation, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure. The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

NOISE-8 Construction work shall be restricted to the times of day delineated below:

Weekdays	7 a.m. to 6 p.m.
Weekdays[1]	8 a.m. to 5 p.m.
Weekends and Holidays	9 a.m. to 5 p.m.
Steam Blows	9 a.m. to 5 p.m.

[1] – For construction activities within 300 feet of the San Joaquin Yacht Harbor residences

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.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Contra Costa Power Plant Unit 8 Project
(00-AFC-1)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

Barnes, J.D., L.N. Miller, and E.W. Wood. 1976. Prediction of Noise from Power Plant Construction. Bolt Beranek and Newman, Inc., Cambridge, Massachusetts. Prepared for Empire State Electric Energy Research Corporation, Schenectady, New York.

Beranek, L.L., I.L. Ver. 1992. *Noise and Vibration Control Engineering:Priniciples and Applications*. John Wiley and Sons, August.

City of Antioch. 2000. City of Antioch, California Code of Ordinances. http://www.ci.antioch.ca.us/. 2000.

Contra Costa County. 1996. Contra Costa County General Plan, Noise Element, July 1996.

Cunniff, Patrick F., *Environmental Noise Pollution*. John Wiley & Sons, 1992.

DHS (California Department of Health Services), Office of Noise Control. *Model Community Noise Control Ordinances*, 1977.

Edison Electric Institute. *Electric Power Plant Environmental Noise Guide*, 1984.

Kryter, Karl D. *The Effects of Noise on Man*. Academic Press, N.Y., 1970.

Miller, L.N., E.W. Wood, RM. Hoover, A.R. Thompson, and S.L. Paterson. 1978. Electric Power Plant Environmental Noise Guide, Volume 1. Bolt Beranek and Newman, Inc., Cambridge, Massachusetts. Prepared for Edison Electric Institute, New York, New York.

Office of Planning and Research. 1990. State of California General Plan Guidelines. June.

Peterson and Gross (Peterson, Arnold P. G. and Ervin E. Gross, Jr.). *Handbook of Noise Measurement*, 7th ed. GenRad, Concord, MA., 1974.

Smith, B.J., R.J. Peters, S. Owens. 1996. Acoustics and Noise Control, 2nd Edition. Addison-Wesley. November.

Southern. 2000 a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Submitted to the California Energy Commission, January 31, 2000.

Southern. 2000 f. Supplemental Information. Submitted to the California Energy Commission, April 18, 2000.

State of California. 1990. General Plan Guidelines, Office of Planning and Research, June 1990.

U.S. EPA. 1971. *Community Noise*. Washington D.C., December.

U.S. EPA. 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. 550/9-74-004. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. Washington, DC.

U.S. EPA . 1978. *Protective Noise Levels, (Condensed Version of EPA Level Document)* (No. PB82-138827).

WMSCC (Western Midway Sunset Cogeneration Company). 1999. Application for Certification, Western Midway Sunset Cogeneration Company Project (99-AFC-9). Volumes 1, 2, and 3. Submitted to the California Energy Commission, December 22, 1999.

NOISE: APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. Table A1 provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period Leq, or by day and night levels with a nighttime increase of 10 dBA Ldn. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use.Typical Ldn noise levels might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects (USEPA 1971). At 70 dBA, sleep interference effects become considerable.

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 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.
L10, L50, & L90	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L90 is generally taken as the background noise level.
Equivalent Noise Level L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 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} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: California Department of Health Services 1976.

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		
Very Loud Music	110	Rock Music Concert	Very Loud
Pile Driver (50')	100		Very Loud
Ambulance Siren (100')	90	Boiler Room	Very Loud
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	Quiet
Large Transformer (200')	40		
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		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.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

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

Sound and Distance

- Doubling the distance from a noise source reduces the sound pressure level by six dB.

- Increasing the distance from a noise source ten times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

NOISE: 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 Regulation

VISUAL RESOURCES

William Kanemoto

INTRODUCTION

The following analysis evaluates potential visual impacts of the Contra Costa Power Project (CCPP) Unit 8 in conformance with applicable guidelines of the California Energy Commission and the California Environmental Quality Act, and the conformity of the project with applicable laws, ordinances, regulations, and standards (LORS).

VISUAL INVENTORY METHODOLOGY

The following discussion describes the evaluation methodology employed in conducting the visual resource inventory of the project setting. Visual impact assessment methods are described in detail in the Impacts section, below.

The analytical methodologies employed are described in greater detail in subsequent sections, and reflect accepted professional practice derived primarily from the Bureau of Land Management (BLM) Visual Resource Management (VRM) Contrast Rating method (U.S. Dept. of Interior, 1986) and the U.S Forest Service Visual Management System (VMS) method (U.S. Dept. of Interior, 1974). The basic principles and structure of these methodologies have been utilized and adapted to the present project circumstances.

The viewshed or area of potential visual effect (sphere of influence) was defined using computer-generated viewshed mapping and field observation. The viewshed represents the broad area within which the project would be potentially visible. Within this overall viewshed, the existing landscape of the proposed project was characterized as contiguous, broadly consistent areas of visual character, or landscape units. The character of these units is described in Visual Setting, below; they are then rated for their scenic quality. Potentially sensitive receptors, i.e., viewers with potentially high visual sensitivity within the viewshed, were then identified.

Visual character and quality have been ascribed to each of the mapped, broad landscape types of the project viewshed. In addition Landscape Unit 3 comprising the immediate surroundings of the project, has been subdivided further into landscape sub-types, each with distinctive visual character, scenic quality, land uses, and viewer sensitivity levels. This subdivision is necessary to arrive at a meaningful assessment of potential impacts.

Visual character, a descriptive term, refers to formal visual attributes typical of the setting and is often closely tied to an area's typical land use as well as its physiography. A landscape's visual character underlies its perceived quality and value, and also forms the basis for a project's level of contrast or conspicuousness in the impact assessment phase. Visual quality, an evaluative term, reflects a judgment of a landscape's attractiveness as determined by such characteristics as visual distinctiveness, coherence, intactness, variety and interest, and the presence

of features, such as vegetation and water, known to be preferred by the majority of viewers. Visual quality of a landscape setting, in combination with the visual sensitivity of viewers within it, determines the level of acceptable project contrast in the determination of impact significance. Visual sensitivity is a judgment of anticipated viewer concern and response to proposed visual changes, and in this study has been inferred based on factors such as typical viewer activity and corresponding level of scenic expectations, number of viewers exposed to the project, extent, duration and character of such views, known local and historic values, and explicit expressions of public policy relating to the visual resource or urban design. In this study residential and recreational land uses were assumed to have high visual sensitivity, as were viewers on designated State Scenic Highway SR 160.

Key Observer Points (KOPs) were identified to represent sensitive viewer groups within each of the affected landscape units of the project setting. The most sensitive of these have been used as viewpoints for computer-generated simulations of the proposed project and for evaluation of project contrast in impact evaluation, described further under the **Impacts** section, below.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The proposed project is located within unincorporated Contra Costa County immediately adjacent to the boundary of the City of Antioch. Applicable visual resource policies are principally found in the General Plans of these two jurisdictions. In addition the project viewshed includes portions of a State designated Scenic Roadway.

CITY OF ANTIOCH GENERAL PLAN

COMMUNITY IMAGE GOALS AND POLICIES

The City of Antioch General Plan identifies the Antioch Bridge, ridgelines in the vicinity of Hillcrest Avenue/Southeast Antioch, the San Joaquin River, and views of Mt. Diablo as principal visual landmarks of the City (City of Antioch, 1994, Figure 3-16, Community Design Characteristics, p. 42). The intersection of 18th Street and Highway 160, and the approach to the Antioch Bridge are identified as principal City gateways.

The overall image goal of the City is to “preserve and enhance aesthetic and cultural elements that contribute to the City’s image of small town neighborhoods positioned at the gateway to the Delta.“

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. Important view corridors to be protected are along … Hillcrest Avenue and Highway 160 … (and) Highway 4...”

Policy 2: “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: “Edges, the visual boundaries between neighborhoods and adjacent communities, should be maintained to provide relief from urban sprawl and to reinforce neighborhood identity. Important edges to be enhanced include … Highway 4 on the east side of the City.”

CONTRA COSTA COUNTY GENERAL PLAN

LAND USE ELEMENT

Policy 3-19. Buffers shall be provided between new industrial developments and residential areas by establishing setbacks, and park-like landscaping or other appropriate mechanisms.

OPEN SPACE ELEMENT

SCENIC RESOURCES GOALS

9-D. To preserve and protect areas of identified high scenic value, where practical, and in accordance with the Land Use Element map.

9-E. To protect major scenic ridges, to the extent practical, from structures, roadways, or other activities which would harm their scenic qualities.

9-F. To preserve the scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento-San Joaquin River/Delta shoreline.

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.

CALIFORNIA STATE DEPARTMENT OF TRANSPORTATION (CALTRANS)

SCENIC HIGHWAY PROGRAM

Caltrans identifies a state system of eligible and designated scenic highways. For the eligible roadway to become designated, a local jurisdiction must apply to the State on the basis of approved scenic corridor protection plans and local policies and ordinances to implement that protection. SR 160 is a designated State Scenic Highway, and SR 4 east of the Antioch Bridge is eligible for designation as a State

Scenic Highway. Scenic corridor controls applied to SR 160 by Sacramento County are limited to a sign ordinance (Southern, 2000b, 8.11-16).

The identification of road corridors as either eligible or designated scenic highways is a strong indication of the scenic value of that corridor's viewshed and an indicator of high visual sensitivity in the assessment of potential visual impacts.

SETTING

REGIONAL LANDSCAPE SETTING

The proposed project is located on the southern shore of the San Joaquin River adjacent to the Antioch Bridge, the principle gateway into the Sacramento/San Joaquin Delta from the San Francisco Bay Area. Scenic hills and ridgelines of Contra Costa County rise to the south, framing views of Mt. Diablo, the most prominent regional landmark. To the north lies the Sacramento/San Joaquin Delta, an extensive and highly distinctive regional landscape type dominated by the Sacramento and San Joaquin Rivers and characterized by large tracts of level reclaimed agricultural land and wetland. The project site itself is situated between these two landscapes, at the eastern edge of a heavily industrial area on the San Joaquin River's southern shore, amid a very heterogeneous mix of land uses adjoining the eastern boundary of urban Antioch.

As discussed previously the potential viewshed of the project was defined from computer-generated viewshed mapping supplied by the project Southern and confirmed by field observation, and is depicted in **VISUAL RESOURCES Figure 2**, Project Viewshed and Landscape Types. The character of the project's regional landscape setting is evident in this mapping, which shows largely uninterrupted views of the project extending to background distances (five miles) over the level Delta to the north, west, and east. The long views afforded by this level terrain are reinforced by the general absence of structures, orchards or other tall land cover within the viewshed to the north, east, and northwest. To the south, north-facing slopes of the Contra Costa Hills contain the viewshed.

PROPOSED PROJECT SITE

The proposed power plant site is located approximately 300 feet south of the San Joaquin River shoreline, on a flat paved and gravel covered parcel situated directly east of the existing power plant Units 6 & 7. Though the site is largely disturbed, a number of low and medium-height trees, including a number of moderate-sized native live oaks, occur near the southeastern edge of the site along the existing access road, and elsewhere in the northern half of the site. Approximately the southern half of the proposed site is currently occupied by a 20+ foot-tall berm of sand fill created during construction of existing plant facilities. This berm is currently devoid of significant vegetation or structures, though many of the aforementioned trees occupy the foot of the berm to the east and north.

EXISTING POWERPLANT

The existing CCPP facility is depicted in **VISUAL RESOURCES Figure 1**. Prominent features include three generation structures – Units 1, 2, and 3 (123 feet tall) with six exhaust stacks (209 feet tall); Units 4 & 5 (138 feet tall) with two exhaust stacks (209 feet tall); and Units 6 & 7 (156 feet tall) with 1 large exhaust stack (459 feet tall). The Unit 6 & 7 stack is a prominent landmark within the project viewshed. Other features of visual importance include several steel lattice type transmission towers (120 feet tall); and seven storage tanks of varying diameters (all 48 feet tall). Of these structures, all but the storage tanks are visible from the majority of foreground and middle-ground viewpoints.

Existing lighting at the CCPP facility is shielded from upward light casting and is of low-intensity, amber color. While this lighting highlights the facility at night, it is perceptibly less bright and intrusive than that of other nearby industrial facilities in the immediate vicinity, notably the brightly lit GWF power facility southeast of the site.

PROJECT VISUAL SETTING: VISUAL QUALITY, VISUAL SENSITIVITY, AND KEY OBSERVER POINTS

In the discussion that follows, the project viewshed is subdivided into major units of distinct landscape character and visual quality. These are depicted in **VISUAL RESOURCES Figure 2**, **`Project Viewshed and Landscape Types`**. Within Landscape Unit 2 landscape sub-types are described in order to identify sensitive receptors and potential impacts with greater accuracy. These are depicted in **VISUAL RESOURCES Figure 3, Landscape Sub-types and Key Observation Points**. As described above, Key Observation Points (KOPs) were selected to represent typical viewpoints within each landscape unit and sensitive receptor group.

In the following discussions, KOP numbers adopted by Southern in the AFC have been retained to maintain consistency and minimize potential confusion.

LANDSCAPE UNIT 1 – SACRAMENTO/SAN JOAQUIN DELTA

The project site lies approximately 2,000 feet west of the Antioch Bridge, the principle gateway into the scenic rural Delta from the urbanized Bay Area. The bridge's tall arching form is, along with the San Joaquin River itself, the most visually prominent landmark within Landscape Unit 1. The Delta's distinctive, panoramic, and scenically intact rural landscape, featuring vivid views of the San Joaquin River, the Antioch Bridge, and Mt. Diablo, contribute to high visual quality throughout this portion of the viewshed. (See **VISUAL RESOURCES Figure 2, Project Viewshed and Landscape Types**). The principal highway through the area, State Route 160, is a designated State Scenic Highway from the Antioch Bridge northward, and as such is considered a high sensitivity viewpoint.

KOP 1: **ANTIOCH REGIONAL SHORELINE PARK.**

Though adjacent to marinas and harbors discussed under Landscape Unit 3, below, KOP 1 arguably belongs within Landscape Unit 1 since its most heavily used and

visually sensitive feature, the fishing pier, extends out into the San Joaquin River, where panoramic, highly scenic views dominate. As depicted in **VISUAL RESOURCES Figure 4a**, foreground views of the proposed project would occur from this pier.

This park is an important recreational destination near the City of Antioch and is located roughly 2,000 feet east of the project site. The park receives 250,000 user visits per year (Southern, 2000b, p. 8.11-8). Due to its recreational use it is considered of high visual sensitivity. Viewing conditions at this park are very mixed. Views to the project site from much of the park are blocked by the intervening Antioch Bridge approach structure. Nevertheless, the park's fishing pier offers open views to the project site. While panoramic views of high scenic quality are the dominant feature of this park, the quality of views in the direction of the existing plant and surroundings, comprising the existing CCPP and other industrial facilities of Landscape Unit 3, is low.

KOP 7: **SOUTHBOUND SR 160 ON ANTIOCH BRIDGE**

This view (**VISUAL RESOURCES Figure 5a**) is representative of views of motorists in southbound lanes of the Antioch Bridge, situated at foreground distance from the project site. Panoramic views of the river and hills are compromised by the prominent, highly industrial character of the existing CCPP in the foreground, and other industrial facilities to the west as well as industrial and commercial development visible along SR 4 to the south. These views are visible only to motorists in tall vehicles such as sport utility vehicles and trucks due to the bridge railing, which blocks views by motorists in sedans. This KOP is considered to have moderately high visual quality. Viewers are considered to have high sensitivity.

KOP 6**: SR 160**

This view **(VISUAL RESOURCES Figure 6a**), taken near the northern landing of the Antioch Bridge from SR 160 roughly 1 ¼ mile north of the project site, is the closest view of the site from State Route 160 before the bridge and is a worst-case representation of similar middle-ground views of the project that extend to background distances (five miles) from this designated State Scenic Highway. These views have moderately high to high visual quality. Viewers on SR 160 are considered highly sensitive.

KOP 8**: SAN JOAQUIN RIVER**

Large numbers of recreational boaters embarking from the marinas adjacent to the project site have views of the site from very close foreground distances see (**VISUAL RESOURCES Figure 7a**). Although the river landscape is of high visual quality overall, views from boats traveling west of the Antioch Bridge are already degraded by the existing CCPP and other prominent industrial facilities near the water. Nevertheless, in the immediate vicinity of the marina entrances, south-facing views include a predominantly natural and open view corridor to the hills to the south, roughly 2000 feet wide, between the eastern edge of the existing CCPP to the Antioch Bridge. Views from the river near the marinas are thus considered to have moderate to high visual quality, depending upon the segment of view, and

moderate quality overall. Viewers from the river are considered to have moderate to high sensitivity, depending upon location and activity.

LANDSCAPE UNIT 2– EASTERN ANTIOCH

The project site is located near the eastern edge of the City of Antioch, in a lowland area of very heterogeneous land uses straddling SR 4 along the San Joaquin River's southern shore. This area, on the eastern margin of expanding suburban development in the City of Antioch, contains extensive large-scale heavy industry near the shoreline, with commercial and light industrial, residential, and waterfront recreational uses amid remnant pockets of agricultural use and large areas of open undeveloped land. Due to the intermittent character of development, the presence of scattered areas of open space, and a generally low intensity of development, the landscape tends to be dominated by prominent vertical industrial features including steel lattice transmission towers and other tall structures of industrial plants near the shore area, the existing CCPP being the most conspicuous. The patchwork pattern of land uses and the prominent industrial facilities lend the setting a visually incoherent character with moderate to low scenic quality depending on the level of visibility of the industrial facilities from a particular viewpoint. Vapor plumes from several existing facilities are visible at various times during the year, particularly during cold clear weather.

Within the proposed project's general vicinity are thus a variety of distinct land uses and landscape sub-types. Landscape sub-types are defined here as finer-grained subdivisions of the landscape unit with distinct visual character, quality and, generally, land use and corresponding levels of visual sensitivity (**VISUAL RESOURCES Figure 3, Landscape Sub-Types and Key Observation Points**). Below, these sub-types of Landscape Unit 2 are discussed and rated separately in order to facilitate subsequent impact assessment from associated potentially sensitive receptors and KOPs.

HEAVY INDUSTRY

The area encompassing the project site and extending westward between the San Joaquin River shoreline and the Burlington Northern & Santa Fe (BN&SF) Railroad tracks consists of heavy industry. This landscape sub-type, including the project site, has low visual quality and is devoid of sensitive receptors but is dominant in establishing the visual character of the vicinity due to its many prominent vertical industrial features.

The existing CCPP and proposed Unit 8 site have been described above. In addition major industrial facilities located in the vicinity include a GWF power plant located approximately ½ mile to the southeast of the CCPP site, the Gaylord Paper Mill directly west of the CCPP, a Georgia Pacific sheetrock plant to the west of that, the GWF Wilbur East Alternative Energy Power plant ½ mile southwest of the CCPP, and large scale high voltage transmission lines leading to the CCPP.

Existing visible plumes were identified from at least five nearby sources (within 1.5 miles of the project site) and it is likely that other sources would be visible from slightly greater distances depending upon the viewpoint. Available information on

the nature and size of these facilities and informal observation strongly suggest that these plants would issue vapor plumes of comparable magnitude to the proposed project under roughly similar conditions, particularly cold clear winter mornings. Plumes of the sheetrock plant west of the project may be larger and more frequent than the others. Two nearby GWF power plant sites listed above, were observed to produce visible plumes at night. Periodic seasonal industrial vapor plumes are thus an existing part of the visual setting of this landscape unit.

No sensitive receptors or KOPs are located within this sub-type.

SHORELINE RECREATIONAL – MARINAS/HARBORS

The nearby Antioch Shoreline Regional Park has already been described above. In addition, several marinas are located immediately east of the project site. The nearest, the Sportsmen Yacht Club, directly faces the project site across an existing access road. The club has 170 members with two to three long-term 'live-aboard' members and one on-site caretaker residence. The historic Sausalito Ferry is dry-docked on the site's west side facing the project site at a distance of under 200 feet. Trees along the property line intermittently filter existing views from the Sportsmen Yacht Club to the project site. Views of the project site are also screened from much of the club by the two-story Sausalito Ferry, which screens views to the west of the property. Views of the project exist from the west facing interior windows of the clubhouse.

East of the Sportsmen Yacht Club is the San Joaquin Yacht Harbor, with 67 slips and two caretaker residences. Views of the project site from the slips are largely screened by the marina facilities themselves. Other views from within the facility range from open to partially screened by existing trees and structures.

KOP 4: ***Entrance to San Joaquin Yacht Harbor***

KOP 4, taken from the entrance drive to the San Joaquin Yacht Harbor approximately 200 feet east of the project site, represents the worst case view from marinas adjoining the project (see **VISUAL RESOURCES Figure 8a**). Views of the existing CCPP are of generally low quality due to their highly industrial character, though existing trees at the site's eastern boundary partially screen and improve these views. The marinas themselves are of moderate visual quality and, due to their recreational use, of generally high visual sensitivity.

Other marinas farther east from the project site include Lloyd's Holiday Harbor and New Bridge Marina, with 200 slips and eight live aboard boats, and the New Bridge Marina Yacht Club. Views within the marina are directed mainly to the river but filtered foreground views of the existing Units 6 & 7 exist between various intervening structures. Views to the project site from the slips are screened by the existing marina facilities.

The Driftwood Marina and Lauritzen Yacht Harbor are located east of the Antioch Bridge approximately ½ mile from the project site. The Lauritzen Yacht Harbor contains 137 slips and 160 dry storage spaces for boats. Views to the project site

are almost completely screened due to the bridge structure and other intervening buildings.

The bridge and other intervening structures largely screen views from other commercial and residential locations east of SR 160 and the Antioch Bridge approach.

VIERA AVENUE NEIGHBORHOOD (RESIDENTIAL)

An estimated 78 residences comprise the Viera Avenue neighborhood, a setting of moderate visual quality typical of an older residential neighborhood, located within one mile of the site. Sensitivity to visual change is considered high due to the residential use. Views to the site from this neighborhood were found to be limited in number due to various intervening features including other houses and trees. Where open views toward the site exist, the Unit 6 & 7 power plant dominates views (see (**VISUAL RESOURCES Figure 9a**, the view from KOP 3). These views toward the existing plant are of low visual quality.

18TH STREET/WILSON STREET NEIGHBORHOOD (RESIDENTIAL/RECREATIONAL)

KOP 2, at 18th Street and Wilson Street (**VISUAL RESOURCES Figure 10a**) represents a worst-case view from this general area (due to proximity to the project and open viewing condition). It is taken from the entrance to the principal residential development in the vicinity at a distance of approximately ¾ mile from the project site, in a location where open views exist over low lying vineyards north of 18th Street.

This area is predominantly suburban residential, with two cemeteries about ½ mile to the east and a local park ¼ mile south of KOP 2. Sensitivity of viewers is considered high due to the predominantly residential land use in the area. The project site is not visible from Almond Ridge Park due to intervening homes. Oak View Memorial Park and Holy Cross Cemeteries are located roughly ½ mile east of this KOP at a distance of about one mile from the project site. Views from these cemeteries are highly filtered by trees on and off site, and by intervening buildings. The intersection of 18th Street and SR 160 is identified in the City of Antioch General Plan as a major community 'gateway' (City of Antioch, 1994).

18TH STREET/WILSON STREET NEIGHBORHOOD (COMMERCIAL/AGRICULTURAL)

As indicated in **VISUAL RESOURCES Figure 3**, a portion of the 18th Street vicinity is distinguished by commercial or agricultural activities with moderate visual quality and moderate to low sensitivity. No sensitive receptors or KOPs are located in this area. Much of this area north of 18th Street is in vineyard, providing open views to the project site with prominent transmission lines in the foreground.

OAKLEY – AREAS EAST OF SR 160

The town of Oakley east of SR 160 is predominantly rural, consisting mainly of vineyards and undeveloped open land within the project viewshed. A light industrial strip lines 18th Street within the project viewshed. The area of vineyards within the project viewshed is considered to have low visual sensitivity due to a lack of

potential viewers. The industrial strip on 18th Street is considered to have low visual sensitivity due to the work-related nature of activities and associated low scenic expectations. Two residences identified on 18th Street are located in a light industrial context of low visual quality and are not considered visually sensitive. Views toward the project site are partially screened throughout this area by the raised roadbed of SR4 and SR 160. No KOPs were identified in this area.

STATE ROUTE 4

This route is a heavily traveled commuter corridor. From Hillcrest Avenue westward the corridor has a predominantly suburban character with mature trees along SR 4. East of Hillcrest Avenue views open north to the project site at a distance of 1 ½ to 2 miles, behind a foreground of open undeveloped lands and the residential areas described above. The Antioch Bridge is the dominant element in these views, but the existing Unit 6 & 7 stack is a co-dominant feature prominent throughout the area. Views to the site are screened by terrain for roughly one mile as the highway turns northward, then open again to provide elevated views to the site. These overviews of Landscape Unit 2 reflect its mixed character as described previously but tend to be dominated by the presence of existing CCPP Units 6 & 7. Views in this segment of roadway vary from moderate to low visual quality. Due to the very high numbers of viewers and the designation of SR 4 as an eligible State Scenic Highway, it was assigned a high level of sensitivity. Open views to the site from SR 4 are essentially similar to those of KOP5.

LANDSCAPE UNIT 3 – CONTRA COSTA HILLS

To the south of the project site, views are contained by hills of Contra Costa County, which rise from the San Joaquin River floodplain immediately south of SR 4. These low hills, which appear relatively undeveloped in south-facing middle-ground to background views from SR 160 and other viewpoints to the north of the project site, are a scenic feature of high visual quality in such views (**VISUAL RESOURCES Figure 2**). They form a visually contiguous undeveloped ridgeline extending westward, where they merge with background views of Mt. Diablo, the most prominent landmark throughout both the Delta and Contra Costa County (refer to **VISUAL RESOURCES Figure 6a**).

HILLCREST AVENUE NEIGHBORHOOD

Hillcrest Avenue neighborhood is a residential development with associated commercial services that occupies the lower hills south of SR 4 approximately two miles southwest of the project site. Homes on these north-facing slopes have scenic, panoramic views of the San Joaquin River and the Antioch Bridge, but also overlook heavy industrial facilities in the foreground of those views (see (**VISUAL RESOURCES Figure 11a**, the view from KOP 5). Despite the elevated position of this subunit, views to the project site were found to be scattered and spotty due to variations in microtopography and the presence of other homes or landscaping. The area is of moderate visual quality typical of a suburban residential neighborhood and has a high level of visual sensitivity due to its residential use.

IMPACT ASSESSMENT METHODOLOGY

In a manner similar to the BLM VRM method and Forest Service VMS method, impacts in this study were characterized in terms of their contrast with the existing setting. This contrast is expressed as the level of perceived visual modification, dominance and tendency to attract attention attributable to project-caused changes. In both the cited methods, this characterization of objective visual change is stated in terms of how likely the visual contrast of the project is to be noticed by casual observers. This tendency to capture viewers' attention is referred in this study as visual dominance and classified as follows:

Levels of Visual Contrast or Dominance

Inevident	Change not noticed by casual observers
Subordinate/Weak	Change noticed but attracts less attention than other existing features in the landscape
Co-Dominant/Moderate	Change noticed and attracts attention to a similar degree as dominant features of the existing landscape setting
Dominant/Strong	Change noticed and visually dominates the setting, i.e., attracts attention of viewers more strongly than other features in the existing setting.

In all cases these levels of *visual dominance* or modification are understood to be a corollary of the level of contrast created by the introduced project features. Contrast is generally evaluated in terms of apparent visual scale, as well as contrast in formal visual attributes such as form and color, and ultimately expresses contrast with existing visual character, which is the product of those attributes.

Visual contrast/dominance are affected by viewing distance, specific conditions of project viewing and project exposure, and other factors. These are reflected in the ratings developed for each particular representative KOP.

Contrast/dominance ratings were conducted with the assistance of visual simulations submitted by Southern and validated in the field.

IMPACT SIGNIFICANCE CRITERIA

Contrast *per se* is not equivalent to impact. The acceptable degree of contrast or dominance, or visual change, described above depends upon the *visual quality* of a viewer's setting, and that viewer's *visual sensitivity*, as follows:

VISUAL RESOURCES Table 1
Maximum Acceptable Levels of Visual Dominance

	High Sensitivity	**Moderate Sensitivity**	**Low Sensitivity**
High Quality	Subordinate	Subordinate	Co-Dominant
Moderate Quality	Subordinate	Co-dominant	Dominant
Low Quality	Co-dominant	Dominant	Dominant

In keeping with usage of the U.S. Bureau of Land Management and U.S. Forest Service, this table does not apply the threshold of 'inevident,' which is reserved for special designation areas of unique scenic value, such as national parks, legislated scenic areas, etc.

Visual changes that exceed these guidelines may represent potentially significant impacts. For example, a visually subordinate change to a high quality, high sensitivity view may be an acceptable level of change. A visually co-dominant change may represent a significant impact to the same viewpoint (depending upon other viewing factors described directly below).

In addition to these criteria of visual dominance, a variety of other factors may influence evaluations of visual impact. These include such factors as viewing conditions, special local or cultural values, and factors affecting visual exposure. In the present case the latter is of special relevance.

Power plants typically have the potential to generate visible vapor plumes of varying magnitude; impacts may fluctuate between highly dominant to nonexistent for varying periods of time and under various viewing conditions. This transient and changeable character necessitates the consideration of time in the evaluation of their potential impact.

This study adopted the following criteria for evaluating plume impact significance for the purposes of evaluating this project. Plumes were considered to represent a potentially significant impact if they were anticipated to exceed 'normal' acceptable levels of visual change (as determined by the visual quality and sensitivity of a KOP under **Visual Resources Table 1**, above) in excess of 50 percent of critical viewing periods, as defined below; **or** to be *dominant* in conditions of high or moderate quality and sensitivity for 10 percent or more of critical periods. For example, a viewpoint of moderate visual quality and high sensitivity could experience significant impacts if subordinate levels of contrast from plumes were exceeded for 50 percent or more of critical periods, consistent with **Visual Resources Table 1**, but would not if such contrast occurred less than 50 percent of critical periods, *unless* dominant levels of contrast occurred 10 percent of the critical period. These 'critical viewing periods' were defined as daylight hours without fog per season, or nighttime hours without fog per season. The seasonal criterion reflects the tendency of visible plumes to be concentrated in certain seasonal periods and not in others. The 'without fog' criterion simply reflects the fact that plumes may often form in conditions that are also conducive to fog formation, but they are not likely to be highly visible or perceived as substantially adverse under such conditions.

Nighttime plumes would only have the potential to cause impacts if they were to be illuminated by bright night lighting.

OTHER IMPACT SIGNIFICANCE CRITERIA

The CEQA Guidelines define 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)

Under the CEQA Guidelines, significant visual impacts may result from:

a. A substantial adverse effect on a scenic vista

b. Substantial damage to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway

c. Substantially degrade the existing visual character or quality of the site and its surroundings

d. A new source of substantial light or glare which would adversely affect day or nighttime views in the area

Finally, visual impacts are considered potentially significant if they conflict with published public policies or goals.

VISUAL PROJECT DESCRIPTION

VISUAL RESOURCES Figure 12 depicts architectural elevations of the proposed project. **VISUAL RESOURCES Figure 13** depicts a plan of the proposed facility overlaid on an aerial photograph of the site.

The most visually prominent features of the proposed project include:

- two combustion turbine generator and heat recovery steam generator (HRSG) trains (115 feet tall), including two 195 foot tall exhaust stacks;
- ten cell cooling tower system (59 feet tall);
- plant electrical switchyard (70 feet tall); and
- seven tubular steel 230 kV transmission towers (95 feet tall), of which four would be visible from off-site viewing areas.

The proposed Unit 8 plant would be sited on a newly graded pad 9 to 10 feet above mean sea level. The project would be located east of the existing Unit 6 & 7 power plant and northeast of the existing substation.

Appurtenant features would include roads, parking areas, fencing, and lighting.

Mature oak trees currently located on the project site would be removed, including several trees located on the eastern property boundary which currently provide visual screening of the existing plant from adjacent marinas. A large earth berm consisting of spoil from previous plant construction and grading occupies the southeast portion of the project site. This berm would be redistributed to raise the grade level of the existing project site.

Southern has committed to use of low-reflection metal surfaces with a neutral color scheme such as tan, brown or other earth tones.

VAPOR PLUMES

Vapor plumes are a principal source of potential visual impact from the proposed project. The visual magnitude and dominance of these plumes are described in general terms in the following discussion. The resulting visual impacts are described in relation to individual KOPs in the discussion titled Visual Impact Assessment that follows this section.

COOLING TOWER PLUMES

Southern has performed a Seasonal/Annual Cooling Tower Impact (SACTI) visible plume modeling study to determine potential visual impacts from cooling tower vapor plumes (Southern, 2000c, Data Response #96). The following analysis is pending certain items of requested data and pending a staff review of predicted plume data.

According to Southern's SACTI studies, cooling tower plumes would range between 20m and 30m in length, and 20m to 30m in height for 50 percent of the time annually. At these magnitudes the plume would be visually subordinate from all but the nearest foreground viewpoints.

Plumes would range between 40m and 50m in length, and 20m to 40m in height during Spring, Summer, and Fall seasons for 10 percent or less of the critical period (daytime no fog hours per season). Plumes of this magnitude would be visually subordinate from all middle-ground viewpoints, and subordinate to co-dominant from foreground distances, depending upon specific viewing conditions.

In winter, cooling tower plumes could reach 300m to 350m in length and 60m to 70m in height for five percent or less of the critical period. The plumes could thus be co-dominant to dominant from middle-ground (½ to 3 miles), near-middle-ground (½ to 1 mile), and foreground (0 to ½ mile) distances, but for five percent or less of the critical viewing period. (Dominant plumes occurring less than 10 percent of critical periods were considered less than significant). Plumes would be 50m to 60m in length and 40m to 50m in height, for 10 percent or more of the critical period. Plumes in this size range would likely be visually subordinate from middle ground viewpoints, and subordinate to co-dominant from foreground distances, depending upon specific viewing conditions. Plumes would be 20m to 30m in both height and length for 50% of the time during winter daytime hours. These would be visually subordinate from middleground viewpoints and subordinate to co-dominant

from foreground distances depending upon specific viewing locations and conditions.

Nighttime plumes would represent a potential visual impact if bright upwardly directed night lighting could illuminate them. However, no such light exists in the vicinity within the 10 percent-frequency predicted plume length radius of 350m. Thus, no significant impacts are anticipated for the remaining 90 percent of the critical period. Plumes could be illuminated by lights of the GWF power plant to the southeast of the project site and be visible from SR 160 for five percent of winter nighttime no fog hours or less.

Plumes in the five percent total annual no fog ranges were depicted in computer-generated simulations by Southern and validated by staff. Five percent annual no fog plumes were of a similar or slightly smaller size range than the 10 percent winter critical period identified as the 'reasonable worst case' in this study (Southern, 2000c, Data Response Table 96-1). Staff also determined, however, that these plume depictions were conservative and appear to represent somewhat larger plumes than described in the SACTI tables for 5 percent annual no fog conditions. These simulations are included as the 'after' (with project) visual simulations under those KOPs for which the plumes were represented, below (refer to **VISUAL RESOURCES Table 2** (Southern, 2000c, Data Response Table 96-2) for dimensions). To give additional context for the predicted plume dimensions and assist in reading the simulations, the distance from the project site to the Antioch Bridge is roughly 550m, or 200m farther than the predicted 5 percent daytime no-fog cooling tower plume.

Visual Resources Table 2
Summary Cooling Tower Calculations for Use in Visual Simulations

Condition & Percentage	Cooling Tower Plume Length (m)	Cooling Tower Plume Height above ground (m)	Cooling Tower Plume Width (m)
No fog night 5%	331.10	111.18	98.42
No fog night 50%	25.65	49.78	27.88
No fog day 5%	56.29	58.16	69.50
No fog day 50%	28.41	41.38	25.66

HRSG Exhaust Stack Plumes

Southern also used the Combustion Stack Visible Plume (CSVP) model to predict potential visible vapor plumes from the project HRSG exhaust stacks (Southern, 2000c, Data Response #97).

Visible HRSG plumes are expected to be higher, longer, relatively narrower, and semi-opaque as compared to the cooling tower plumes. Overall they are expected to cause somewhat less contrast than the wider and more highly opaque plumes produced by the cooling towers. According to a summary of Southern's HRSG plume studies, visible HRSG plumes would occur a total of 171 daytime no fog hours or less than 4.5 percent of total annual daytime no fog hours, primarily in the morning (Southern, 2000c, Data Response #97 and Table 97-3; Southern, 2000d, Revised Table 139-1). They would thus represent an intermittent impact occurring for a relatively small proportion of total annual hours. Data on predicted HRSG plumes contained certain inconsistencies; clarification of these data as well as technical staff review of modeling have been requested and responses are still forthcoming.

However, based on data submitted by Southern (Southern, 2000c, Data Response #97, Table 97-4 and Table 97-5), during daylight no fog hours, HRSG plumes of 300m - 550m length would occur almost exclusively in the month of January, for a predicted total of approximately 32 hours. Plumes in this size range could potentially have co-dominant to dominant visual contrast as seen from middle-ground viewpoints, depending on plume height and width, atmospheric conditions (not only fog, but different degrees of haze and cloud cover reduce plume contrast), and plume opacity. When visually dominant, such plumes represent a potentially significant impact from sensitive middle-ground viewpoints. According to Southern's data, the total number of hours of plumes in this size range annually would equal roughly 36 hours, occurring exclusively in the months of January and February (Southern, 2000c and d, Data Response #97, Table 97-4 and Table 97-5). This figure would equal roughly 6.4 percent of the critical period (565 winter daytime no-fog hours). Even if these were all to appear visually dominant, which is unlikely, they would thus fall below the 10 percent-of-critical-period threshold and be less than significant.

Plumes of between 150m and 300m in length are predicted to occur for lesser periods of time in the months of October through December, and in the months of February through April. Plumes in this size range would range from visually subordinate to co-dominant at middle-ground distances depending upon ambient viewing conditions. Since these plumes would not be visually dominant and would occur for periods far below the 'typical condition' threshold of 50 percent of the critical period, they are considered to be less than significant. This conclusion is also true of plumes in the 50m to 200m size range predicted for the months of November, December, April and May – both the magnitude and frequency of occurrence are less than significant.

Readers should note that HRSG-type plumes depicted in Southern simulations represent Unit 6 & 7 plumes and *not* project HRSG plumes, which were assumed by Southern to fall below the 'reasonable worst case' frequency of occurrence and were not depicted.

VISUAL IMPACT ASSESSMENT

The following discussion focuses on impacts associated with long-term operation of the project. Potential construction impacts and mitigation measures are addressed in the section following the discussion of operation impacts. The analysis, utilizing the impact criteria discussed above, addresses impacts to each sensitive receptor group identified in the study separately by representative KOP.

In the following discussions, KOP numbers adopted by Southern in the AFC have been retained to maintain consistency and minimize potential confusion.

OPERATION IMPACTS

IMPACTS IN LANDSCAPE UNIT 1 (RIVER AND DELTA VIEWPOINTS)

Antioch Regional Shoreline Park

VISUAL RESOURCES Figures 4 a and b, **KOP 1:** Antioch Regional Shoreline Park, Existing Condition and Simulation Showing Proposed Project, depict the existing view from the end of the park's heavily utilized fishing pier, and a simulation of the proposed project from the same view. (Note that the large Steam Turbine Generator enclosure structure situated in front of the cooling towers is no longer a feature of the project. Instead, the components which would have been enclosed by the structure, including the HRSG stacks and turbines – as depicted in **VISUAL RESOURCES Figure 8c** - would be visible and would be less visually prominent). The KOP is located about ½ mile from the proposed project site, at the margin between foreground and middle-ground distance zones. The project would result in visually subordinate modifications to the existing view due to the new cooling tower and HRSGs and associated stacks, which would be similar in character and color and smaller in scale than the existing Units 6 & 7 and 2 & 3 plants and stacks. The proposed cooling tower would block a portion of views of hills to the south. This distant hill view is currently seen behind a foreground of marina and CCPP structures that compromise its intactness and quality. Because of the highly industrial, low scenic quality of existing views in the direction of the project, impacts to recreationists at the pier and park are considered less than significant. High quality panoramic views of scenic portions of the viewshed to the north, west, and east would not be affected by the project. In the long term (15 – 20 years), recommended landscape screening would, at maturity, largely screen these views of the new facilities with a tall (up to 80+ feet tall) redwood hedge. At that point, impacts of the project would be beneficial to park users since screening would conceal a large portion of the view of both existing and new CCPP facilities.

New lighting of the project is not considered to affect the park, which is used primarily during the day.

Cooling tower plumes of between 20m and 40m in length, and 20m to 30m in height for 50 percent of the time annually would represent a subordinate to co-dominant contrast from this viewpoint, seen in the direction of the powerplant. As discussed above dominant plumes would be expected in January, but for less than the 10

percent threshold of frequency representing potentially significant impact. In the context of the lowered visual quality of this highly industrial segment of the view, and the fact that scenically intact portions of views from this KOP would not be affected, this impact was considered to be less than significant.

State Route 160 and Antioch Bridge

VISUAL RESOURCES Figures 5a and **b**, **KOP 6**: State Route 160, depict the project from the nearest viewpoint on SR 160 prior to the Antioch Bridge at a middle ground distance of roughly 1-¼ miles. Views from this point to background distances (5 miles) on SR 160 are similar but with the project less prominent. At these distances the new project structures would be a very subordinate new element in the view and would not be noticed by most casual viewers. This impact is thus less than significant. The principal potential impact from SR 160 views would result from visible plumes in clear weather. These impacts would be as discussed above for middle-ground viewpoints. That is, typical (50 percent frequency) cooling tower plumes would be visually subordinate and less than significant. Plumes in winter could be visually co-dominant to dominant, but plumes of this size would occur for less than 10 percent of the daytime no-fog seasonal critical period and were thus considered to be *less than significant.* Similarly, HRSG plumes of potentially dominant size and contrast (or co-dominant contrast in the presence of similar Unit 6 & 7 plumes) could occur for about 36 hours in January and February or less than 10 percent of the critical period threshold. HRSG plumes of lesser magnitude would occur in fall and spring months but both size and frequency would be less than significant. Potential night lighting impacts at this distance would be less than significant at these distances with the recommended Conditions of Certification VIS-3.

VISUAL RESOURCES Figures 6 a and **b**, **KOP 7**: Antioch Bridge, represents views of the project site from the southbound ascent of the Antioch Bridge at distances of about ½ of a mile and less. At this foreground distance the existing plant appears prominently, with the Unit 6 & 7 stack skylined above the ridgeline of hills to the south and competing visually with, though not blocking, views of Mt. Diablo. The view in this figure would be seen only in vehicles taller than a typical sedan. In the latter, the railing generally blocks views of the CCPP and river. Nevertheless the total number of affected viewers would be high and sensitivity from this location is correspondingly high. As depicted in **VISUAL RESOURCES Figure 6b**, from taller vehicles the new project facilities would not sky-line against the ridgeline of hills to the south, and would be visually subordinate to the existing plant, constituting an extension of the plant's industrial character that would probably be little noticed by casual viewers. This is a less than significant impact. As described above, the anticipated typical (50 percent) cooling tower plume (up to 30m or 100' in height and length) would also be visually subordinate to the existing facility and would not be expected to sky-line the ridgeline to the south. Likewise, the anticipated reasonable worst-case winter plume (10 percent of winter daytime no fog hours) would be up to 50m in height and 60m in length. A plume of this magnitude would not skyline the background ridgeline, would be visually subordinate, and would thus represent a less than significant impact.

New night lighting with recommended Conditions of Certification VIS-3 would be visually subordinate, representing a small incremental increase in the existing night lighting which would be little noticed by casual viewers and less than significant (see **VISUAL RESOURCES Figures 6c** and **d**).

San Joaquin River

VISUAL RESOURCES Figures 7a and **b**, **KOP 8**: San Joaquin River, depict views of the project seen from the river at foreground distance of about ½ mile. From this viewpoint the existing plant is strongly dominant, skylining above the hills and blocking views of Mt. Diablo for a considerable distance in the vicinity of the plant. Despite the highly scenic character and quality of the rest of the river viewshed, views to the south are thus strongly compromised by the existing plant's industrial character, reducing the visual quality of these views to low to moderate. Moderate quality portions of these views are a product of a view corridor from the river over the marinas and undeveloped portions of the CCPP site to hills to the south. The new facilities would be visually subordinate to co-dominant with the existing plant (depending upon the location and focus of the viewer) in these views from the river facing south. The proposed facilities would be co-dominant to boaters traveling to and from the adjacent marinas within roughly a ½ mile radius from the marinas. These viewers were assumed to have moderate sensitivity to visual effects because of the need for embarking and returning boaters at these marinas to focus upon navigation. These impacts were thus considered *less than significant*. In addition to introducing a co-dominant element of industrial character into these south-facing boat views, the proposed plant would obstruct a portion of the existing view corridor to the hills east of the adjacent recreational marinas. As depicted in **VISUAL RESOURCES Figure 7b**, this existing view corridor to hills to the south, of approximately 2000 feet in width between the existing plant Units 6 & 7 and the Antioch Bridge, would be reduced in width by roughly one-third by the proposed Unit 8 facility. A view corridor approximately ¼ mile wide would remain. The proposed project would thus result in reduction but not elimination of the view corridor. Within a foreground distance from the project site of about ½ mile, this intrusion into the view corridor is considered adverse to marina users, but partial and transitory, and therefore *less than significant***.** To boaters on the river beyond ½ mile, views of the plant would be less dominant, existing views to the hills less prominent, and impacts would be *less than significant*. As depicted in **VISUAL RESOURCES Figure 7c**, in the long term (15-20 years) the new facilities would become partially screened by proposed landscaping, reducing the proposed plant's visual contrast.

IMPACTS IN LANDSCAPE UNIT 2 (URBAN ANTIOCH)

Marinas and Harbors

VISUAL RESOURCES Figure 8a, **b**, **c**, **d**, and **e**: **KOP 4**, Marinas/Harbors, depicts the view of the project site from the entrance to the San Joaquin Yacht Club at a distance of roughly 200 feet. This very close foreground view is similar to that experienced by two residences at the San Joaquin Yacht Club, and to visitors in and around the Sportsmen Yacht Club clubhouse (Sausalito Ferry), as well as visitors coming and going from this and the Sportsmen Yacht Club. **VISUAL**

RESOURCES Figure 8b depicts this view with the proposed project and proposed landscaping after three years of growth. **VISUAL RESOURCES Figure 8c** depicts the view after 15 to 20 years of growth. From this KOP the project would be visually co-dominant to dominant, with and without vapor plumes. The cooling tower would remain co-dominant with the proposed landscape screening, due in part to gaps in the available locations for establishing landscape screening, and due to the contrast of typical plumes, which would not be mitigated by landscaping. Cooling tower plumes would be expected to range from subordinate to dominant at this distance, depending on plume size at a given time, and would be present at a subordinate level virtually all of the time. They are not expected to be dominant under typical (50% of critical periods) frequency. In the context of the low to moderately low existing quality of these views, these impacts would be *less than significant.*
VISUAL RESOURCES Figure 8 shows a worst-case view that is not representative of most views within these facilities, particularly from the principal activity areas. The condition depicted would affect marina visitors principally as they arrive or leave in their cars, and the two caretaker residences at the San Joaquin Yacht Club cited above. Almost all viewers exposed to these worst-case views of the project would thus have moderate sensitivity due to their brief, transitory exposure. Because of the low to moderate visual quality of the view from KOP 4, visual impacts, although adverse, would be *less than significant*. Impacts on views within the marinas, particularly views from the slips, would be *less than significant*, since views of the project site are largely screened now by intervening structures and visual quality is low to moderate. The adverse impacts to the few views of the project from principal use areas of the Sportsmen Yacht Club and San Joaquin Yacht Club would eventually be reduced as a result of proposed landscape screening. When the screening approaches maturity (15 to 20 years) it would substantially mitigate adverse project effects because the screening would provide a higher degree of screening of the CCPP as a whole than currently exists.

Potential impacts from night lighting from the project are a major concern and could represent a significant impact. However, with recommended Conditions of Certification VIS-6 to ensure prevention of off-site light trespass, this impact would be *less than significant* (see **Visual Resources Figures 8d and e**).

Viera Avenue/Santa Fe Avenue Neighborhood

VISUAL RESOURCES Figure 9 a and **b**: **KOP 3**: Viera Avenue/Santa Fe Avenue Neighborhood (Existing Conditions and Simulation), depict the worst-case views from this residential neighborhood located from ¾ to one mile from the project site. Views exist primarily from yards of homes in the eastern portion of this neighborhood, where unobstructed views to the site over adjacent vineyards occur. From other locations within the area views to the site are blocked by other homes and landscaping. Impacts from these viewpoints would be due principally to cooling tower plumes, which would range from visually subordinate to the existing plant under typical (50 percent or more of the time) conditions, to visually dominant, but for less than 10 percent of the seasonal daytime no-fog critical period. This level of impact, though adverse, is considered less than significant. This is particularly so due to the relatively few and scattered available open views that would be affected. Night lighting impacts would be inevident to casual viewers and insignificant.

18th Street/Wilson Street Neighborhood (Residential)

VISUAL RESOURCES Figure 10 a and **b**: **KOP 2**: Existing and Simulated Views from 18th Street and Wilson Street, depicts a view from the entrance to the residential neighborhood directly south of 18th Street at a distance of about ¾ of a mile. It is representative of the adjacent residential development and other nearby sensitive receptors including the Oak View and Holy Cross Cemeteries roughly ½ mile to the east on 18th Street, a golf driving range, and a local park. In this near-middle-ground view, the project facilities themselves would be visually subordinate, but typical cooling tower plumes could be visually subordinate to co-dominant. This borderline condition, though adverse, is considered less than significant because the majority of views in the area are located at greater distances than this viewpoint and would thus present lower visual dominance of project effects; the majority of views from sensitive receptors in this sub area are not as open as this view but are more typically obstructed by existing structures; and though the area is of moderate visual quality, views in the direction of the existing plant are compromised by extensive existing industrial structures and are of lower visual quality. Visually dominant cooling tower plumes would be expected but for less than 10 percent of the seasonal (winter) critical viewing period. This impact is thus considered less than significant. Views to the project site from the two cemeteries and Almond Ridge Park are highly to completely filtered by intervening trees and structures.

Agricultural and commercial areas north of 18th Street are of moderate to low visual quality and moderate to low sensitivity. No sensitive receptors were identified in this area.

IMPACTS IN LANDSCAPE UNIT 3 (CONTRA COSTA HILLS)

Hillcrest Avenue Neighborhood

VISUAL RESOURCES Figure 11a and **b, KOP 5**: Hillcrest Avenue Neighborhood and State Route 4 (Existing Condition and Simulation), depicts views from this residential neighborhood located about two miles south of the project site. From this middle ground distance, the physical structures of the project would be inevident or very subordinate next to the visually dominant existing Units 1 & 2 and 6 & 7 plants and stacks as well as other industrial facilities in the view. This impact would be less than significant. Typical cooling tower plumes would be subordinate and impacts would be less than significant. Visually dominant HRSG plumes and cooling tower plumes could occur in winter, but for less than 10 percent of daytime no-fog hours, and are thus regarded as less than significant. Night lighting impacts of the project would be inevident to very subordinate, and would be less than significant. Despite the elevated position of the development, views to the project site are relatively few and scattered due both to microtopography and intervening homes and landscaping.

CONSTRUCTION IMPACTS

Construction impacts would be expected exclusively in the immediate project site vicinity, to neighbors at the adjoining marinas and residences viewing construction activities at foreground distances as represented by KOP #4.

Impacts of construction from KOP 4 would include removal of substantial existing oak trees and other vegetation, unsightly equipment storage and operation, material storage, and site grading. In addition, any nighttime construction could result in impacts on neighbors from construction lighting. All these impacts have the potential to be visually dominant, significant short-term impacts. With recommended Condition of Certification VIS- 6 short-term impacts would be reduced to less than significant levels. The measures required by Condition of Certification VIS-6 are:

- During construction opaque visual fencing of sufficient height to substantially screen construction equipment, grading, and material storage shall be constructed at the property line.

- Nighttime lighting for construction shall be strictly controlled to prevent any light trespass outside the site boundaries.

- Construction-created dust shall be minimized by site watering prior to grading and other measures as needed.

Due to the very long time before the proposed landscape screening would become effective, the impacts of removing existing trees would be adverse and considerable. Nevertheless, over the long term, this measure would substantially reduce potential impacts to neighbors and is an important and necessary measure. Staff has proposed Condition of Certification VIS-4 to expand the applicant's proposed landscape screening on- or off-site between the project and neighboring marinas and residents.

CUMULATIVE IMPACTS

The proposed project would add to the existing heavy industrial character of the viewshed, particularly along the San Joaquin River shoreline. The project's visual impacts would thus increase the already significant cumulative impact caused by the extensive past industrial development in the area. To partially mitigate the project's contribution to this cumulative impact, staff recommends adoption of the applicant-proposed landscape screening measures as expanded in staff's proposed Condition of Certification VIS-4.

Even with the landscaping mitigation required by Condition VIS-4 the project would contribute to cumulative visual impacts in the viewshed. The screening would not mitigate impacts from elevated view locations, including the Antioch Bridge, and would not screen the upper portions of the periodically larger cooling tower plumes from any view.

The proposed project would contribute to cumulative vapor plume impacts in the viewshed in combination with existing industrial facilities. These cumulative industrial vapor plume impacts are already significant periodically when daytime no fog conditions conducive to visible plume formation occur. The project's cooling tower plumes would be larger than any of the other visible plumes in the viewshed with the exception of the much less frequent plumes from the existing Unit 6 and 7

stack (Southern 2000_, Data Response 27). Staff is continuing to evaluate the magnitude of the contribution of the project's cooling tower plumes to cumulative visual impacts. Planned analysis includes additional field observations during the upcoming period when weather conditions are conducive to more frequent formation of larger visible plumes.

Industrial development along the south shore of the San Joaquin River in the project vicinity has introduced substantial exterior lighting, causing a significant cumulative impact. In particular, night lighting of the existing CCPP facility identifies it as industrial (see **VISUAL RESOURCES Figure 6c**). Exterior night lighting of the proposed project, even with the proposed project-specific mitigation, would add to this cumulative visual impact (see **Visual Resources Figure 6d**). Staff recommends that exterior lighting at the existing CCPP facility be shielded from public view areas to compensate for the contribution of the proposed project to cumulative lighting impacts. Proposed Visual Resources Condition VIS-6 specifies this requirement.

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 APPLICABLE LORS

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.

CITY OF ANTIOCH GENERAL PLAN

COMMUNITY IMAGE GOALS AND POLICIES

The City of Antioch General Plan identifies the Antioch Bridge, ridgelines in the vicinity of Hillcrest Avenue/Southeast Antioch, the San Joaquin River, and views of Mt. Diablo as principal visual landmarks of the City (City of Antioch, 1994, Figure 3-16, Community Design Characteristics, p. 42). The intersection of 18th Street and Highway 160, and the approach to the Antioch Bridge are identified as principal City gateways.

Effects on these key landmarks were discussed above in relation to specific representative KOPs, and were reflected in the impact assessment by the assigned levels of viewer sensitivity. No specific significant impacts on views of these features were identified. The project is thus consistent with the intent of this portion of the 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. Important view corridors to be protected are along … Hillcrest Avenue and Highway 160 … Oakley Avenue (and) Highway 4.”

Though the project would not block named view corridors, the project would reduce the extent of views of the hills from the river as seen from viewpoints within ½ mile of the project and adjacent marinas, and from nearby Antioch Shoreline Park. A view corridor to the hills of ¼ mile in width would remain to boaters traveling to and from the River. A view corridor to the hill ridgeline from the park would be blocked by the proposed facility. However, as discussed previously this view corridor was considered to be highly compromised by the existing powerplant, consequently of limited visual quality and value, and this intrusion was thus found to be a less than significant visual impact. Thus, though the project could be construed as being inconsistent with this policy, the blocked view from Antioch Shoreline Park is regarded as of limited quality value, and this effect on the park landscape is regarded as of minor importance.

Policy 2 states that “[v]iews 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.”

With recommended Condition of Certification VIS-4 (landscape screening on south side) foreground views along existing utility easements in the vicinity would be somewhat improved over the long term. It would thus be consistent with this policy.

Policy 4 states that “[e]dges, the visual boundaries between neighborhoods and adjacent communities, should be maintained to provide relief from urban sprawl and

to reinforce neighborhood identity. Important edges to be enhanced include … Highway 4 on the east side of the City."

With recommended Condition of Certification VIS-4 (landscape screening) the edge between the project and adjacent residential and recreational land uses would be enhanced over the long term. Over the long term the recommended redwood screening would provide visual separation between the heavy industry zone near the City's eastern edge, and both the adjacent marinas and the Antioch Bridge. The project would thus be consistent with this policy.

CONTRA COSTA COUNTY GENERAL PLAN

LAND USE ELEMENT

Policy 3-19 states that buffers shall be provided between new industrial developments and residential areas by establishing setbacks, and park-like landscaping or other appropriate mechanisms.

Recommended Conditions of Certification VIS 4 and 5 (landscape screening on east side) would establish a buffer between the project facilities and both the adjacent marinas and nearby Antioch Regional Shoreline Park.

The proposed project would include landscape screening between the site and adjacent marinas and associated caretaker residences. There would be setbacks of from 100' to 250' from the cooling tower structure to the project's eastern site boundary. Setbacks to the powerplant would be minimal, though its most prominent vertical features, the HRSG stacks, would be setback approximately 100'. The adjacent marina is not a residential area and the few existing residences represent non-conforming uses. The project is thus consistent with this policy.

OPEN SPACE ELEMENT

SCENIC RESOURCE POLICIES

Policy 9-17: New power lines shall be located parallel to existing lines in order to minimize their visual impact.

Although the proposed project includes several new transmission towers, these are restricted to a very short distance within the site. This policy is thus not applicable.

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.

Signs and overhead utility lines are not a part of this project. The proposed project incorporates certain aesthetic design measures to reduce the visual bulkiness of major structures as summarized in Condition of Certification VIS-1. Landscaping as described in condition VIS-4 could have a beneficial long-term effect on the

River/Delta viewshed, though this effect would not be substantial for a long time. With the proposed landscape screening the project would be substantially consistent with this policy in the long term (15 to 20 years).

CALIFORNIA STATE DEPARTMENT OF TRANSPORTATION SCENIC HIGHWAY PROGRAM

Specific local ordinances enforcing controls on designated Scenic Highway 160 and eligible Scenic Highway 4 and applicable to the proposed project were not identified.

The general intent of the Scenic Highway program has been reflected in the high visual sensitivity assigned to these viewpoints in the assessment above. Specifically, the discussion of KOP 6 and areas east of SR 160 including Route 4 determined that anticipated impacts would be less than significant from these key viewing areas.

Since no local policies implementing the State Scenic Highway status of SR 4 and SR 160 were identified, this status is not applicable to the project.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project as proposed has the potential to cause project-specific adverse visual impacts due to intrusion into certain view corridors, reduction of visual quality of certain sensitive views due to an increase in visually unattractive industrial features, vapor plumes of various sizes, and lighting. However, primarily because of the heavy industrial character of the area, project-specific impacts except for lighting are not expected to be significant, and proposed project-specific mitigation is expected to cause residual project-specific lighting impacts to be less than significant. Nevertheless, the project would intensify the industrial character of the area and add to the significant cumulative visual impacts that existing industry has caused. Implementation of Southern's proposed mitigation measures and staff's additional proposed mitigation measures, both specified in staff's recommended Conditions of Certification, would reduce the proposed project's contributions to most of these cumulative impacts. Staff is continuing to evaluate the magnitude of the contribution of the proposed project's cooling tower plumes to cumulative visual impacts.

The project would result in blockage of a view corridor to the Contra Costa Hills as seen from a portion of Antioch Regional Shoreline Park. Policy 1 of the Community Image Element of the City of Antioch General Plan states that views to the river, hills, and ridgelines should be preserved by prohibiting the siting of structures or landscaping that would block views from adjacent properties. Although the project could be construed to be inconsistent with this policy, the affected view corridor was considered in this analysis to be highly compromised by the existing power plant, and consequently of limited visual quality and value, therefore the view intrusion was found to be a less than significant visual impact. This effect on the park landscape was thus regarded to be of limited importance.

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 harmonizing color or colors with a low-gloss finish to blend with the surroundings.

Surface design treatment shall be provided for the façades of the cooling tower to reduce visual monotony and apparent scale through architectural detailing to break up the façade surface. A color scheme using a combination of approved colors shall be employed, to increase visual variety and reduce the size of areas of uninterrupted uniform color or texture, without creating distracting levels of contrast.

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:

a. specification, and 11” x 17” color simulations at life-size scale, of the treatment proposed for use on project structures, including structures treated during manufacture;

b. a detailed schedule for completion of the treatment; and,

c. 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 ninety (90) 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 thirty (30) days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Not less than thirty (30) 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 thirty (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 when the fencing has been installed and is ready for inspection.

Verification: At least thirty (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 thirty (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 (7) days after completing installation of the fencing that the fencing is ready for inspection.

VIS-3 The project owner shall design and install all project lighting to minimize potential night lighting impacts, as follows:

a. All exterior night lighting shall be of minimum necessary brightness consistent with operational safety.

b. All exterior lighting shall be shielded and directed to prevent all uplighting and all direct light trespass (direct lighting extending outside the boundaries of the facility).

c. c) Wherever feasible, emergency lighting shall be kept off when not in use.

d. d) A lighting complaint resolution from shall be maintained by plant operations, to record all lighting complaints received and to document the resolution of that complaint.

Protocol: The project owner shall develop a lighting plan for the project incorporating the above measures and submit it to the CPM for review and approval.

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 ninety (90) days before ordering the exterior lighting, the project owner shall provide the lighting 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 thirty (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 power plant, the project owner shall implement the installation of permanent aesthetic screening along the south, east, and north edges of the power plant site that will screen views of the facility from neighbors and the public to the maximum feasible extent. This screening shall be located on-site wherever feasible, and off-site where necessary to achieve maximum feasible screening for viewers at the neighboring marinas and along the access road to the marinas.

Screening shall consist of a combination of plants, aesthetic berms, and walls or fencing as appropriate and feasible. Fencing shall consist of approved, opaque visual screens of sufficient height to substantially screen new project lighting and views of lower portions of the powerplant. Vegetation selected for landscape screening shall consist primarily of evergreen trees using species that will achieve the greatest height at maturity and provide an uninterrupted visual screen at maturity. Screening located on the east boundary of the project site shall consist of trees that are 12' to 15' tall at the time of installation, planted to form a continuous visual screen within a period of 3 to 5 years. Other plants that are native to the local region such as oaks may also be used but only in a way that will not interfere with complete, uninterrupted screening. Planting of screening vegetation shall be initiated as soon as possible during facility construction. 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 to provide uninterrupted screening of the lower portion of the power plant and cooling tower to the maximum feasible extent.

If desired by resident caretakers at San Joaquin Yacht Club, off-site landscape screening shall be provided to effectively screen views of the proposed cooling tower from these residences. Such screening shall consist of plant material of sufficient size to ensure substantial screening within a period of five (5) years.

Protocol: The project owner shall submit to the CPM for review and approval and to the City of Antioch and Contra Costa County for review and comment, an aesthetic screening plan. The plan shall include, but not be limited to:

1) A detailed landscape, grading, and irrigation 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.

2) Elevation views of the aesthetic screening projected for five (5) years and ten (10) years from the time of startup of operation of the facility that show the extent of screening that the landscaping is expected to achieve.

3) Maintenance procedures, including any needed irrigation; and

4) 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, when the plan has been implemented and is ready for inspection.

Verification: No later than one year (365 days) after the start of power plant construction, unless otherwise agreed to by the CPM, the project owner shall submit the proposed aesthetic screening plan to the CPM for review and approval. The project owner shall submit any required revisions within thirty (30) days of notification by the CPM. The project owner shall complete installation of the screening no later than sixty (60) days after completion of project construction, unless otherwise agreed to by the CPM. The project owner shall notify the CPM within seven days after implementing the proposed plan that the aesthetic screening installation is ready for inspection.

VIS-5 Before beginning construction or use of construction laydown areas for the power plant, the project owner shall install temporary, visually opaque aesthetic screening along the perimeter of all areas that would be open to public view, particularly but not limited to the perimeter on the eastern site boundary. The aesthetic screening shall be of sufficient height to substantially screen construction materials, equipment and activities from the view of neighbors and the public, and shall remain in place for the duration of the use of the area. Screening shall be high enough to obscure views of all direct lighting from the site, as seen from nearby roadways and neighbors to the east. Upon completion of construction of the project, the aesthetic screening shall be removed and construction laydown areas shall be revegetated.

Protocol: The project owner shall submit to the CPM for review and approval, and to the City of Antioch and Contra Costa County for review and comment, a plan describing proposed temporary aesthetic screening. The plan shall include, but not be limited to:

a. A detailed plan, at a reasonable scale, that identifies the type, character, colors, and other detailed information for the proposed temporary screening;
b. Elevation views of the temporary aesthetic screening, showing how the objectives of the screening will be accomplished;
c. Any maintenance procedures; and
d. A procedure and plan for removing the temporary aesthetic screening.

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 any other plan features shall not be installed before the plans are approved. The project owner shall notify the CPM, the City of Antioch, and Contra Costa County when the plan has been implemented and is ready for inspection.

Verification: At least sixty (60) 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 and to the City of Antioch and Contra Costa County for review and comment. The project

owner shall submit any required revisions within thirty (30) days of notification by the CPM. The project owner shall notify the CPM within seven (7) days after implementing the proposed plan that the temporary aesthetic screening installation is ready for inspection.

VIS-6 Prior to completion of project construction, to offset the contribution of the Contra Costa Unit 8 project to cumulative lighting impacts, the project owner shall have the lighting at the Contra Costa Unit 6 and 7 power plant modified 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 modification plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated, and backscatter to the nighttime sky is minimized. The luminescence or light source shall be 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 shall be 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 modifications shall not be made before the plan is approved. The project owner shall notify the CPM when the lighting modifications have been made and are ready for inspection.

Verification: No later than one year (365 days) after the start of project construction the project owner shall provide the lighting modification 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 thirty (30) days of receiving that notification the project owner shall submit to the CPM a revised plan.

Prior to the completion of project construction the project owner shall notify the CPM that exterior lighting modifications to Units 6 and 7 have been completed and that the lighting is ready for inspection.

REFERENCES

City of Antioch, 1994. General Plan 1988-2000.

Contra Costa County, 1996. General Plan 1995-2010.

Southern Company, 2000a. Application for Certification for Contra Costa Power Plant Unit 8 Project.

Southern Company, 2000b. Application for Certification for Contra Costa Power Plant Unit 8 Project, Supplemental Information, April 2000.

Southern Company, 2000c. Southern Data Response, June 2000.

Southern Company, 2000d. Southern Data Response, October 2000.

U.S. Dept. of Interior, 1974. National Forest Landscape Management, Vol. 2, The Visual Management System (Agriculture Handbook Number 462).

U.S. Dept. of Interior, 1986. Visual Resource Management (Bureau of Land Management Manual 8400).

CULTURAL RESOURCES

Gary Reinoehl and Dorothy Torres

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 Contra Costa Power Plant (CCPP) Unit 8 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 period resources, and ethnographic 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 period 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 period resources include archaeological deposits, sites, structures, traveled ways, artifacts, documents, buildings and objects.

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 U.S. 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.

- National Historic Preservation Act, 16 U.S.C. § 470, commonly referred to as Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning. Regulations revised in 1997 (36 CFR Part 800 et. seq.) set forth procedures to be followed for determining eligibility of properties for the National Register of Historic Places (NRHP). The eligibility criteria and the process are used by federal, state, and local agencies in the evaluation of 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. Recent revisions to Section 106 in 1999 emphasized the importance of Native American consultation.
- 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.
- The American Indian Religious Freedom Act, Title 42 United States Code, Section 1996 protects Native American religious practices, ethnic heritage sites, and land uses.
- The 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 Resources (CRHR); sets forth criteria to determine significance; defines eligible properties; and lists nomination procedures.
- 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.
- The California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.; Title 14, California Code of Regulations, Section 15000 et seq.) 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 "historical resources" and "unique archaeological resources."
- Penal Code, Section 622 1/2 states that 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 states that 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 archaeologic 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 archaeologic 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 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 1999).

ENVIRONMENTAL SETTING

REGIONAL DESCRIPTION

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.

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).

PROJECT VICINITY DESCRIPTION

The project area is located within the Sacramento-San Joaquin River Delta, a region characterized today primarily by agricultural development situated upon reclaimed tracts separated by meandering sloughs and channels. A mix of agricultural and industrial development characterizes the vicinity immediately surrounding the plant. Prior to the reclamation and flood control projects of the nineteenth and twentieth centuries and subsequent development, however, the region was characterized by extensive marshlands fed by the seasonal flooding of the Sacramento and San Joaquin rivers (Southern 2000a, p. 8.3-2). Refer to the **PROJECT DESCRIPTION** section of this Staff Assessment for a regional map of the project development area.

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).

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 adjacent 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 1998, 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; DEC 1998, 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). 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 1998, 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 1998).

The proposed project is located in northern Contra Costa County just east of the location where Antioch was founded. In 1853, John Marsh built Marsh Landing consisting of a smokehouse, a wharf, a blacksmith shop and a warehouse, east of the current city of Antioch. The early economy of the vicinity was based on farming, herding, and trading. 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 (Southern 2000a, 8.3-7 through 8.3-10).

RESOURCES INVENTORY

As part of the preparation of the Application for Certification (AFC), consultants to the applicant conducted archival research, a pedestrian survey, and Native American consultation.

ARCHIVAL RESEARCH

The applicant's consultant conducted a record 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. The 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.

The record search included the Area of Potential Effect (APE) and areas within one mile of the APE. The search determined that the APE had been surveyed previously for cultural resources with negative results. The previous survey had been conducted for the environmental impact report (EIR) for PG&E in order to sell the existing power plant. Information in the EIR indicated that there is a low potential for archeological resources because of past disturbance in the existing plant area. The EIR also stated that there has not been a formal determination for the older portions of the power plant although they "are not likely" to be eligible for inclusion in the National Register of Historic Places (NRHP) (Southern 2000a, p. 8.3-9).

Previous studies in the area have identified three sites, CA-CCO-135, -149, and 441. CA-CCO-149 and –441 are within a half-mile of the project site. CA-CCO-149 was recorded in 1938 and consists of a single obsidian projectile point. By today's standards, this would have been recorded as an isolated artifact rather than a site. In contrast, archeological site CA-CCO-441 consists of obsidian debitage burnt clay artifacts and faunal (animal) remains within a midden (dark sticky soil produced by human habitation) matrix. Site CA-CCO-135 is a little further away and was recorded in 1945. The record noted the following materials: flaked and ground stone

artifacts, an *Olivella* shell bead, and an antler flaking tool. None of these resources are within the APE (Southern 2000a, p. 8.3-9).

The record search also indicated that Marsh Landing, an early dock facility, was located about one-half mile east of the project area and the applicant conducted additional research on the location of Marsh Landing, comparing historic maps with current maps. Marsh Landing appears to be within the Contra Costa Power Plant (CCPP) Unit 8 boundaries. The proposed project site appears to be east of Marsh Landing, but is within the APE as illustrated in Figure 8.3-1 of the AFC. The historic maps also illustrate other buildings near the project site. There is the potential for buried deposits near these buildings.

Specific information on the location of archeological sites was filed with the Energy Commission under separate cover to maintain confidentiality of sensitive resource locations (Southern 2000o. p. 8.3-9).

ARCHAEOLOGICAL FIELD SURVEYS

The consultants to the applicant conducted a pedestrian field survey of the proposed power plant site (all project linears of the new unit will be contained within the CCPP site) using 20 meter intervals. Ground visibility was variable. The ground was completely obscured in highly developed areas and partially visible in undeveloped areas. In locations where dense vegetation obscured the ground surface, small patches of vegetation were occasionally cleared to increase ground visibility. Unpaved roadways, furrows, drainage banks, and rodent burrows were also examined for evidence of past human activity. No archeological resources were identified within the portions of the power plant examined during the course of the current investigation.

ARCHITECTURAL RECONNAISSANCE

Structures older than approximately forty-five years are potentially significant historic resources in the project area. The archival research indicated that the older portions of the power facility did not appear eligible for inclusion in the National Register of Historic Places when they were considered in the 1998 EIR (Southern. 2000a, p. 8.3-9). Units 1, 2, and 3 were constructed in 1950 and 1951. Tanks 1 through 5 were constructed between 1951 and 1953. No architectural reconnaissance was conducted for the current project. The buildings and structures within the CCPP that are more than forty-five years of age need to be evaluated.

NATIVE AMERICAN CONSULTATION

The applicant's consultant contacted the State of California Native American Heritage Commission (NAHC) requesting information regarding traditional cultural properties such as cemeteries and sacred places in the project area. 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 representatives of the Native American community who wish to be contacted regarding construction related ground disturbances in their area. The NAHC responded with a list of Native American contacts for the general project area. Eleven persons or organizations of Miwok and/or Ohlone/Costanoan heritage were

listed. Each of these individuals/groups was contacted by letter (Southern. 2000a, p. 8.3-10).

The NAHC search of the Sacred Lands file indicated that no known sacred properties were located within the immediate project area. The record 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 (Southern 2000a, p.8.3-10 and Appendix F).

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 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 Historical 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 "historical resources" and sets forth a listing of criteria for making this determination. As used in CEQA, the term "historical 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 historical resource, which the regulations define as a significant effect on the environment. The mitigation for impacts to historical resources that meet these criteria are not subject to the limitations provided in Public Resources Code (PRC) section 21083.2.

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, excavation, demolition, destruction, relocation, or alteration of the resource. Direct impacts may include alteration of the immediate surroundings of the buildings such that the significance of an historical resource would be materially impaired. 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 indicates further potential for unknown resources to be encountered, 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 subsurface disturbance of the ground, the proposed project has the potential to adversely affect previously unknown cultural resources. Twelve archaeological sites, features, objects, buildings, or structures are known to be located in the vicinity of the proposed project. These include historic-era buildings. This indicates a moderate to high potential for previously unknown historic and prehistoric resources to be encountered and affected during project construction.

Research of historic documents indicates that Marsh Landing is within the CCPP property. Although the landing and associated buildings appear to be west of the proposed project area, they are within the project APE. Archeological deposits associated with the landing and other historic buildings could be encountered during project construction.

The older portions of the power facility are about fifty years old. These buildings were considered in an EIR published in 1998. The passage of time and changes in the CEQA require that the older portions of the power facility be evaluated against the California Register and National Register criteria to see if the buildings could be significant. New construction of buildings and power facilities in the vicinity of historical resources have the potential to cause substantial adverse change in the significance of a historical resource by the alteration of the immediate surroundings of an historical resource.

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

POWER PLANT SITE AND LAYDOWN AREA

As previously discussed, all components of the new unit will be contained within the CCPP site. Fill and paving cover portions of the site and vegetation is dense in some undeveloped areas. The plant area is covered with about six feet of fill. Major plant components may have to be supported on piles while shallow-bearing foundations may be used for the lighter plant components. Several small and temporary structures will be removed from the proposed plant site. The site area will

be stripped of organic matter to a depth that is suitable for backfill. Fill from other portions of the parcel will be used to raise the grade to ten feet above mean sea level. Excavations for foundations are typically less than five feet deep. Trenches for the gas supply pipeline will at a minimum be four feet below surface. Existing water supply systems will be used for the new facility. Transmission lines will be connected to the substation at the plant site. Cultural resources, archeological deposits associated with Marsh Landing and other historic buildings as well as the old power plant, exist within the project APE. Based on known cultural resources in the vicinity, the potential for impacts to unknown cultural resources is moderate to high.

Although development has previously occurred or currently exists on much of the land where new project related facilities would be built, the new facilities may cause ground disturbance to areas (and cultural resources) that have not been previously disturbed. The new project related facilities may alter the immediate surroundings of cultural resources. Therefore, the new facilities have the potential to cause impacts to cultural resources.

CUMULATIVE IMPACTS

Two energy facilities are currently under construction in the City of Pittsburg, within seven miles from the proposed CCPP expansion. Fourteen residential projects, eighteen commercial projects, and one industrial project have been proposed for the Antioch Planning Area. Forty percent of the growth in eastern Contra Costa County is expected to occur in Antioch (Southern 2000f, p. 8.4-3).

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 rise as increasing development opens more undisturbed areas and eventually exposes highly sensitive cultural resource sites. Information regarding the cumulative effect will be presented in the FSA. If mitigation measures such as avoidance, recordation, or data recovery are conducted for all of the project components, the potential cumulative impacts will be mitigated below a level of significance.

FACILITY CLOSURE IMPACTS

PLANNED CLOSURE

The anticipated lifetime of the project is expected to be forty years. If the plant is not economically viable within the forty year lifetime, then it may be decommissioned. If it is still economically viable at forty years, it could be operated longer. 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 and local/regional plans will be identified and the closure plan will address compliance with those LORS and plans.

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. The closure plan, when created, will address impacts to 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 LORS

The Contra Costa General Plan sets goals for important archeological sites and historic resources within the county. The goals include preserving areas of important archeological sites or places of historical significance, preferably in public ownership; protecting buildings or structures that have visual merit and historic values, and compatible and high quality design surrounding areas of historic significance in order to protect and enhance the historic quality of the area (Contra Costa 1996).

Staff's proposed conditions of certification 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 or other mitigation measures 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.8.3-12) states that "…in the event previously unknown archaeological materials…are encountered during project implementation, all ground-disturbing activities within the vicinity of the exposed materials will be halted until the nature and significance of the find can be evaluated by a qualified archaeologist and

mitigation measures, if needed, implemented." Development of mitigation measures would be conducted in consultation with the California Energy Commission.

The AFC (p.8.3-12) recommends that a worker education program be initiated prior to project implementation. The program should describe site characteristics and the procedures to follow in the event of such a discovery. The information should be provided in both oral and written form.

The applicant states that any mitigation measures would be developed in consultation with the California Energy Commission and State Historic Preservation Office, and, if the site is of aboriginal association, the Native American Heritage Commission and local Native American community (Southern. 2000a, p. 8.3-12).

STAFF'S PROPOSED MITIGATION MEASURES

Staff concurs with the mitigation measures proposed by the applicant for the discovery of archeological deposits. 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 U.S. Secretary of Interior guidelines, the Commission staff recommendations, and incorporate the policies and guidelines of Contra Costa County and the City of 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 significant.

For buildings and standing structures that are significant, mitigation measures need to be developed and implemented prior to pre-construction site preparation. If any of the buildings or structures are significant resources, then mitigation measures may include, but should not be limited to photographic documentation, architectural documentation, and documents prepared for distribution to local libraries, schools, and local historical societies. Documentation maintained by local entities would make historical information on the importance of the resources and photographic and architectural documentation available to the public.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The proposed project has the potential to adversely effect cultural resources. 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 vegetation clearance, earth disturbing activities, or project site preparation, 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 resources specialist who will be responsible for implementation of all cultural resources Conditions of Certification.

Protocol: The statement of qualifications for the designated cultural resources specialist shall include all information needed to demonstrate that the specialist meets the minimum qualifications specified in the U.S. 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:

   a) leading archaeological resource field surveys;

   b) leading site and artifact mapping, recording, and recovery operations;

   c) marshalling and use of equipment necessary for cultural resource recovery and testing;

   d) preparing recovered materials for analysis and identification;

   e) determining the need for appropriate sampling and/or testing in the field and in the lab;

   f) directing the analyses of mapped and recovered artifacts;

   g) completing the identification and inventory of recovered cultural resource materials; and

   h) preparing appropriate reports to be filed with the receiving curation repository, the State Historic Preservation Office, all appropriate regional archaeological information center(s).

The statement of qualifications for the designated cultural resources 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 related vegetation clearance, earth disturbing activities or project site preparation, the project owner shall submit the name and statement of qualifications of its designated cultural resources 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 resources specialist will be available at the start of construction and is prepared to implement the cultural resources Conditions of Certification.

At least ten (10) days prior to the termination or release of a designated cultural resources 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 resources specialist.

CUL-2 Prior to the start of project related vegetation clearance, earth disturbing activities, or project site preparation, the project owner shall provide the designated cultural resources specialist and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps provided will include the USGS Antioch North 7.5 minute topographic quadrangle map and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. In addition, the project owner shall provide a set of these maps to the CPM at the same time that they are provided to the specialist. If the footprint of the power plant or linear facilities changes, the project owner shall provide maps and drawings reflecting these changes, to the cultural resources specialist and the CPM within five days. Maps shall show the location of all areas where surface disturbance may be associated with project related access roads, and any other project components.

Verification: At least seventy-five (75) days prior to the start of project related vegetation clearance, earth disturbing activities, or project site preparation, the project owner shall provide the designated cultural resources 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.

CUL-3 Prior to the start of project related vegetation clearance, earth disturbing activities, or project site preparation, 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. discussion of where monitoring of project construction activities is deemed necessary by the designated cultural resources 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 and the areas where excavation will be required.

g. 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 California State Historic Resources Commission Guidelines on Curation Facilities of cultural resources.

h. 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 any project related vegetation clearance, earth disturbing activities or project site preparation, the project owner shall provide the Cultural Resources Monitoring and Mitigation Plan, prepared by the designated cultural resources specialist, to the CPM for review and written approval.

CUL-4 Prior to the start of project related vegetation clearance, earth disturbing activities or project site preparation, 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 resources 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 project related vegetation clearance, earth disturbing activities, or project site preparation, 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 project related vegetation clearance, earth disturbing activities, or project site preparation and throughout the project construction period as needed for all new employees, the project owner shall ensure that

the designated cultural resources 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 project related vegetation clearance, earth disturbing activities, or project site preparation, 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 CPM-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 resources 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 resources specialist or the specialist's delegated monitor(s) 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, the halting or redirection of construction shall remain in effect until:

a. the specialist has notified the CPM and the project owner 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 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 resources 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 project related vegetation clearance, earth disturbing activities, or project site preparation, 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, the project owner shall notify the CPM as soon as possible.

CUL-7 Throughout the project site preparation and construction period, the project owner shall provide the designated cultural resources 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).
The designated resources specialist may informally discuss the cultural resources monitoring and mitigation activities with Commission technical staff.

Verification: The project owner shall provide the designated cultural resources 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 The designated cultural resources specialist or their delegated monitor shall be present at times the specialist deems appropriate to monitor construction-related ground disturbance, including grading, excavation, trenching, and/or augering in the vicinity of previously recorded archaeological sites, in areas where significant cultural resources have been identified during project construction, and at any other locations specified in the approved monitoring and mitigation plan.

Protocol: If the designated cultural resources 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 and the CPM of the changes. The designated cultural resources 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 resources specialist regarding project-related cultural resources monitoring.

CUL-9 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 resources-related activities. The project owner shall provide the weekly summary reports to the CPM for review.

The designated resources specialist may informally discuss the cultural resources monitoring and mitigation activities with Commission technical staff.

Verification: Throughout the project pre-construction and construction period, the project owner shall ensure that the daily log is available for periodic audit by the CPM.

CUL-10 The project owner shall ensure that the designated cultural resources specialist performs the recovery, preparation for analysis, analysis, preparation for curation, and delivery for curation of all cultural 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 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 sites shall be kept confidential and accessible only to qualified cultural resources specialists.

CUL-11 Following completion of any 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 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 isolated artifact 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 specialists 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 Resources Report to the public repository to receive the recovered data and materials for curation, to the SHPO, and to the appropriate regional California Historical Resources Information Center(s) (CHRIC). 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 Resources Report to be sent to the curating repository, the SHPO, and the regional CHRIC) 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 appropriateCHRIC.

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 Cultural Resources Report with the following:

a) the public repository receiving the recovered data and materials for curation,
b) the SHPO, and
c) the appropriateCHRIC.

CUL-14 Following the filing of the CPM-approved Cultural Resources 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 U.S. Secretary of Interior's 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 Resources Report to the public repository receiving the recovered data and materials, to the SHPO, and to the appropriate CHRIC.

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.

REFERENCES

Bendorff, Ron; City of Antioch, Senior Planner. 1999. Telephone Conversation with Dorothy Torres, Energy Commission staff, February 2, 1999.

Contra Costa County, 1996. Contra Costa General Plan 1996.

DEC (Delta Energy Center). 1998, AFC. Delta Energy Centeer (980AFC-3). Submitted to California Energy Commission December 18, 1998.

PDEF Pittsburg District Energy Facility, L.L.C. 1998a. AFC, Pittsburg District Energy Facility Project (98-AFC-1). Submitted to the California Energy Commission, July 20, 1998.

PDEF (Pittsburg District Energy Facility). 1998b. AFC Confidential Appendix K, Cultural Resources Technical Report. Submitted to the California Energy Commission, June 12, 1998.

Southern. 2000a. AFC, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000e. Various confidential filings—archaeological resources and emissions offsets data, received in dockets April 18, 2000.

Southern. 2000f. Supplemental information, received in dockets April 18, 2000.

Southern. 2000o. data responses to CEC data requests, received in dockets August 18,2000.

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 Contra Costa Power Plant (CCPP) Unit 8 Project 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

SB 50 and other statutory amendments enacted in 1998 provide that, notwithstanding any other provisions of local or state law (including CEQA), state and local agencies may not require mitigation for the development of real property for effects on school enrollment except as provided by new provisions in the Government Code. (Govt. Code, § 65996(a)) The relevant provisions restrict fees for the development of commercial and industrial space to a maximum of $0.31 per square foot of “chargeable covered and enclosed space.” (Govt. Code, § 5995(b)(2))

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 and low-income populations.

SETTING

PROJECT LOCATION

The project site is located in unincorporated East Contra Costa County about one mile east of the City of Antioch on Wilbur Avenue near State Route 4 and the Antioch Bridge. The proposed project is situated in an area designated for Heavy

Industrial Use (Contra Costa County General Plan). The site is surrounded by industrial uses to the south and west, including a power plant and a paperboard manufacturing facility. The San Joaquin River is to the north, and the Antioch Regional Shoreline Park is to the northeast. A commercial marina, chemical manufacturer, and open space lie to the east. The CCPP Unit 8 is the third power plant proposed in East Contra Costa County within the last three years. The other two power plants are Los Medanos (98-AFC-1), certified on August 17, 1999, and Delta Energy Center (98-AFC-3), certified on February 9, 2000. East Contra Costa County encompasses the cities of Antioch and Pittsburg, and the unincorporated community of Bay Point. East Contra Costa County is characterized largely by industrial uses. Industrial uses in Antioch include DuPont, Gaylord Container Corporation, G-P Gypsum, two GWF power plants, Hickson Kerley, Kernwater North America, Owens-Brockway Glass, Western Steel and Tinplate, the existing 680 MW Contra Costa power plant (formerly PG&E), and the proposed Contra Costa 530 MW power plant. Those in Pittsburg include the 500 MW Los Medanos Energy Center, the 880 MW Delta Energy Center, American Color Graphics, Dow Chemical, two GWF power plants, Kernwater North America, Marble Shop Inc., PG&E power plant, Praxair Inc., a recycling and transfer facility, USS POSCO, and Sunoco Fibre Drum. Those in Bay Point include ACME Packaging Corp., Chemical and Pigment Co., Criterion Catalyst Co., Dexter Corp., General Chemical Corp., and GWF power plant.

Because of the potential economic and fiscal benefits from property taxes, local purchasing of equipment and supplies, and local spending by construction workers and permanent employee households during project construction and operation, for purposes of evaluating potential socioeconomic impacts and benefits of the project, staff has defined the study area as Contra Costa County.

For purposes of evaluating construction worker availability, Energy Commission staff has defined the study area as a four-county area that includes the counties within an hour's commuting distance of the project: Contra Costa, Solano, Alameda, and San Joaquin Counties.

IMPACTS

Staff reviewed the following sections from the CCPP Unit 8 AFC for information regarding potential impacts to community services and infrastructure (employment, housing, schools, utilities, emergency and other services), and environmental justice: the executive summary, public health, socioeconomic resources, land use, and project description sections. Staff also reviewed the CCPP Unit 8 Response to Data Adequacy Request, April 2000. Based on its independent analysis and the socioeconomic data provided by Southern Energy Delta, LLC (Southern or applicant) and referenced from governmental agencies and trade associations, staff finds that construction and operation of the project will not impact police, fire, or emergency medical services. Because of the availability of local construction labor, there will not be an impact on housing and schools in the area.

Staff's criteria for assessing socioeconomic impacts are based on impacts to existing levels of service for medical services, law enforcement, fire and emergency services, and housing. Determination of impact is based on input from local agencies and service personnel. Regarding potential impacts to schools, public agencies may not impose fees, charges or other financial requirements to offset the cost for school facilities. 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. Environmental justice has a numeric threshold of fifty percent when determining the presence of minority and low-income populations. Project-related impacts are discussed under specific headings, below.

CONSTRUCTION EMPLOYMENT AND PROJECT SCHEDULE

Table 8.8-8 in the AFC shows the workforce needs by craft for project construction. Specific trades required for construction include carpenters, laborers, ironworkers, operators, pipefitters, electricians, millwrights, boilermakers, insulators, painters, and teamsters. **SOCIOECONOMICS Table 1** indicates the number of construction workers in the four-county area. Figure 8.8-8 in the AFC indicates that project construction will occur over a 22-month period. Peak construction will occur from month 10 through month 17, with an estimated average of 263 construction workers on site during this time. Based on employment information provided by Southern in the AFC, and staff's independent analysis of employment data, staff believes there is a considerable surplus of construction workers available to staff the construction of the project. Because the labor pool will be drawn primarily from the four-county area, staff does not expect workers to relocate to Contra Costa County during project construction.

SOCIOECONOMICS TABLE 1
1999 Construction Employment

	1999 Total Employment	Percent Construction	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 Department, Labor Market Information Division			

HOUSING

Housing characteristics in the AFC indicate that there are about 347,000 housing units in Contra Costa County. Contra Costa County has a vacancy rate of 5.1 percent. 1998 data from the Association of Bay Area Governments (ABAG) shows that 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 (ABAG 1998).

Southern expects that hiring of construction and operation workers will occur within Contra Costa County or within a reasonable commuting distance from adjacent counties. Therefore the demand for housing during construction and operation is expected to be minimal to non-existent. Any potential demand for housing as a result of project construction can be accommodated by the existing vacancy rates and existing motel/hotel rooms in Antioch or Pittsburg.

SCHOOLS

The school district where development will occur is the Antioch Unified School District. The Antioch Unified School District assesses developer fees of $0.31 per square foot of covered and enclosed space for industrial development. Southern states that the project will total an estimated 158,000 square feet. Therefore, the project will be assessed a one-time developer fee of $48,980. 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 district will receive the fees or how they will be spent. 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.

Southern has stated in the AFC that operation and maintenance of the proposed project would include the addition of about ten workers. Southern expects to hire construction and operation staff from within the study area, and therefore does not expect these workers and their families to relocate for either construction or operation of the proposed project. Staff's independent analysis on worker availability concurs with the findings of Southern's, and staff does not expect any project-related adverse effects to the affected school districts as a result of project construction and operation.

PUBLIC SERVICES

COMMUNITY FIRE AND EMERGENCY MEDICAL SERVICES

Information in the AFC states that the Contra Costa County Fire Protection District provides the project with fire protection services. Fire Station 81, located in Antioch at 315 West Tenth Street, is the closest station and can respond to an alarm at the facility in three minutes. 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. 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.

COMMUNITY PROTECTIVE SERVICES

The Contra Costa County Office of the Sheriff provides law enforcement services to the project. The Delta Station, at 210 O'Hara Street in Oakley is the closest station to the project site and is located about five miles east of the site. Staffing at this station includes one Lieutenant, five Sergeants, and 18 Deputies.

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.

Based on the availability of local labor for construction and operation, staff does not expect an in-migration of workers and their families. Thus, staff does not expect a significant adverse impact on medical, emergency, or protective services as a result of project construction or operation.

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.

IMPACT ON FISCAL RESOURCES AND THE LOCAL ECONOMY

PROPERTY TAX

Southern states that the existing property generated 2.1 million in property taxes in 1997. Due to the proposed project, the assessed value of the property would likely increase and Contra Costa County would see an increase in property tax revenue. Southern states that the estimate of increased property tax revenues was unknown because the future assessed value of the expanded facility was under negotiation when the AFC was filed.

LOCAL PURCHASING OF EQUIPMENT AND SUPPLIES

Table 8.8-10 in the AFC shows that during the construction period, between $20 and $25 million of construction materials will be purchased in Contra Costa County. Table 8.8-11 states that of the total estimated annual operating costs, about $2 to $3 million will be spent in Contra Costa County. 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 will generate income for Contra Costa County in the form of sales tax revenues.

ENVIRONMENTAL JUSTICE SCREENING ANALYSIS

The purpose of the screening analysis is to determine whether there exists a low-income and/or minority population, which may be exposed to disproportionately high and adverse human health or environmental effects as a result of the proposed project. For all siting cases, Energy Commission staff conducts the screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis" (Guidance) dated April 1998.

Minority populations, as defined by EPA's guidance document, are identified where either:

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

The Guidance provides a numeric measure to determine the presence of an affected population: a minority population exists if the minority population percentage of the affected area is greater than fifty percent of the affected area's general population. The Guidance does not define the term "affected area," however it states that the analyst should interpret the term "as that area which the proposed project will or may have an effect on." Typically, Energy Commission staff has defined the affected area as the area potentially impacted by the proposed project (primarily for air quality, public health, noise, water, traffic and visual). The affected area for the CCPP Unit 8 was initially determined by Energy Commission staff as that area within a six-mile radius of the site and represents the area affected by various project emissions.

SOCIOECONOMICS FIGURE 1 shows the census tracts within six miles of the proposed project. **SOCIOECONOMICS TABLES 2, 3, and 4** contain 1999 population estimates for Contra Costa County, the City of Pittsburg, and the City of Antioch, respectively. **SOCIOECONOMICS TABLES 5** and **6** contain 1990 census data and 1999 population estimates for the census tracts in East Contra Costa County that are within six miles of the proposed site, respectively. Data for **SOCIOECONOMICS TABLES 4** and **6** were obtained from the marketing firm of Claritas. Claritas produces demographic estimates and projections based on data solicited from local, state, and federal government agencies, and private sector sources. Sources include U.S. Bureau of Labor Statistics, U.S. Bureau of the Census, U.S. Postal Service, and city and regional planning departments.

Socioeconomics Figure 1

SOCIOECONOMICS TABLE 2: Contra Costa County: 1999 Population Estimates by Race and Hispanic Origin

Hispanic	White	Black	Asian	Other	Total Population
134331	575274	82010	106770	6022	904,407
14.9%	63.6	9.1	11.8	0.7	100%
Source: City of Pittsburg Chamber of Commerce					

SOCIOECONOMICS TABLE 3: CITY OF PITTSBURG: 1999 Population Estimates by Race and Hispanic Origin

Hispanic	White	Black	Asian	Other	Total Population
15,848	18730	9086	7887	320	51,871
30.6%	36.1%	17.5%	15.2%	0.6%	100%
Source: City of Pittsburg Chamber of Commerce					

SOCIOECONOMICS TABLE 4: CITY OF Antioch: 1999 Population Estimates by Race and Hispanic Origin

Hispanic	White	Black	Asian	Other	Total Population
15,520	57,542	2,518	5,556	772	81,908
18.9%	70.3%	3.1%	6.8%	0.9%	100%
Source: CLARITAS. Race and Hispanic Origin population estimates					

SOCIOECONOMICS TABLE 5 1990 Demographic Profile for Census Tracts Within Six Miles of the CCPP Unit 8 Site

Census Tract	Hispanic Origin	White	Black	American Indian	Asian Pacific Islander	Other Race	Total by Tract
3010	146	2960	0	27	11	0	3152
3020.01	1988	8792	199	87	495	0	11561
3020.02	1603	4009	22	59	152	27	5881
3032	1344	4418	58	33	90	32	5975
3050	1457	4131	143	68	149	7	5955
3060.01	1203	5705	81	93	116	13	7211
3060.02	302	2051	42	14	116	0	2525
3071.01	547	3552	67	45	149	10	4370
3071.02	916	3564	39	36	127	4	4686
3072.01	566	2171	128	31	139	11	3045
3072.02	770	2566	280	61	143	23	3843
3072.04	564	3024	51	45	125	4	3813
3072.05	887	4854	208	55	312	4	6320
3080.01	950	5659	102	49	185	11	6956
3080.02	296	1811	110	7	226	5	2455
3090	541	705	682	9	124	2	2063
3120	237	442	1331	3	181	6	2200
3131.02	613	2115	639	31	344	1	3743
3131.03	802	3270	517	27	456	7	5079
3551.01	1347	8905	296	65	971	13	11597
3551.02	80	593	9	15	7	4	708
Totals	**17159**	**75297**	**5004**	**860**	**4618**	**184**	**103138**
% of Totals	**16.6%**	**73%**	**4.8%**	**<1%**	**4.4%**	**<1%**	

Source: 1990 Census Data STF1A

SOCIOECONOMICS TABLE 6: 1999 Projections of Demographic Profile for Census Tracts Within Six Miles of the CCPP Unit 8 Site

Census Tract	Hispanic Origin	White	Black	American Indian	Asian Pacific Islander	Other Race	Total by Tract
3010	334	4470	50	61	49	2	4966
3020.01	2006	11435	312	131	879	20	14783
3020.02	3526	7048	135	86	350	51	11196
3032	3635	12502	145	125	379	16	16802
3050	2135	3917	185	69	221	10	6537
3060.01	1897	5927	118	101	180	18	8241
3060.02	430	2525	69	17	209	0	3250
3071.01	579	3807	95	50	226	10	4767
3071.02	1360	3520	44	37	191	7	5159
3072.01	897	2277	186	31	231	14	3636
3072.02	1199	2353	359	55	194	23	4183
3072.04	900	3155	72	49	198	4	4378
3072.05	1372	5001	288	59	493	4	7217
3080.01	1565	7231	172	59	354	16	9397
3080.02	864	4511	325	15	792	5	6512
3090	695	494	771	4	165	3	2132
3120	494	247	1442	1	198	6	2388
3131.02	887	1912	790	30	484	1	4104
3131.03	1313	3018	621	27	650	8	5637
3551.01	2445	13906	581	105	2187	17	19241
3551.02	752	3156	56	76	47	4	4091
Totals	**29285**	**102412**	**6816**	**1188**	**8677**	**239**	**148617**
% of Totals	**19.7%**	**68.9%**	**4.5%**	**<1%**	**5.8%**	**<1%**	

Source: CLARITAS. Race and Hispanic Origin population estimates

According to the guidelines, a minority population exists if the minority population percentage of the affected area is greater than fifty percent of the affected area's general population. Based on the screening process for environmental justice, information in **SOCIOECONOMICS TABLE 6** indicates that the minority population of the affected area is about 31 percent.

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. **SOCIOECONOMICS TABLE 7** indicates that the total number of people living below the poverty level is 9,669 or about 8.7 percent of the total population of the census tracts within six miles of the CCPP Unit 8 project site. 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 threshold used for minority populations.

SOCIOECONOMICS TABLE 7

Percentage of Persons Living Below the Poverty Level Within Six Miles of the CCPC Site

Census Tract	Number of Persons in Tract	Persons Below Poverty Level
3010	3,152	225
3020.01	11,561	268
3020.02	5,881	593
3032	5,975	260
3050	5,865	1,228
3060.01	7,303	615
3060.02	2,511	44
3071.01	4,370	337
3071.02	4,686	527
3072.01	2,487	331
3072.02	3,842	877
3072.04	3,813	101
3072.05	6,320	818
3080.01	6,982	549
3080.02	2,429	53
3090	2,071	437
3120	2,229	445
3100	3,959	806
3110	4,133	551
3131.02	3,743	142
3131.03	5,060	203
3551.01	11,593	201
3551.02	716	58
Totals	**110,681**	**9,669**

Source: 1990 US Census Data, Statistical Information on Population

Although **SOCIOECONOMICS TABLES 6** and **7** do not indicate the presence of environmental justice populations, as defined by the Guidance, members of the community who live near the proposed site are concerned about the growing industrialization of East Contra Costa County. On June 15, 2000, environmental and legal staff, in coordination with the Public Advisor's Office, held an Environmental Justice Scoping meeting in Pittsburg. The purpose of the meeting was to learn of any concerns or unique circumstances associated with minority or low income populations in the community where the CCPP Unit 8 is proposed to be sited. Specifically, staff was interested in obtaining information from the public in the following areas:

- Public health – Are there any specific public health concerns in the community that staff should be aware of? What are the sources of information to collect more facts and data?

- Life style – Are their specific life styles that staff should be aware of such as dependence on local fishing by members of the community? If so, are there any specific areas in the vicinity of the proposed project where most of this fishing occurs?

- Communication – Are there non-English speaking people in the community? If so, would it be helpful to have notices translated for them? Is there someone in that community that we can coordinate with?

During the meeting, staff gave a brief description of the CCPP Unit 8, an overview of the CEC siting process, and a presentation of demographics in Contra Costa County. The meeting was then opened up to audience discussion of environmental justice issues. Thirteen members of the public who reside in Pittsburg, Antioch, Bay Point, and Walnut Creek attended the meeting. There were no non-English speaking members of the public in attendance. Issues raised by the community members included air quality, water quality, public health, quality of life issues, and the belief that East Contra Costa County is a "dumping ground" for industrial uses. Staff also explored means for further outreach in the community, including persons or agencies in the community who might assist staff in locating neighborhoods of non-English speaking members of the community who reside near the proposed site. Staff will continue to hold workshops in the Pittsburg/Antioch area in all technical areas, including environmental justice.

Figures 8.1-7 through 8.1-28 in the Air Quality section of the AFC show that the project will cause no violations of air quality standards for CO, No_2, PM_{10}, and SO_2. In the FSA, staff will provide a cumulative analysis of air quality to determine whether there are any disproportionate air quality impacts to the community when Air Quality staff has reviewed the isopleths that Southern will provide. Isopleth maps show lines that connect points on the map that have equal or corresponding values with regard to air quality emissions.

CUMULATIVE IMPACTS

Construction of the CCPP Unit 8 is expected to begin about three months after project certification. Project construction will occur over a 22-month period. Peak construction will occur from month 10 through month 17, with an estimated average of 263 construction workers on site during this time. Construction of the Delta Energy Center (98-AFC-3) (DEC) began in mid 2000 and is expected to 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 Los Medanos project (98-AFC-1) is scheduled for construction and operation during the same time frame as the DEC. Construction of Los Medanos began in mid 1999 and is expected to end in early 2001. The peak construction period was 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 three 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. Based on employment information (State of California, Employment Development Department, Labor Market Information), there is a considerable surplus of construction workers available to staff the construction of the three projects. Because the labor pool will be drawn primarily from the four-county area, staff does not expect workers to relocate to Contra Costa County during project construction. For these reasons, staff does not expect any adverse cumulative impacts to schools, housing, or public services.

MITIGATION

Because the applicant has proposed economic and fiscal benefits to the project area through sales tax and direct purchases of construction materials and services from local vendors (Southern 2000), Energy Commission staff is incorporating a contingency measure into the proposed conditions of certification. Staff also proposes a condition of certification requiring CCPP Unit 8 to pay a one-time school impact fee based on the project's covered or enclosed space.

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.

CONCLUSION AND RECOMMENDATION

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. Staff also proposes a condition of certification requiring Southern to pay a one-time school impact fee based on $0.31 per square foot of "chargeable covered and enclosed space" and fire facilities fee.

PROPOSOUTHERN 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 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 CPM shall review and comment on the submittal as needed.

SOCIO-2 The project owner shall pay the statutory school facility development fee and fire facilities fee as required at the time of filing for the "in-lieu" building permit with the Contra Costa County Building Department.

Verification: The project owner shall provide proof of payment of the statutory development fee and fire facilities fee in the next Monthly Compliance Report following the payment.

REFERENCES

Association of Bay Area Governments (ABAG). Projections 1998.

California State Board of Education 1999. Educational Demographics Unit; www.cde.ca.gov/demographics.

Claritas. connect.claritas.com

Contra Costa County General Plan 1990-2005. January 1991.

Crisp, Wynlee. Objective Determination of Disproportionate Impacts in Environmental Justice Impacts. Paper presented at the National Association of Environmental Professionals annual meeting, June 22, 1999.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000o. Data responses to CEC data requests, received in dockets August 18, 2000.

State of California, Employment Development Department, Labor Market Information. www.calmis.cahwnet.gov.

US Environmental Protection Agency. Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses, July 12, 1998.

US Census 1990. "California: Preliminary Counts for Cities, Counties, and State"; April 1, 1990.

BIOLOGICAL RESOURCES

Jim Buchholz, Mary Hammer, Shannon Lucas, and Richard Anderson

INTRODUCTION

This section provides the California Energy Commission staff's analysis of potential impacts to biological resources from Southern Energy's proposal to construct and operate the Contra Costa Power Plant (CCPP) Unit 8. The analysis focuses on impacts to state and federally listed species, fully protected species, species of special concern, wetlands, and other areas of critical biological concern. In this section, staff 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.

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 CCPP Unit 8.

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. §10.1-24.12) provides protection for migratory birds.
- Rivers and Harbors Act (33 U.S.C. § 401 et seq.), protects waters of the U.S.
- Clean Water Act (33 U.S.C. § 1251-1376; 30 CFR § 330.5(a)(26)), protects wetlands and waters of the U.S.

STATE

- California Native Species Conservation and Enhancement Act, (Fish & Game 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 of 1984 (Fish & Game Code §2050-2098), protects California's endangered and threatened species or those designated as candidates for listing.

- California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) protects the environment within California.
- Native Plant Protection Act (Fish & Game 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, section1603 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 California Department of Fish and Game (CDFG), 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 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.

LOCAL

- Contra Costa County General Plan (1996) Goal 8-D protects ecologically significant lands, wetlands, plants, and wildlife habitat.
- Contra Costa County General Plan (1996) Goal 8-E protects rare, threatened, or endangered species and increases the functions and values of wetlands.
- Contra Costa County General Plan (1996) Goal 8-F preserves and restores natural characteristics of the Bay-Delta.
- Contra Costa Tree Ordinance (Chapter 816-6) protects and preserves trees.

SETTING

REGIONAL DESCRIPTION

The CCPP is located along the San Joaquin River, which is part of the Bay-Delta estuary. The brackish, slow-moving water in this region is the result of a mixture of saltwater inflow from the San Francisco Bay and freshwater outflow from the San Joaquin and Sacramento Rivers, and provides habitat for many plant and animal species. Much of the land within the Delta region has been converted to agriculture (row crops and livestock grazing), industrial and/or commercial use, or is used for recreation (including fishing, boating, and waterfowl hunting). The regional landscape includes a variety of wetland habitats including open water, mudflats, salt marsh wetlands, and disturbed shoreline, as well as upland habitats including non-native and ruderal (areas that have been disced or tilled and are currently growing

weeds and nonnative vegetation) grasslands. These habitats support many amphibians, reptiles, passerines, raptors, shore birds, waterfowl, and small to medium sized mammals. A list of plant and animal species recognized as being of special concern or protected under state and federal regulations are listed in Table 1.

There are several significant biological resource areas in the vicinity of the CCPP: The Sherman Island Waterfowl Management Area is located to the northwest; the Antioch Dunes National Wildlife Refuge, Kimball Island, DOW Wetlands Preserve, New York Slough, Brown Island and Winter Island are located to the west; the Big Break shoreline is located to the east; and the San Joaquin River shoreline runs to the north of the site (Southern 2000a, page 8.2-2).

SITE AND VICINITY DESCRIPTION

Site-specific field surveys of terrestrial biological resources were conducted at the project site by the applicant's biological consultant, Dames & Moore Group (DMG), in October 1999 (Southern 2000a, page 8.2-2). Energy Commission staff and consultants (Wetlands Research Associates, Inc.) visited the power plant site and transmission line route on September 6, 2000.

The new Unit 8 is proposed for construction on approximately 20 acres of the existing CCPP site. This area currently includes an asphalt parking lot, a paved road, and an area of approximately five acres of clean fill now covered with ruderal vegetation. The banks of the fill area have been planted with native oak trees.

An 18 kilovolt (kV) transmission line will be constructed between the new plant and the existing Pacific Gas and Electric (PG&E) switchyard immediately west of the proposed project site. The western portion of the transmission line will traverse existing roadways, a railroad right-of-way, and annual grasslands. The eastern portion of the transmission line may be underground.

The majority of the plant species observed during site surveys were non-native, which is reflective of the disturbed nature of the site. Observed non-natives included fennel (*Foeniculum vulgare*), Russian thistle (*Salsola* sp.), and yellow star thistle (*Centaurea solstitialis*). Ornamental trees observed included pepper tree (*Schinus* sp.), and eucalyptus (*Eucalyptus* sp.). Twenty-eight mature and 18 sapling coast live oak trees (*Quercus agrifolia*) have been planted along the bank of the fill area (Southern 2000a, page 8.2-4), and are currently in poor health.

Common animal species observed include California gull (*Larus californicus*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), great egret (*Casmerodius albus*), and house finch (*Carpodacus mexicanus*). Other evidence of common mammal species was also observed, such as raccoon tracks (*Procyon lotor*) and California ground squirrel burrows (*Spermophilus beecheyi*) (CCPP 2000a, AFC page 8.2-18). One special status bird species, the Loggerhead shrike (*Lanius ludovicianus*), a Federal Species of Concern, was observed during a site survey (Southern 2000a, page 8.2-18).

BIOLOGICAL RESOURCES Table 1
Sensitive Species

Sensitive Plants	Status*
Large-flowered fiddleneck (*Amsinckia grandiflora*)	FE/SE
Mt. Diablo manzanita (*Arctostaphylos auriculata*)	1B
Suisun marsh aster (*Aster lentus*)	FSC/1B
Alkali milk vetch (*Astragalus tener* var tener)	1B
Heartscale (*Atriplex cordulata*)	FSC/1B
San Joaquin saltbush (*Atriplex joaquiniana*)	FSC/1B
Big tarplant (*Blepharizonia plumosa* ssp *plumosa*)	1B
Mt. Diablo fairy lantern (*Calochortus pulchellus*)	1B
Soft bird's beak (*Cordylanthus mollis* ssp *mollis*)	FE/1B
Dwarf downingia (*Downingia pusilla*)	2
Mt. Diablo buckwheat (*Eriogonum truncatum*)	1A
Contra Costa wallflower (*Erysimum capitatum* ssp *angustatum*)	FE/SE/1B
Diamond-petaled California poppy (*Eschscholzia rhombipetala*)	FSC/1A
Fragrant fritillary (*Fritillaria liliacea*)	FSC/1B
Diablo helianthella (*Helianthella castanea*)	FSC/1B
Brewer's western flax (*Hesperolinon breweri*)	FSC/1B
Rose-mallow (*Hibiscus lasiocarpus*)	2
Delta tule pea (*Lathyrus jepsonii* var jepsonii)	FSC/1B
Mason's lilaeopsis (*Lilaeopsis masonii*)	FSC/1B
Delta mudwort (*Limosella subulata*)	2
Showy madia (*Madia radiata*)	1B
Antioch dunes evening-primrose (*Oenothera deltoides* ssp *howellii*)	FE/SE/1B
Blue skullcap (*Scutellaria lateriflora*)	2
Rayless ragwort (*Senecio aphanactis*)	2
Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)	FSC/1A

Sensitive Wildlife Status	**Status**
Tricolored blackbird (Agelauis tricolor)	FSC/CSC
California tiger salamander (*Ambystoma californiense*)	FC/CSC
Antioch dunes anthicid beetle (*Anthicus antiochensis*)	FSC
Lange's metalmark butterfly (*Apodemia mormo langei*)	FE
Sacramento perch (*Archoplites interruptus*)	FSC/CSC
Burrowing owl (*Athene cunicularia*)	FSC/CSC
Western pond turtle (Clemmys marmorata)	FSC/CSC
San Joaquin dune beetle (*Coelus gracilis*)	FSC
Antioch cophuran robberfly (*Cophura hurdi*)	FSC
Antioch efferian robberfly (Efferia antiochi)	FSC
White-tailed kite (*Elanus leucurus*)	CFP
Bridges' coast range shoulderband (*Helminthoglypta nickliniana bridgesi*)	FSC
Curved-foot hygrotus diving beetle (*Hygrotus curvipes*)	FSC
Middlekauf's shieldback katydid (*Idiostatus middlekaufi*)	FSC
California black rail (*Laterallus jamaicensis coturniculus*)	FSC/ST
Molestan blister beetle (*Lytta molesta*)	FSC
Alameda whipsnake (*Masticophis lateralis euryxanthus*)	FT/ST
Antioch multilid wasp (*Myrmosula pacifica*)	FSC
Yellow-banded adrenid bee (*Perdita scituta antiochensis*)	FSC
San Joaquin pocket mouse (*Perognathus inornatus inornatus*)	FSC
Double-crested cormorant - rookery site (*Phalacrocorax auritus*)	CSC
Antioch specid wasp (*Phianthus nasalis*)	FSC
California red-legged frog (*Rana aurora draytonii*)	FT/CSC
Salt-marsh harvest mouse (*Reithrodontomys raviventris*)	FE/SE
Giant garter snake (*Thamnophis gigas*)	FT/ST
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE/ST

Status legend:

CNPS List 1A = Plants presumed extinct in California
CNPS List 1B = Plants rare or endangered in California and elsewhere (California Native Plant Society 1994)
CNPS List 2 = Plants rare, threatened or endangered in California but more common elsewhere

FE = Federally listed Endangered
FT = Federally listed Threatened
FSC = Federal species of concern
FC = Federal Candidate
CSC = CDFG species of special concern
CFP = CDFG fully protected
SE = State endangered
ST = State threatened

No other special status plant or animal species were observed on-site during the October 1999 (DMG) or September 2000 surveys. However, previous surveys (ESA, 1998) have recorded the endangered Contra Costa wallflower (*Erysimum capitatum* ssp. *angustatum*), Antioch dunes evening primrose (*Oenothera deltoides* ssp. *Howellii*), Suisun marsh aster (*Aster lentus*), and Mason's lilaeopsis (*Lilaeopsis masonii*) in the vicinity of the CCPP (Southern2000a, page 8.2-6). Suisun marsh aster and Mason's lilaeopsis are both Federal Species of Concern (Mason's lilaeopsis is also a State Rare species) and have been observed growing within the northeastern corner of the CCPP property along the San Joaquin River; however, this area is outside of the proposed Unit 8 project area and will not be affected by CCPP Unit 8 construction and operation activities.

No wetlands were identified within the Unit 8 project area on the project site. The San Joaquin River, however, runs immediately north of the project area and along the CCPP property boundary. This aquatic habitat is known as an estuarine transition zone, where freshwater from the Delta mixes with saline water from estuarine bays to the west (Southern 2000a, page 8.2-5). The CCPP shoreline is predominantly rip-rap material, as well as pilings, docks, and piers. The limited brackish marsh habitat along the waterline supports submergent and emergent vegetation. The open water habitat in the channels, sloughs, and rivers within the delta system support a wide variety of aquatic species and provide habitat for native sensitive fish species including the federal and state threatened Delta smelt (*Hypomesus transpacificus*) and the California species of special concern, longfin smelt (*Spirinchus thaleichthys*). These areas also serve as migration routes for sensitive native anadromous fish species such as chinook salmon (*Oncorhynchus tshawytscha*)(Table 2 below shows sensitive status---this species depending on when it spawns, is endangered, threatened and a candidate for listing at the state and federal levels), and the California threatened steelhead (*Oncorhynchus mykiss*). Other sensitive species include the Sacramento splittail (*Pogonichthys macrolepidotus*) white sturgeon (*Acipenser transmontanus*), and green sturgeon (*Acipenser medirostris*) (Southern 2000a, page 8.2-6).

BIOLOGICAL RESOURCES Table 2
Special Status Aquatic Species

Listed Fish Species	Status*
Delta smelt (*Hypomesus transpacificus*)	FT/ST
Longfin smelt (*Spirinchus thaleichthys*)	CSC
Winter-run chinook salmon (*Oncorhynchus tshawytscha*)	FE/SE
Spring-run chinook salmon (*Oncorhynchus tshawytscha*)	FT/SPE
Fall-run chinook salmon (*Oncorhynchus tshawytscha*)	SC
Late fall-run chinook salmon (*Oncorhynchus tshawytscha*)	SC
Steelhead (*Oncorhynchus mykiss*)	ST
Sacramento splittail (*Pogonichthys macrolepidotus*)	FPE/ST/CFP
White sturgeon (Acipenser transmontanus)	CSC
Green sturgeon (Acipenser medirostris)	CSC

Status legend:

FE = Federally listed endangered
FPE = Federally proposed endangered
FT = Federally listed threatened
endangered
CSC = CDFG species of special concern
CFP = CDFG fully protected

SC = State candidate for listing
SE = State endangered
SPE = State proposed

ST = State threatened

PROJECT SPECIFIC IMPACTS

The project site is located within a disturbed, industrialized area. Located within the CCPP site are: (1) operational and retired plant facilities; (2) regraded ruderal areas; and (3) areas landscaped with ornamental and native trees. Plants and wildlife identified on-site and those expected to utilize the site are common species, none of which are federally or state listed. One special status bird species, the Loggerhead shrike (*Lanius ludovicianus*), a Federal Species of Concern, was observed during a site survey (Southern 2000a, page 8.2-18). Due to the disturbed and industrialized nature of the site and area, and the moderately tolerant nature of this species, it is unlikely that this project represents an important adverse impact, even for this individual loggerhead shrike.

The proposed project includes the construction of two 195-foot tall cooling towers that potentially pose a collision hazard to birds. Most collisions would be expected to occur during darkness and inclement weather when birds are unable to see objects in their path. Due to the industrialized nature of the area, it is unlikely that many special status bird species would use the proposed site. The site is not known to be a migration path for nocturnal migrating bird species, nor a heavy bird use area, and considering the relatively low structure height, a significant level of collisions is not anticipated.

Bird collisions with new project related electric distribution poles and lines (less than 1000 feet planned) are expected to be rare because of the relatively low height of the poles-approximately 70 feet (Southern 2000a, page 2-49)-and because of their close proximity to buildings, stacks, and other transmission towers and lines. A portion of the line may be routed underground, eliminating the possibility of collision for that portion of the line. It is not expected that bird collisions with electric transmission/distribution towers and lines will pose a significant impact.

Electrocutions occur when a bird simultaneously contacts two conductors of different phases or contacts a conductor and a ground. If there is not sufficient clearance between these elements, electrocutions may occur. In general, transmission lines larger than 65 kV have sufficient clearance between these elements to protect large birds from electrocution. Installation of transmission lines and related facilities according to the guidelines suggested in the Avian Power Line Interaction Committee report (1996) will eliminate most impacts associated with electrocution.

Cooling tower drift impacts on sensitive vegetation near the project site are not expected to be significant. The cooling tower will be designed to have a drift rate not to exceed 0.0005 percent of the circulating water flow (Southern 2000a, page 8.2-10). Quarterly wind data (Southern 2000a, Appendix C1) indicate prevailing winds are out of the northwest and would cause cooling tower drift to be directed mainly away from potentially sensitive areas along the river shoreline. No significant impacts are expected from cooling tower drift.

The proposed project will not require new water intake or discharge structures for the cooling water system. No construction activities will take place on the shoreline, within the San Joaquin River, or in wetlands associated with the river. Therefore, no significant impacts are expected to these resources.

A power plant once-through cooling water system may impact aquatic organisms, by impingement, entrainment, and/or thermal discharge effects. Impingement of aquatic species result when organisms come in contact with the intake screens, and are held there by the velocity of the water being pumped through the cooling system. Entrainment occurs when aquatic organisms pass through the intake screens (screen mesh size usually 5/16 or 3/8 of an inch) and are pumped through the cooling system. It is generally assumed that a high percentage of entrained species are lost. Thermal discharge (i.e. heated water) from the cooling water system may also have adverse effects on aquatic species. Past studies at the existing CCPP indicate the potential for adverse impacts to several sensitive fish species (Table 2) due to impingement and entrainment (PG&E 1981a; PG&E 1981b; PG&E 1992). These impacts are the result of cooling water intake associated with the operation of the existing CCPP Units 6 and 7. The proposed new Unit 8 cooling tower system would take approximately 5% of the water discharged from units 6 and 7 (prior to it being discharged to the Delta) and re-use this water for cooling Unit 8. Therefore, there would be no new additional intake flows for Unit 8 when Units 6 and 7 are operating. An evaluation of the impingement, entrainment, and thermal discharge effects of the proposed unit 8

cooling water system on the estuarine and marine environment has been completed by the applicant's consultant, Tenera Energy (Southern 2000a, Appendix D). Tenera Energy determined that because Unit 8 will re-use discharge water from the existing CCPP Units 6 and 7, it will not produce significant adverse effects to aquatic biological resources. Staff agrees with this determination.

Four variable-speed drive pumps provide cooling water for existing Units 6 and 7. One of those pumps operating at 50 percent capacity (12.5% of current water use) would be required to provide cooling water to Unit 8 if both Units 6 and 7 were simultaneously shut down. These simultaneous shutdowns of Units 6 and 7 occurred only three percent of the total operating time over an 18-month period between 1999 and mid-2000 (Southern 2000d, Response 16). This means that the proposed Unit 8 would be responsible for one of four pumps operating at 50% capacity (37,500 gpm) for a small portion of power plant operation time each year. No significant impingement impacts are expected to result from the velocity of the intake water for one pump at 50% capacity, nor would the Unit 8 cooling tower water discharge temperature result in significant impacts to aquatic resources (See Soils and Water Resources Section). Biological organisms would, however, be entrained in the 37,500 gpm of water. The U. S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and California Department of Fish and Game (CDFG) are currently finalizing a Habitat Conservation Plan (HCP) (to address impacts to state and federal listed species from the existing units 6&7 power plant operations and any that may occur from the operation of CCPP Unit 8) for the Pittsburgh and Contra Costa Power Plants.

HABITAT CONSERVATION PLAN (HCP)

The Federal Endangered Species Act (FESA), 15 USC Section 1531 et seq., establishes a process to list fish, wildlife, and plant species as threatened or endangered and provides for the protection and conservation of those listed species. Administered by the USFWS and NMFS, the FESA prohibits the "take" of any listed species. Take defined by Section 9 of the FESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Activities otherwise prohibited by the FESA, and subject to the civil and criminal enforcement provisions of Section 11 of the FESA, may be authorized for appropriate federal agency actions pursuant to Section 7 of the FESA and non-federal agency or private actions pursuant to Section 10 of the FESA. As a part of the requirements of Section 10, "incidental take" may be permitted with submittal of an HCP for the species affected by the non-federal agency or private action (Southern 2000n, pages 1-2).

Similarly, the California Endangered Species Act (CESA) in California Fish and Game Code, Section 2050 et seq., provides for a process to list fish and wildlife, and plant species as threatened or endangered and provides for the protection and conservation of those listed or candidate species. Administered by the CDFG, Section 2080 prohibits the "take" of any listed species. Take, as defined by CESA, means to "hunt, pursue, catch, capture, or kill, or attempt to [engage in such activity]." Activities otherwise prohibited by Section 2080, and subject to the civil and criminal enforcement provisions of Section 12000 et seq., may be authorized

for appropriate state agency actions pursuant to California Fish and Game Code Section 2090 et seq., and for other agency and private actions pursuant to Sections 2081 and 2084. Recent enabling legislation signed by the governor on September 26, 1997, authorized the CDFG to issue Management Authorizations or permits under Section 2081 authorizing incidental take for activities for which the primary purpose is not species conservation (Southern 2000n, pages 1-2 and 1-3).

This HCP is also intended to meet the requirements of the CESA and CDFG Code Section 2081 Management Authorization Program. The HCP includes a phased plan for the mitigation, habitat enhancement and implementation of protective measures for Delta smelt, chinook salmon (winter-run, spring-run, and fall/late fall-run), steelhead, Sacramento splittail, green sturgeon, salt marsh harvest mouse, California black rail, California clapper rail, California least tern, and soft bird's-beak (Southern 2000n, page 1-3).

The HCP for the CCPP and Pittsburg power plant is in final draft form and includes CCPP Unit 8. The activities covered by this HCP include: cooling water intake and discharge (including Aquatic Filter Barrier[1] (AFB)); operation, maintenance and repair; fisheries monitoring activities at the power plant; and the enhancement and restoration activities at the Montezuma Enhancement Site.

The term of the HCP and Section 10(a) permit is 15 years from the date of issuance (Southern 2000n, page iv). The Section 10(a) permit would make the take of federally listed species lawful as long as it is in accordance with the conditions described in the HCP and Implementing Agreement. Implementation of the HCP is intended to meet the requirements of FESA and CESA to allow the power plant owner to operate the Contra Costa Power Plant and to support the species recovery efforts of the various resource agencies. Implementation of the HCP will allow the issuance of an ITP for the power plant under the FESA and the necessary approvals under CESA (Southern 2000n, page 1-1).

The draft HCP identified no thermal impacts from the operation of Units 6, 7, and 8, but did find entrainment and impingement impacts from the operation of Units 6 and 7. The HCP identifies mitigation measures to address these impacts. In developing the mitigation requirements for entrainment, impingement, and thermal discharge impacts for the HCP, these agencies considered a worst case scenario of full

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[1] Aquatic Filter Barrier (AFB)(aka Gunderboom)

The Aquatic Filter Barrier (AFB) is, in essence, a curtain-like barrier that would hang in the water column and extend to the substrate. The AFB is a filter fabric comprised of a nonwoven poly propylene/polyester material with small melted holes that allows water to pass through the curtain but prevents aquatic organisms from passing through the barrier. Because the AFB is designed to allow for very slow water pass through rates, it has a low probability of impinging aquatic life-forms. An AFB has been used successfully on the Hudson River in New York to reduce the entrainment and impingement of fish species. The AFB would be placed in front of the Contra Costa Units 6&7 Cooling Water Intake structure to prevent sensitive aquatic species from entering the cooling water intake. An intensive biological monitoring program would be implemented to determine the effectiveness of the AFB at the Contra Costa Power Plant (Southern 2000n, page ii).

operation for existing Units 6 and 7 with no shutdowns (Mike Thabault, Pers. Comm.). Therefore, when Unit 8 runs by itself it will cause fewer impacts than those fully mitigated for Units 6, 7, & 8. The applicant's compliance with the Regional Water Quality Control Board's NPDES permit, and the HCP mitigation requirements (see below in mitigation) will result in the proposed Unit 8 causing no significant impacts to aquatic biological resources.

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.

Major factors threatening plant and animal life in the Bay-Delta estuary are habitat loss and degradation, disease, introduced predators and competitors, and pollution. Two-thirds of the 89 species of resident wildlife currently in decline or receiving attention from the state or federal governments are special dependent on wetlands. The natural communities that comprise tidal wetlands, freshwater wetlands, and native uplands, as well as the plant, fish, and wildlife species that depend on those communities, have been significantly reduced in the delta (Southern 2000n). No impacts are expected to wetlands from this project, therefore, no cumulative impacts are expected.

Almost all the land in the central, northern, eastern, and southern Delta is committed to agriculture; the western Delta adjacent to the CCPP is largely urbanized and industrialized. The CCPP, as well as chemical, steel, and paper manufacturing industries, are located on the south shore of the San Joaquin River in the western Delta near the city of Antioch. The Unit 8 terrestrial site is surrounded by decades of past development and the site has been significantly affected during that time. Cumulative impacts to upland biological resources on-site are not expected to result in any significant impacts.

Amount of water use that can be attributed to the Unit 8 cooling water system, taking water from Units 6 and 7 discharge water is minor compared to the current water use at the Contra Costa Power Plant and miniscule when considering water uses in the nearby area. Cumulative impacts to aquatic resources resulting from the construction and operation of unit 8 will be minor and are not expected to be significant.

FACILITY CLOSURE

For the eventual permanent closure of the power plant project, the project owner must utilize methods and measures that protect the environment and public health and safety. To achieve this, the project owner will develop an "on-site contingency plan" for facility closure as required in the General Conditions of Certification. Detailed measures specifically addressing biological resources, such as structure removal and habitat restoration, should be done according to Biological Resources Condition of Certification BIO-8. Restoration to natural habitat becomes more important due to the facility's waterfront location. In addition, removal of stacks will

eliminate potential impacts associated with bird collisions. The plan should also include the anticipated measures that would be implemented in the case of a temporary, but prolonged closure.

MITIGATION

APPLICANT'S PROPOSED MITIGATION MEASURES:

The applicant proposes to mitigate potential impacts by implementing various mitigation measures as identified in their AFC (Southern 2000a, pages 8.2-13c to 8.2-14) and Biological Resources Mitigation, Implementation, and Monitoring Plan (BRMIMP) (Southern 2000c, pages 5-9). They are the following:

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

The applicant has agreed to submit a final Biological Resources Mitigation Implementation and monitoring Plan (BRMIMP) that outlines how Southern Energy will implement all mitigation measures. This BRMIMP will be provided for review and approval by the Energy Commission prior to the start of any ground disturbance activity.

TREE MEASURES

- In accordance with the Contra Costa tree ordinance, Tree Protection and Preservation (chapter 816-6), all oak trees removed will be replaced onsite with a minimum replacement ratio of 2:1 as identified in the BRMIMP. The newly planted trees will be monitored for five years. All new plantings must be irrigated for the first two years of growth to ensure successful root establishment. Plantings will be required to meet a minimum survival rate of 80 percent. If this rate is not met at the end of the five-year monitoring period, replanting and continued monitoring will be conducted.
- Removal of trees will be conducted during the non-breeding season for local birds (September-January).

ON-SITE EROSION CONTROL

- Erosion control measures will be implemented that control the terrestrial and airborne movement of soils, sediments, and other substances into the San Joaquin River or connected waterways as described in the AFC pages 8.9 4-5;

PRE-CONSTRUCTION SURVEYS

- Conduct pre-construction surveys for active raptor nests within 30 days prior to construction operations.

DESIGNATED BIOLOGIST

- 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.
- Upon completion of construction, all areas subject to temporary ground disturbance will be subject to post-construction cleanup. Cleanup will consist of removal of all stakes, flagging, construction equipment, and any refuse generated by construction.
- All grass areas subject to temporary disturbance due to construction activities will be seeded with an appropriate grassland seed mix. A post-construction inspection by the designated biologist (DB) will be conducted within 15 days upon completion of construction. It will be the responsibility of the DB to verify that all construction debris is removed from the site and that all disturbed areas are properly seeded.
- Preparing construction monitoring and compliance reports that analyze the effectiveness of the mitigation measures;

AQUATIC RESOURCES MITIGATION

- Proposed mitigation includes the construction, monitoring, maintenance and evaluation of aquatic filter barriers (AFB).

WORKER ENVIRONMENTAL AWARENESS PROGRAM

- 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.

CEC STAFF PROPOSED MITIGATION MEASURES:

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

The project owner shall include the following in the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) for this project:

- 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 terms and conditions contained in the USFWS, NMFS, and CDFG Biological Opinion(s);
- 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 mitigation measures identified in the AFC and BRMIMP and comply with State Water Resources Control Board/Regional Water Quality Control Board standards;
- 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.
- Installing raptor-friendly electric transmission lines and any interconnection between structures, substations and transmission lines as described in the "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (APLIC 1996).

HCP MITIGATION MEASURES APPLICABLE TO THE CONTRA COSTA POWER PLANT:

All mitigation measures in the HCP will become part of the Conditions of Certification for CCPP Unit 8. They are summarized below, the details are included in the HCP.

- The construction, maintenance, monitoring, and evaluation of an aquatic filter barrier (AFB) also known as a Gunderboom, at the Contra Costa Power Plant.
- Enhancement of aquatic and terrestrial habitat, in perpetuity, at the Montezuma Enhancement site, including the granting of a conservation easement for the 139-acre site to protect species identified in the HCP.
- If results of biological monitoring and a sampling program determine that the AFB is not effectively minimizing impacts to aquatic organisms, the AFB would be removed and flow reduction using variable speed drive pump (VSD) mode would be implemented from February 1 through July 31 each year. This will seasonally reduce water flow through the pumps, resulting in a decrease in loss of juvenile and larval fish.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

This analysis has discussed potential impacts related to bird collisions with project structures, oak tree removal, and aquatic resources. No potential impacts to biological resources associated with this project are expected to be significant, provided all proposed mitigation measures and Conditions of Certification are

implemented, as well as any terms and conditions included in a federal or state incidental take authorization (HCP Section 10 permit/2081 permit) under the respective Endangered Species Acts.

RECOMMENDATIONS

If the project is approved by the Energy Commission, we recommend the following Conditions of Certification be adopted to ensure protection of biological resources.

CONDITIONS OF CERTIFICATION

Implementation of the conditions of certification described below will result in no significant biological impacts resulting from this 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 (DB) 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: 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 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.

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 submit to the CPM for review and approval a copy of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) 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 terms and conditions contained in the USFWS, NMFS, and CDFG Biological Opinion(s) (HCP);
- design new above-ground transmission lines and connections to reduce the risk of electrocution for large birds;
- 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 mitigation measures identified in the AFC and BRMIMP and comply with State Water Resources Control Board/Regional Water Quality Control Board standards;
- 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 BRMIMP 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 BRMIMP. 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 BRMIMP 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 Prior to site disturbance at the project site or linear facilities the project owner shall provide final copies of the Biological Opinions/HCP obtained from the USFWS, NMFS, and CDFG and incorporate the terms of the agreement(s) into the BRMIMP.

Verification: At least 60 days prior to the start of site disturbance, the project owner shall submit to the project CPM copies of the final Biological Opinions/HCP.

BIO-7 The project owner shall incorporate into the facility closure plan a Biological Resources Element that includes measures to address current local biological resources issues. The biological resource facility closure measures shall also be incorporated into the BRMIMP for this project.

Protocol: For permanent closure, biological resource-related measures shall include:

1) Removal of all power plant site facilities or proposed alternatives actions;

2) Measures to restore wildlife habitat and promote the re-establishment of native plant and wildlife species, and

3) Updating the plan to address current biological resources issues.

Protocol: For temporary, but prolonged closure, biological resource-related measures shall include:

1) Notifying the CPM of the project owner's decision to initiate a temporary, but prolonged closure;

2) Turning off the once-through cooling water system pumps; and

3) Updating the plan to address current biological resources issues.

Verification: At least twelve months (or a mutually agreed upon time) prior to the commencement of permanent closure activities a Biological Resources Element will be incorporated into the Facility Closure Plan and the BRMIMP and submitted to the

CPM for review and comment. The CPM will be notified within two weeks of the project owner's decision for a temporary, but prolonged closure and provide an updated plan of action.

REFERENCES

APLIC (Avian Power Line Interaction Committee), 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Edison Electric Institute. Washington, D.C.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000c. Phase II Environmental Site Assessment, received in dockets February 29, 2000 (dated June, 1998).

Southern. 2000f. Supplemental information, received in dockets April 18, 2000.

Southern. 2000n. Draft Multispecies Habitat Conservation Plan, Revision 5, received in dockets August 18, 2000.

Southern, 2000o. Draft Biological Resources, Mitigation, Implementation, and Monitoring Plan (BRMIMP) for CCPP Unit 8 Project. August 2000, docketed August 18, 2000

CEC (California Energy Commission). 2000a. Data Adequacy Recommendation, February 29, 2000.

CEC. 2000d. CEC first set of data requests, June 29, 1999.

ESA (Environmental Science Associates), 1998. Draft Environmental Impact Report Pacific Gas and Electric Company's Applications for Authorization to sell Certain Generating Plants and Related Assets Application No. 98-01-008. Prepared for California Public Utilities Commission, August 5, 1998.

Jones & Stokes Associates, Inc. 1998. Draft Environmental Assessment for Pacific Gas and Electric Company□s Multispecies Habitat Conservation Plan for Pittsburg and Contra Costa Power Plants. August 10, 1998 (Revised September 3, 1998).

Thabault, Mike. Personal Communication, Biological Resources Workshop, September 14, 2000.

SOIL & WATER RESOURCES

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INTRODUCTION

This section of staff's Preliminary Staff Assessment (PSA) analyzes potential effects on soil and water resources from the construction and operation of the Contra Costa Power Plant (CCPP) Unit 8 Project, which is proposed by Southern Energy Delta, LLC (Southern). The analysis focuses on the potential for the project to induce erosion and sedimentation, and to adversely affect water quality and quantity. Also addressed by staff in this analysis is the project's ability to comply with all applicable federal, state and local laws, ordinances, regulations and standards. Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impacts and, as appropriate, recommends conditions of certification.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

CLEAN WATER ACT

The Clean Water Act (33 USC § 1251), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States.

The Clean Water Act requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. These discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards. The proposed project will be addressed either through modification of the existing NPDES permit for the CCPP or through a new NPDES permit for Unit 8 and the existing units. A new NPDES permit will be required if the Central Valley Regional Water Quality Control Board (CVRWQCB) considers CCPP Unit 8 a new source under the Clean Water Act. The CVRWQCB, however, will likely treat Unit 8 as a modification of the existing NPDES permit, which is in the process of being renewed. The existing NPDES permit regulates cooling water, other wastewater and operational stormwater discharges. Stormwater discharges during construction of CCPP UNIT 8 will be addressed through compliance with the General Construction Activities NPDES permit.

Section 404 of the Clean Water Act regulates the discharge of dredged or fill materials into the waters of the United States, including rivers, streams, and wetlands. The U.S. Army Corps of Engineers administers the Section 404 permit program.

Section 401 of the Act requires that any activity which may result in a discharge into a water body must be certified by the Regional Water Quality Control Board that the proposed activity will not violate state and federal water quality standards.

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 Basin Water Quality Control Plan (1998) and the Sacramento River and the San Joaquin River Basin Plan (1998).

STATE WATER RESOURCES CONTROL BOARD POLICY 75-58

The SWRCB has adopted a number of policies that provide guidelines for water quality protection. The principal policy that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976 by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy recommends 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 wastewaters of low total dissolved solids, and other inland waters. This policy also defines cooling water discharge prohibitions.

CALIFORNIA WATER CODE

California Water Code § 13550 (California Law, California Water Code, 2000) requires the use of reclaimed water, where available. The use of potable domestic water for nonpotable uses, including industrial uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available.

LOCAL

CONTRA COSTA COUNTY CONSTRUCTION AND DEVELOPMENT CODE

Chapter 8 of the Code sets forth erosion control procedures for construction grading projects, including projects involving construction or grading near waterways or on lands with slopes exceeding 10 percent (8-ce). Chapter 8 suggests uses of construction techniques that are effective and essential to erosion and sedimentation reduction.

The grading permit ensures land stability, erosion control, and proper drainage. It pertains to the removal, placement and movement of soil on private property dependent on cubic yards and slope. If the amount of soil being handled is over 1000 cubic yards, a public hearing may be required. Erosion control plans for NPDES are required and erosion mitigation procedures may be required.

CONTRA COSTA COUNTY PLANNING AND ZONING CODE

The applicable County Code Section for drainage requirements is 82-2.014. Minimum requirements are described in Division 914 and include the following:

- On-site collect and convey requirements
- Stormwater disposal restrictions
- Runoff quantity determinations
- Minimum capacities for drainage facilities.

ENVIRONMENTAL SETTING

SITE AND VICINITY DESCRIPTION

The proposed Unit 8 is to be located on the northeast corner of the existing CCPP. The existing facility is located in an unincorporated portion of Contra Costa County, adjacent to the City of Antioch. This facility is located north of the Los Medanos Hills, which are associated with the northern end of the Diablo Range. The Los Medanos Hills extend to an elevation of approximately 1,300 feet. The Diablo Range is part of the northern Coast Ranges province, which extends from the Oregon border to the Transverse Ranges of southern California. North-northwest trending mountains with intervening valleys characterize the province. South of the CCPP site is the Sacramento River Delta that consists of islands, many of which are comprised of man-made levees.

The site is located on the south bank of the San Joaquin River, which is near the western edge of the Sacramento River Delta. The CCPP site has a relatively flat topography with some sloping along the shoreline and around man-made structures and facilities (Southern 2000a § 8.15.1).

Annual precipitation in Antioch is 12.8 inches, with a maximum average monthly precipitation of 2.6 inches in January. The climate is characterized by warm dry summers and mild wet winters. Average summer and winter temperatures are approximately 75°F and 45°F, respectively.

SURFACE WATERS

The proposed project would be located near the confluence of the Sacramento and San Joaquin Rivers, in the western Sacramento River Delta area.

The San Joaquin River in the vicinity of the plant site is strongly influence by tidal and river flows. The river flows westerly during ebb tides and periods of high Delta outflows and flows east during periods of strong flood incoming tides. The quantity of water that flows past the power plant between successive tidal phases is approximately 1.3 billion cubic feet. The City of Antioch Water Department uses only surface water (from the San Joaquin River) from around Antioch for drinking water purposes and does not use groundwater.

The water quality of the San Joaquin River in the vicinity of the CCPP is variable due to its position between the estuarine transition zone that separates the upstream freshwater delta from the downstream saltwater bay. Near the plant, the river changes from fresh water (during periods of high river flow) to brackish water (during periods of lower flow). The water temperature of the river in the vicinity of the CCPP varies seasonally between a low in January of 48°F and a high in July and August of 73°F. Table 1 shows the ranges of the results of water quality analysis taken from the San Joaquin River near the project site from 1993-1997 during different times of the year. Beneficial uses of water from the San Joaquin River include industrial, commercial, domestic, irrigation, recreation and preservation of wildlife.

Table 1
Soils and Water Resources
Water Quality for the San Joaquin River

Date	Ammonia mg/L	DOC Mg/L	DO mg/L	Nitrate mg/L	Nitrite mg/L	pH	Phaeo-phytin mg/m³	Phos-phate mg/L	Salinity %	Silicates mg/L	Temp ºC	TSS Mg/L	Hard-ness mg/L
3/5/93	0.13	6.19	9.40	1.46	0.636	7.7	NC	0.284	0	9.42	14	42.5	NA
5/27/93	0.00	NC	9.90	0.01	0.008	7.9	NC	0.018	0	1.15	20	43.9	NA
9/16/93	0.03	1.69	8.75	1.05	0.046	7.6	259.0	0.234	0.02	8.39	21.5	37.5	NA
2/8/94	0.17	2.41	NC	2.00	0.041	7.6	1.0	0.226	0	6.42	11.5	13.8	17.01
4/28/94	0.03	2.83	NC	1.93	0.041	8.0	1.9	0.263	0	12.92	17.4	30.4	15.01
8/24/94	0.04	2.06	NC	1.07	0.037	7.9	1.2	0.282	1.8	0.18	23	17.5	53.04
2/15/95	0.09	4.08	9.60	2.52	0.046	7.5	3.1	0.179	ND	7.84	11.1	23	6.41
4/18/95	0.06	NA	9.90	0.99	0.032	7.7	ND	0.197	ND	11.41	13.7	24	6.81
8/23/95	0.03	2.27	8.00	0.75	0.028	7.7	2.9	0.197	0	11.76	23.3	26.5	7.61
2/14/96	0.14	6.53	9.00	2.77	0.069	6.3	0.6	0.338	ND	12.72	12.5	24.6	NC
4/23/96	0.03	2.29	9.90	1.13	0.023	7.8	0.6	0.132	ND	13.02	16.1	11.1	NC
7/22/96	0.04	1.91	8.30	0.92	0.041	7.8	0.6	0.179	ND	6.96	22.7	29	NC
1/29/97	0.20	4.00	8.40	0.70	0.022	7.1	1.5	0.130	0	6.00	12.1	70	43.00
4/23/97	ND	2.00	8.40	0.40	0.009	7.8	2.5	0.070	0	6.00	18.3	22	70.00
8/6/97	a	2.00	7.30	0.20	0.012	8.1	2.0	0.080	0.3	8.00	23.2	32	110.00

Notes: a= Not available Q= Outside the QA limit NA= Not Analyzed NC= No Data
ND= Data not quantifiable
Source: (Southern 2000a, AFC pages 8.14-28)

The San Joaquin River is identified as being impaired for a variety of contaminants, including a number of pesticides, selenium, boron and others (State Water Resources Control Board 2000). This impaired listing indicates that the ambient concentrations of these constituents are too high to support the beneficial uses identified for this water body.

GROUNDWATER

The CCPP site is located within the Pittsburg Groundwater Basin. The basin is approximately 30 square miles and extends from the foothills south of the project site to the San Joaquin River in the north and from the Port Chicago area in the west to the City of Antioch in the east. Groundwater generally flows to the north towards the San Joaquin River. Shallow groundwater is found between two and seven feet below the ground surface and is tidally influenced.

The quality of the groundwater in the Pittsburg Basin is generally poor due to chlorides, total dissolved solids, and agricultural runoff. Groundwater in the area of the site is primarily used for industrial purposes and is not a drinking water source because of the high level of total dissolved solids. Well water will not be used for this project (Southern 2000a).

In order to assess the potential for on-site contamination, the previous owner of the CCPP-PG&E commissioned a Phase I Environmental Site Assessment (ESA) in 1996 and 1997 (Southern 2000a, AFC Appendix K). The Phase I ESA was performed in accordance with American Society for Testing and Materials practice E 1527-94. The purpose of an ESA is to determine the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions that may indicate a release or threat of a release from present or past activities.

The ESA covered the entire 198 acre parcel upon which the Contra Costa Power Plant is located, and for reporting purposes, segregated the property into four areas: the fuel tank farm, the switchyard, the non-operational area, and the power generation and operations area. The location of the Unit 8 project is on about 20 acres in the northeast corner of the parcel, and a construction laydown area is located directly south of the proposed project area.

The project and laydown areas are located within the non-operational area and power generation and operations areas as defined in the ESA (see Southern 2000a, AFC fig. 2-2 and Appendix K fig. 3-3). The portion of the power generation and operations area where the Unit 8 project would be located includes the construction yard, located directly east of existing units six and seven. Various buildings there are used for equipment storage and offices. The construction laydown area is located in the raw water clarifier sludge storage area. Clarifier sludge is generated from the backwashing of sand filters used to filter raw river water prior to processing for use as boiler make-up. This material is considered to be nonhazardous and, under Regional Water Quality Control Board Waste Discharge Requirements, was disposed of in an open field in the southeast corner of the plant.

The Phase I ESA found several recognized environmental conditions at the site and concluded that there is a potential for soil and groundwater contamination. In order to further characterize the site and investigate issues identified in the Phase I ESA, PG&E had a Phase II ESA conducted (Southern 2000c). The Phase II ESA involved subsurface testing of soil and groundwater and evaluation of data collected

to determine if the soil or groundwater would require remediation to protect human health and the environment or to comply with environmental laws and regulations.

The Phase II investigations showed that several contaminants exist in soil and groundwater at the proposed site, including volatile organic compounds, polynuclear aromatic hydrocarbons, metals, and polychlorinated biphenyls.

Cleanup levels for groundwater established for the site are set at the maximum contaminant levels for drinking water. For petroleum hydrocarbons, the cleanup level will most likely be set at 100 micrograms per liter.

At the northern end of the proposed site, there is an area containing elevated levels of petroleum hydrocarbons in groundwater (Southern 2000c, Plate 5-1). In the construction laydown area, towards the southern part of the site, there is one small area with elevated levels of petroleum hydrocarbons in water and a larger area containing arsenic in groundwater.

SOILS

The CCPP is on a flat alluvial plain approximately 2.5 miles north of the Mt. Diablo range front. The lack of significant slopes on or near the site indicates that the hazard from slope instability, both landslides and debris flows, is negligible (Southern 2000a AFC § 8.15-11). The proposed CCPP Unit 8 site consists of reclaimed land demonstrated by the shape of the former shoreline, which projects in a northwest-southeast direction across the plant site. The entire surface of the plant area has been previously graded and covered with a layer of artificial fill and, therefore, and has a relatively impervious surface. (Southern 2000a AFC § 8.15-10).

The proposed CCPP UNIT 8 facility site is relatively flat with some sloping toward the shoreline and toward developed structures and facilities. Existing drainage occurs from southeast to northwest. Existing elevations throughout the CCPP site range from 5 to 20 feet above mean sea level (MSL). The proposed elevation for the CCPP UNIT 8 facility would be 10 feet above mean sea level (Southern 2000a AFC § 8.14.4.3, 8.15)

Most of the CCPP is underlain by soil identified as Delhi sand, characterized by rapid permeability. Joice Muck, poorly drained material formed in saltwater marshes, underlies the northeastern portion of the property near the marina. The Delhi sand has low shrink-swell potential and the Joice Muck, confined to the marina area, has high shrink but low swell potential. The erosion characteristics of the soils within the project site are minimal (Southern, 2000a AFC § 8.15-12).

Both the Delhi and Joice Muck soils pose limitations for revegetation. The Delhi soil type has excessive drainage characteristics and the Joice Muck drains poorly and exhibits low pH and high salinity characteristics. The soil mapping units affected by the proposed CCPP facility are identified in Soil & Water Resource Table 2 according to slope percentage, permeability, erosion hazard, and their respective parent material(s).

Table 2. Soil & Water Resources
Soil Descriptions and Properties

Soil Series/ Map Symbol	% Slope	Drainage	Erosion Hazard	Parent Material
Delhi Sand (DaC)	2-9	Excessive	Slight	Wind-modified stream deposits
Joice Muck (Ja)	0-1	Very poor	None	Brackish Marshes

Source: SED 2000a

As noted above, there is soil contamination at the existing CCPP. For further discussion of this issue, see the **Waste Management** section of this PSA. In the area of the proposed CCPP Unit 8 Project, however, there are no requirements for soil remediation.

WATER SUPPLY

CCPP Unit 8 will require water for process makeup, evaporative cooler makeup, combustion turbine online washing, cooling tower makeup, and potable water uses. The project will use San Joaquin River water for these uses, with the exception of the potable water supply, which is provided by the City of Antioch.

Alternative sources of water include groundwater, treated reclaimed water from area treatment plants, and water from municipal sources including the City of Antioch and Contra Costa Water District.

RECLAIMED WATER

Reclaimed water from wastewater treatment plants with effluent in the vicinity include the Delta Diablo Sanitation District, the Central Contra Costa Sanitation District, and the Iron House Sanitation District. The Delta Diablo Sanitation District currently produces 16 million gallons per day (MGD) of reclaimed water.

MUNICIPAL WATER

The Contra Costa Water District and City of Antioch Water Department provide local supplies of water for municipal demands.

EXISTING CONTRA COSTA POWER PLANT

The existing CCPP consists of seven units, three of which have been retired, two of which operate as synchronous condensers and two of which generate electricity. The two units which are used as synchronous condensers do not require water (Southern 2000a).

The two generation units, Units 6 and 7, which total 690 MW, were brought on-line in 1964 (Southern 2000l). These two units use once-through cooling technology in which San Joaquin River water is diverted from the river, pumped through the facility to remove excess heat from the condensers and is discharged back into the river. The intake structure for Units 6 and 7 is located approximately 500 feet northwest of the Unit 8 site. The discharge canal for Units 6 and 7 is located directly north of the Unit 8 site. Figure 2-2 of the AFC (Southern 2000a) shows the

location of these facilities. The intake structure for these two units consists of six bar racks located approximately 15 feet in front of the 3/8-inch mesh vertical traveling screens (Southern 2000I). During normal operation of both units, approximately 306,000 gpm of river water is diverted. Approach velocities to and through the bar racks are 0.6 and 0.7 foot per second (fps), respectively. Approach velocities to and through the traveling screens are 0.8 and 1.5 fps, respectively (Southern 2000i).

The four circulating water pumps servicing the two units have variable speed controls, allowing them to be operated from 50 to 95 percent of their capacity. Chlorination and screen washing are used to control for biofouling. After passing the Units 6 and 7 condensers, the cooling water is discharged to a 600 foot long, 100 foot wide cooling channel that discharges to the river.

Issues associated with the use of once-through cooling technology for Units 6 & 7 include entrainment, impingement and thermal discharge. For further discussion of entrainment and impingement of aquatic organisms, see the **Biological Resources** section of this PSA.

Thermal discharge can adversely affect aquatic resources. Such impacts are discussed further in the **Biological Resources** section of this PSA. To evaluate the potential for thermal impacts on aquatic organisms, in 1991 and 1992 PG&E (then owner of CCPP) conducted five surveys to evaluate the thermal plume from operation of the power plant under different seasonal, tidal and plant operating conditions (PG&E 1992). The temperature of the cooling water discharge varies in response to the volume and temperature of the intake water and thermal loading from the facility, so PG&E conducted the study under “normal” plant operating conditions. However, only one of the five surveys analyzed Units 6 and 7 alone. (The other four surveys included Units 1-5, which have since been retired.) The size and location of the plume varies primarily in response to tidal conditions (PG&E 1992); therefore, the study evaluated the plume under flood and ebb tidal conditions. Other factors that also influence the plume are channel configuration and water depth. To accurately characterize the plume, continuous surface and bottom of the water column temperatures were monitored.

The buoyant nature of the discharge plume limited the plume to the upper five to 10 feet of the water column. Because of this the plume is larger at the surface than at depth (PG&E 1992). The temperature difference between the discharge and the river ranged from 3.9 to 9.3^{o}F during the survey (PG&E 1992; Table 3-1). As noted above, the study found that tidal conditions are a major factor in the location of the plume. During ebb tide conditions, the plume is oriented downstream while during flood tide conditions the plume is oriented upstream (PG&E 1992). The size of the plume during ebb tide was approximately 11.7 acres, while during flood tide it was approximately 21.8 (PG&E 1992; Table 3-3). During slack tide, the plume extends directly offshore from the discharge channel and covers almost 12 acres. It should be noted that under ebb tide conditions, the thermal plume reaches the Units 6 and 7 cooling water intake structure.

The study also evaluated the potential effects of the thermal discharge on aquatic species, especially species of special interest such as delta smelt, longfin smelt. Sacramento splittail and juvenile chinook salmon. The evaluation addresses the potential for the thermal discharge to cause mortality of fish and macroinvertibrates, adversely affect fish size and weight, cause abnormalities and infections, increase susceptibility to predation and cause migration blockage. The study concluded that there were no adverse effects on species abundance and diversity in the vicinity of the thermal discharge.

The Contra Costa Power Plant operates under an existing NPDES permit issued by the Central Valley Regional Water Quality Control Board (CVRWQCB) in 1995 (Order No. 95-234; NPDES permit No. CA0004863). This permit allows a discharge from the existing Units 6 and 7 outfall of 341 MGD. All but one MGD of this is allowed for cooling water discharge. The remaining one MGD is for boiler blowdown, intermittent screen wash, and intermittent wash water from other cleaning operations. The permit also limits the maximum temperature of the discharge for Units 6 and 7 to 89°F. (CVRWQCB 1995). As part of the permit renewal process, the permit is being revised to reflect the proposed project.

ENVIRONMENTAL IMPACTS

PROJECT SPECIFIC IMPACTS

EROSION AND SEDIMENTATION

POWER PLANT CONSTRUCTION AND OPERATION

Accelerated wind and water-induced erosion may result from earthmoving activities associated with construction of the proposed project. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Most of the annual precipitation in the Antioch area is contributed during the mild, wet winters. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can potentially enhance onsite erosion eventually resulting in increased sediment load within nearby receiving waters.

As illustrated in Soil & Water Resources Table 2, soil sensitivity related to erosion by the proposed CCPP UNIT 8 facility is low. Soils at the power plant site are slightly susceptible to water erosion. However, all soils are highly susceptible to erosion upon removal of any vegetative, asphalt, or gravel cover and the commencement of earthmoving activities.

According to the draft Storm Water Pollution Prevention Plan (SWPPP) prepared by Southern, the proposed CCPP UNIT 8 facility would affect 20 acres. The applicant has also indicated that the acreage for construction parking, trailers, and laydown would be 6, 4, and 12 acres, respectively. The proposed facility would be filled to a final elevation of 10 feet MSL. The applicant has not indicated the amount of earth

disturbance required for the laydown and parking areas. Earth disturbance will consist of topsoil and aggregate material. The excavated topsoil material will be stored as stockpiles for future reuse. The applicant has not identified stockpile location(s) at this time.

PIPELINE CONSTRUCTION AND OPERATION

Temporary and permanent disturbances related to construction of linear facilities (pipelines) are expected to occur within the existing CCPP site. The proposed natural gas pipelines would be installed across slopes ranging from 0 to 2 percent.

The gas pipeline interconnection for the proposed Unit 8 facility would be made to Line 400. A 12-inch lateral would be taken off of Line 400, south of PG&E's saddle valve that is located along the eastern boundary of the proposed Unit 8 facility. The 12-inch line would then transition to a 16-inch line while enroute to a metering station. Upon exiting the metering station, the pipeline would tee. One line would connect to an existing 20-inch diameter pipeline that serves the existing Units 6 and 7. The other 16-inch pipeline would serve the proposed Unit 8 facility (Southern 2000a). The applicant has not identified the specific lengths of the proposed natural gas pipelines.

The applicant has not identified locations, sizes or lengths of proposed water supply pipelines that will tie-in with the existing CCPP site. The applicant has not identified proposed stormwater and wastewater discharge pipelines.

ROADS

The access road for the proposed Unit 8 project will be the existing road off of Wilbur Road. Physical erosion related to wind and water may continue to erode unprotected surfaces during project operation. Impervious surfaces can cause increased runoff that may eventually lead to accelerated erosion in unprotected areas. Construction of the proposed project could result in soil compaction from the erection of foundations and paving and from vehicle traffic along access roads and equipment storage areas. Increased runoff, erosion and sedimentation can result from compaction (Southern 2000a AFC § 8.9.2.1). Southern has provided a draft SWPPP that identifies potential temporary and permanent Best Management Practices. This plan and provisions for the final draft are discussed under the proposed mitigation presented below.

Pipeline construction activities that will cross any watercourses require a Streambed Alteration Agreement from the California Department of Fish and Game. Refer to the **Biological Resources** Section for more information regarding these requirements.

SPILL PREVENTION

The CCPP Spill Prevention Control and Countermeasure (SPCC) Plan covers chemical spill control and management of the hazardous materials that will be stored and used on the site (refer to the **Hazardous Materials Management** section of this PSA for more information). As described in the draft SWPPP, hazardous materials at the CCPP UNIT 8 would be stored indoors in watertight

containers and/or surrounded by secondary containment structures. Bermed containment will be used in areas containing bulk hydrocarbon storage areas. Some of the hazardous materials used during construction include petroleum hydrocarbons, cleaning fluids and solvents. Waste generated during construction will be taken to a temporary waste storage facility onsite then transported to an authorized waste management facility. Major hazardous materials stored onsite during operation of the proposed CCPP facility include sulfuric acid and aqueous ammonia. These materials would be stored in aboveground storage tanks that would be surrounded by a containment berm. Other containment/treatment facilities include curbs, berms, concrete pits, and oil/water separators (Southern 2000a AFC § 8.12.2.1, 8.12.2.2.1).

WATER SUPPLY

CCPP Unit 8 will require water for process makeup, evaporative cooler makeup, combustion turbine online washing, cooling tower makeup, and potable water uses. The source of the water supply for these project needs is San Joaquin River water, with the exception of the potable water supply, which is provided by the City of Antioch.

Under average operating conditions, the proposed project will require, on average over the course of a year, approximately 5,081 gpm (Southern 2000a). This is predicated on the water being cycled through the cooling towers for two cycles**.** As shown in Soil & Water Table 3 below, the vast majority of this water is for cooling tower make-up. The source of this water is San Joaquin River water diverted by the cooling water intake structure for Units 6 and 7. This removes the need for additional diversion of river water or discharge of wastewater to the river, unless Units 6 and 7 are not operating (See discussion below). Project water demand will increase when the salinity level of the river increases such that the water can only be cycled through the cooling towers one and a half cycles. At these times, water demand will increase to approximately 7,571 gpm (Southern 2000a).

As noted above, the existing Units 6 and 7 intake includes four variable speed drive (VSD) pumps, each having a maximum capacity of 76,400 gpm, giving a total maximum capacity for all pumps running simultaneously of 305,600 gpm. With both Units 6 and 7 operating, the water demand for Unit 8 represents approximately 2.2 percent of these units once through cooling flow.

If both Units 6 and 7 are not operating, a single variable speed drive (VSD) pump will continue to operate and maintain minimal flow to supply Unit 8. It is anticipated that this VSD pump will operate at 50 percent, or approximately 38,000 gpm, more than sufficient to meet the project's water demand.

Losses of water from the cooling towers occur as a result of evaporation, drift, and blowdown, which is used to control the concentration of minerals in the system. Chemicals are injected into the cooling water to control the growth of bio-organisms. (Southern 2000a). These chemicals are discussed in the Water Quality section below.

The combustion turbines will utilize inlet evaporative coolers to reduce inlet air temperature to the turbines during periods of high ambient temperatures. Water is recirculated through this system with losses resulting from evaporation, and blowdown that is discharged to control the concentration levels of minerals in the water. These losses are made-up from filtered water from the existing water treatment plant, which draws water from the San Joaquin River.

Process water is used for the production of steam to drive the steam turbine generator portion of the combined cycle plant. Makeup water will be drawn from the San Joaquin River and run through the existing water treatment system consisting of a clarifier, gravity filters, a reverse osmosis (RO) primary demineralizer, and an ion exchange demineralizer. Average demineralized water requirements for Unit 8 can be as low as 23 gpm during most operating conditions, but will increase to 137 gpm during power augmentation and supplemental firing. Unit 8 will need 51,840 gpd on average, which gives a total requirement for all units of 76,840 gpd (53 gpm). The production rate is within the design capacity of a single RO unit, and below the historical production rate of 120,000 gpd (83 gpm).

The existing process water treatment facility at the power plant has sufficient capacity to meet the proposed project's requirements. CCPP has approximately 900,000 gallons of demineralized water storage capacity. An additional 500,000-gallon storage tank will be constructed as part of the water treatment system to increase total water storage to 1.4 million gallons.

In order to maintain efficient operating levels the compressor will periodically undergo a water wash both online and offline. This operation is intermittent and will utilize demineralized water. It is estimated that the amount of water required will vary from 1.2 gpm to a maximum of 162 gpm for the compressor washing. (Southern 2000a).

The existing on-site potable water supply from the City of Antioch will be used to supply the needs of staff as well as miscellaneous cleaning and cooling. The City of Antioch Water Treatment Plant has a capacity of providing 26 MGD of potable water with seasonable demands of between 8 and 26 MGD. (Southern 2000a,f). Historically, the CCPP staff numbered at 140 personnel; however, due to the retirement of Units 1-3, the current staffing level is approximately 53. With the addition of Unit 8, approximately 10 permanent onsite workers will be added, bringing the total to approximately 63 personnel. Because this is still substantially below historic staffing levels, the addition of Unit 8 will not create any additional demands on the potable water system.

Table 3 provides the estimated water requirements for the plant.

Table 3. Soils and Water Resources
Water Source and Average Requirements

Type	Source	Range of Average Requirements (gpm)[a]	Average Annual Requirements (gpm)[b]
Process Makeup	Existing CCPP Demineralized Water System	23-137	36
Evaporative Coolers	Existing CCPP Filtered Water System	68	28
Cooling Tower Makeup	Existing Cooling Water System	5,003-5,026	5,016
Potable Water	Existing CCPP Potable Water System	<1	<1

a - Range of normal operating conditions averaged daily over 24 hours expressed in gpm
b - Average total annual requirements expressed as hourly requirements
Source: (Southern 2000a, AFC pages 2-24)

WATER QUALITY AND COOLING AND WASTEWATER DISCHARGES

Incorrect disposal of wastewater or inadvertent chemical spills can degrade soil, surface water and groundwater. The plant systems that contain wastewater include the cooling tower blowdown, evaporative cooler blowdown, heat recovery steam generator blowdown, plant drains, storm water runoff, as well as the existing plant systems to be used including reverse osmosis reject water, mixed bed demineralizer regeneration wastes and sanitary waste.

COOLING TOWER BLOWDOWN

Makeup water to the Unit 8 cooling water system will consist of San Joaquin River water diverted by Units 6 and 7. The water will cycle through the Unit 8 cooling towers 1.5-2 cycles before blowdown. Additionally, chemicals will be added to the cooling water to control scaling, biofouling and corrosion of the towers. The cooling tower blowdown will be discharged back to the return water of the Units 6 and 7 cooling water system. The blowdown flow rate will average 2,523 gpm with a maximum of 5,047 gpm. When Units 6 & 7 are not operating, one circulating water pump will be used to pump approximately 38,000 gpm. Approximately 5,000 gpm of this water will be used for Unit 8, leaving approximately 32,500 gpm. Given the maximum discharge from Unit 8, this flow represents only 15 percent of the discharge.

Of concern to staff is that the San Joaquin River is listed as impaired for several metals. This means that ambient water quality standards cannot support the identified beneficial uses of the river. If the facility is considered a new discharge under the Clean Water Act, it may have to comply with more stringent limits for these constituents. Staff anticipates that these concerns will be addressed in the draft NPDES permit that will be discussed in the FSA.

Table 4. Soil & Water Resources
Estimated Wastewater Quality
For Cooling Water Discharge and Blowdown

Constituent	Units	Existing Units 6 & 7	Unit 8 Cooling Tower Blowdown	Combined Units 6-8 Average Annual	NPDES Permit Limit	RWQCB Objectives
Water flow	gpm	236,800 (est)	2,523	236,111	305,000	-----
PH		7.6	8.0	7.6	6.5-8.5	6.5-8.5
Copper	µg/L	1.91	3.82	1.93	1000	-----
Oil & Grease	µg/L	0.00	0.00	0.00	10-20	-----
Total Suspended Solids (TSS)	mg/L	25.00	49.6	25.3	30-100	-----
Polychlorinated Biphenyls (PCBs)	mg/L	0.00020	0.0004	0.00021	0.1	-----
Dissolved Oxygen	mg/L	7.85	7.85	7.85	-----	>5.0
Silver	µg/L	0.00149	0.00298	0.00151	-----	10
Selenium	µg/L	0.165	0.330	0.167	-----	12
Zinc	µg/L	0.73	1.46	0.74	-----	100

Source: Southern 2000f pages 8.14-31

Chemicals used to control biofouling in the cooling tower and the quantities added include sodium hypochlorite (12.5%) at 5.29 gallons per day, sodium bromide at 3.79 gallons per day, dispersant (polyacrylate) at 9.81 gallons per day, algecide added weekly, and sodium bisulfate at 0.31 gallons per day. Table 4 shows the current discharge chemistry of the Unit 6 and 7 outfall, that of the Unit 8 cooling tower blowdown, and the mixed discharge with Units 6-8 together. Values are shown at average conditions and compared to the NPDES permit limits and water quality objectives for the Central Valley set by the RWQCB under the existing permit.

PROCESS WASTEWATER STREAMS

Evaporative cooler blowdown will consist of waste that was circulated in the combustion turbine evaporative cooler system. It is then discharged as blowdown to maintain the level of dissolved solids within acceptable limits. Makeup water to the evaporative coolers will be treated by filtration from the existing water treatment plant. The evaporative cooler blowdown will be discharged to the cooling tower basins.

Make up water to the heat recovery steam generators will be water from the existing water treatment plant that is supplied by river water as well as boiler blowdown. This water is then treated by filtration, reverse osmosis, and demineralization. Heat recovery steam generator blowdown will consist of water discharged to maintain control of the concentration of boiler water chemicals and salts.

The clarifier is used to remove suspended solids from the river water before it is treated by the existing reverse osmosis and mixed bed demineralizer prior to use in the plant process systems. The clarifier is designed to operate at a capacity of 700 gpm with a peak of 850 gpm. It utilizes a coagulant, flocculent and pH adjustment

to precipitate the solids from the river water. Effluent from the clarifier is filtered by three gravity filters to remove the bulk of the remaining suspended solids before being sent to the reverse osmosis unit.

The reverse osmosis process reject water contains the concentration of dissolved solids from the plant makeup water before it is treated in the ion exchange demineralizer as well as the multi-media filters upstream of the reverse osmosis system. The reject water consists of a concentration of the makeup water as well as residues of the chemicals used to eliminate free chlorine that would damage the reverse osmosis membranes. Filter backwash water will contain the suspended solids removed from the raw water and residues of the coagulant used to enhance filtration efficiency. These wastes streams will be recycled to the existing wastewater treatment facilities.

Process makeup water from the reverse osmosis system for Unit 8 will be treated by the existing mixed bed demineralizer that was originally designed to meet the 83-gpm requirements of Units 1 through 7. Since the retirement of Units 1-3 and conversion of Units 4 and 5 to synchronous condensers, demineralized water requirements were reduced to 17 gpm. The existing demineralized water system has the capacity to produce as much as 500 gpm. Unit 8 will require on average 36 gpm with a peak requirement of 137 gpm therefore no additional demineralizer capacity will be required. (Southern 2000a, AFC pages 2-30) The mixed bed demineralizer will periodically be regenerated with sodium hydroxide and sulfuric acid depending on the ionic charge of the bed. The waste from this process will be treated to be neutralized and discharged to the river under the existing NPDES permit. (Southern 2000f, pages 8.14-7, 7a)

Sanitary wastes will be treated in the existing plant on-site septic tanks and leaching fields.

STORMWATER RUNOFF

Stormwater runoff will not be significantly changed by the addition of Unit 8. This is due to the fact that there will be no significant increase in impervious surfaces or runoff volumes. Currently stormwater runoff from the area where the new unit is to be constructed is collected and discharged to the San Joaquin River through existing outfalls. When Unit 8 is completed, curbs will be constructed around areas that may contain oily materials. The stormwater runoff and runoff from plant drains from the curbed areas will be conveyed via a ditch or pipe to the existing oil/water separator system. Water from the oil/water separator system is conveyed to the onsite wastewater treatment facility and then discharged to the San Joaquin River. Stormwater runoff from the remaining area of the site will be directed towards existing outfalls and discharged to the river. (Southern 2000o)

Table 5 shows the estimated wastewater volumes.

Table 5. Soil & Water Resources
Estimated Wastewater Volumes

Source	Avg. Daily Flow (gal. per day)	Max. Daily Flow (gal. per day)	Disposal/ Discharge
Cooling Tower Blowdown	2,523	5,047[a]	Unit 6&7
Evap Cooler Blowdown	22.5	45.0	Unit 6&7
HRSG Blowdown	22.0	78.0	Unit 6&7
Compressor Building Washdown	0.12	162	Offsite disposal
Drains and Condensate	0.42	250.0	Existing Treatment Plant
Sanitary Waste	0.69	20.0	Onsite septic system
Stormwater Runoff	3.26	242.41	Existing Outfall

Source: (Southern 2000a, AFC pages 2-38)

THERMAL EFFECTS OF UNIT 8 COOLING TOWER BLOWDOWN

Water temperatures in the San Joaquin River vary seasonally and with depth and tidal influences. Other factors that impact the water temperature include ambient air temperature, water temperatures from upstream reservoir releases, and river flow. Based on 1991-1992 studies the water temperatures have varied between a low of 48°F in January and February to highs of 73°F in July and August. (Aquatic Resources 1/21/00, Tenera Energy).

Due to the minimal flow of the Unit 8 cooling tower blowdown when compared to the flow from existing Units 6 and 7,the impact of proposed Unit 8 on the thermal discharge temperature to the San Joaquin River is expected to be negligible. The Unit 6 and 7 average cooling water flow is 236,111 gpm and the design temperature increase is 21°F across the condensers. The cooling tower blowdown flow will average 2,523 gpm with discharge temperatures that will be impacted by the load of the plant and the ambient conditions of wet bulb and dry bulb temperatures. It is expected that when the plant is operating at full load and the ambient temperature is 59°F, that the blowdown discharge will be 68°F. When the ambient temperature rises to 100°F the blowdown temperature will increase to 90°F. Considering the temperature rise of the Unit 6 and 7 cooling water flow and the discharge temperature of the Unit 8 cooling tower blowdown, there does not appear to be significant impact on the discharge to the San Joaquin River. In fact the Unit 8 discharges may be slightly lower in temperature than that of the existing units' cooling water outflow.

When Units 6 and 7 are not operating one of the four existing VSP will operate at 50 percent capacity, approximately 37,500 gpm, to provide makeup water for Unit 8. As mentioned, CCPP Unit 8 will required approximately 5,050 gpm of water. It should be noted that these simultaneous shutdowns of Units 6 and 7 occurred only three percent of the total operating time over an 18-month period between 1999 and mid-2000 (Southern 2000d, Response 16). Therefore, the heated cooling tower blowdown discharge from Unit 8, which is approximately 2,500 gpm, would be mixed with approximately 32,000 gpm of unheated river water, significantly diluting the discharge and reducing water temperatures to ambient levels. Staff anticipates

that when Units 6 and & are not operating, thermal discharge from Unit 8 will not cause significant impacts.

The applicant has indicated that they will provide specific estimates on the temperatures for Units 6, 7 and 8 flows and the final discharge temperature to the river.

SITE DRAINAGE

Since the 20 acres to be used for CCPP Unit 8 are already relatively impervious, an increase in stormwater runoff from the project is not anticipated. Therefore, the applicant intends to use the existing storm drainage system to handle runoff during project operation.

A brief generalized analysis using the rational equation indicated that if the original sizing of the existing drainage system was based on a runoff coefficient of 0.5 to 1.0 and the post-project coefficient for the 20 acres was 1.0, the increase in peak runoff could range from 10 to 15 percent down to zero percent.

No information is provided on the existing storm drainage system that was constructed in 1951. Since the design standards have likely changed, it would appear prudent to analyze the existing storm drainage system using current standards to determine the best approach to handle the storm runoff from the new Unit 8 facilities. If the system was undersized by current standards, the runoff from Unit 8 facilities could be handled separately to minimize impacts to the existing system.

AQUATIC LIFE, WATER INTAKE, AND COOLING/WASTEWATER DISCHARGES

Impacts to aquatic life are addressed by the Draft Habitat Conservation Plan (Southern 2000n) analyzed the combined impacts and joint operation of both the Pittsburg and Contra Costa power plants. The plan will be implemented under Section 10(a)(1)(B) of the federal Endangered Species Act to obtain an incidental take permit for the project. The Draft HCP is intended to mitigate the take as defined by the ESA and California Endangered Species Act (CESA) for several threatened and endangered species and also several unlisted species. The project-related activities that will be addressed by the Draft HCP include cooling water intake and discharge, maintenance and repair, fisheries monitoring, and the enhancement and restoration activities at the Montezuma Enhancement Site. The final HCP and the associated ESA Section 10(a) permit will have a term of 15 years from the date of issuance. This issue is discussed further in **the Biological Resources** section of this PSA.

There are also conditions on the operation of the CCPP contained in the existing NPDES permit. These measures are specified to reduce impingement and entrainment of stripped bass, and also to minimize the discharge of water warmer than 86 ^{o}F, which is the threshold temperature for adverse thermal impacts to stripped bass. Thermal impacts during operation of the two existing CCPP units and the proposed Unit 8, as well as water quality impacts, will be addressed in the FSA.

The existing NPDES permit for the CCPP is currently being renewed and it is anticipated that it will be modified to incorporate Unit 8. Staff anticipates a draft permit will be available prior to the FSA.

CUMULATIVE IMPACTS

WATER SUPPLY

Since the project is proposing to use water that has already been used for cooling water purposes in the existing units, there will be no additional water drawn from the San Joaquin River. Therefore, the addition of CCPP Unit 8 will not contribute to cumulative impacts in the area of water supply as it relates to this proposed plant.

WATER DISCHARGE

The applicant has proposed to discharge cooling tower blowdown into the Unit 6 and 7 outflow. The blowdown is extremely small compared to the Units 6 and 7 discharge, chemicals from the cooling tower will be highly diluted, and thermal differences should be minor. Although at this time, staff does not anticipate any contribution from CCPP Unit 8 to cumulative impacts in the area of water discharge, further analysis needs to be done. This issue will be further discussed in the FSA.

EROSION AND SEDIMENTATION

Construction and operational activities related to the CCPP UNIT 8 project may cause accelerated wind and water erosion. Implementation of the proposed mitigation measures would ensure that erosion and potential sedimentation is minimized.

MITIGATION

APPLICANT'S PROPOSED MITIGATION

COOLING WATER INTAKE

The applicant has proposed as a new demonstration project the installation of an aquatic barrier in front of the intake structure to limit entrainment and impingement losses due to the plant's operations. Since the purpose of this barrier is to reduce entrainment and impingement, this mitigation measure is discussed further in the **Biological Resources** section of this PSA.

EROSION AND SEDIMENT CONTROL

Southern provided a draft Stormwater Pollution Prevention Plan (SWPPP) that identifies temporary and permanent erosion control and stormwater Best Management Practices (BMPs).

The draft SWPPP identified a number of potential Best Management Practices (BMPs) for the construction and operation of the CCPP 8 (Southern 2000o):

- Temporary and permanent vegetation strategies
- Utilize soil stabilizers (i.e. water) as appropriate to minimize dust
- The use of geotextiles and mats to stabilize slopes
- Storm drain inlet protection to prevent sediment-laden runoff from entering inlets or catch basins.
- Utilize silt fence or straw bale barriers to intercept sediment-laden runoff from disturbed soil
- Secondary containment for hazardous material delivery and storage areas to prevent spills or leakage of liquid materials from contaminating soil or soaking into the ground
- Designated storage areas for construction wastes, hazardous materials, paints, and related products along with covered dumpsters and containers for waste and recyclables
- Training of employees on stormwater quality management
- Implementation of a spill prevention and control plan
- Timely removal of construction wastes
- Storage of all liquid wastes in covered containers
- Emergency spill containment kits and materials in areas of potential hazardous materials release
- Routine maintenance of the oil/water separator system.

CEC STAFF PROPOSED MITIGATION

Energy Commission staff finds the applicant's proposed mitigation measures for erosion and stormwater to be incomplete. These measures, however, should be included in the final SWPPP addressed in the proposed conditions of certification.

Erosion Control and Stormwater Management drawings need to accompany the narrative portion of the SWPPP. Both the drawings and the narrative need to be detailed and specific and include the following amendments and additions for the proposed CCPP project:

- The topographic features of the proposed project including areas involving all proposed pipeline construction, laydown (staging) area, and stockpile location(s). The mapping scale should be 1"= 100' or less (1"=50' recommended). The drawings should depict the surrounding area (east of site) including the topography and existing features should also be provided on the drawings. The drawings should also show existing structures, drainage pipes, and diversion swale(s).
- Soil use limitations associated with construction and revegetation need to be acknowledged and resolutions provided to assist the contractor in overcoming any limitation (refer to the soil survey for specific soils information).

- Proposed contours should be shown tying in with existing ones. All proposed utilities including stormwater facilities should be shown on the plan drawings. All erosion and sedimentation control facilities should be shown on the mapping. The drawings should contain a complete mapping symbols legend that identifies all existing and proposed features including the soil boundary and a limit of construction. The limit of construction boundary should include the project facility, pipeline areas, stockpile areas and laydown areas. The limit of construction ensures all work is confined to the proposed CCPP UNIT 8 project in order to protect all surrounding areas not involved in construction or operation of the proposed project.
- A detailed and specific construction sequence that addresses all sequence of events from initial mobilization until final stabilization (i.e. vegetation/asphalt) is achieved.
- Silt fence and haybales, installed on level grade and parallel to the existing contour. If the slope length to the silt fence and haybales exceeds 250 feet, other erosion and sediment control facilities should be used. Silt fence and haybales should be used to trap sediment, and not as runoff conveyance or control facilities.
- All site-specific BMPs on the erosion and sediment control plan and the stormwater management plan. Provide all proposed vegetative areas on the drawings and soil amendment specifications with regards to excessive drainage, low pH, and high salinity characteristics of the site soil types. The stormwater management plan should provide the entire drainage area along with supporting calculations that include a curve number, time of concentration, and rainfall intensity. These calculations should be provided to demonstrate that the existing stormwater pipes and additional pipes, if required, are of sufficient size to handle the runoff from the proposed project. All final plans approved for adequacy are to be implemented by the contractor. The CPM should be contacted before any revisions are made to the approved plans.
- Dewatering facilities, in the event of groundwater contact during excavation activities.
- Stormwater inlet protection during construction
- The erosion control drawings and narrative, designed and sealed by a professional engineer/erosion control specialist and not by the contractor.

WATER SUPPLY

Staff is not recommending any mitigation measures regarding water supply. For a condition regarding the proposed aquatic filter barrier, please see the **Biological Resources** section of this PSA.

WASTEWATER DISCHARGE

The applicant must comply with wastewater discharge requirements contained in applicable permits that specify permissible discharge levels and compliance sampling requirements.

Wastewater discharge from Unit 8 could be affected by new, more stringent effluent limitations if the project is considered a new source under the Clean Water Act and will require a new NPDES permit. The San Joaquin River is listed as an impaired water body under Clean Water Act Section 303(d), meaning that it does not meet ambient water quality standards for several constituents. Although staff considers it likely that the project can comply with any permit limitations, until the draft NPDES permit is issued, it is unknown at this time how this status will affect the combined wastewater discharge.

FACILITY CLOSURE

The CCPP project is expected to operate for a minimum of 40 years. Closure options range from “mothballing,” with the intent of a restart at some time, to the removal of all equipment and facilities.

The decommissioning plan will be submitted to the Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS, and any local and/or regional plans will be required. The plan will address all concerns in regard to potential erosion and impacts on water quality.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Without an NPDES permit, Staff is unable at this time to determine that the project will comply with all applicable laws, ordinances and standards. A determination will be made in the FSA.

The Central Valley Regional Water Quality Control Board (CVRWQCB) originally received a Report of Waste Discharge (ROWD) for a renewal of the existing National Pollutant Discharge Elimination System (NPDES) permit for Units 6 and 7, which has an expiration date in October 2000. The applicant has indicated in the AFC that the addition of the Unit 8 discharge to that of Units 6 and 7 should not be considered a new discharge for NPDES permit purposes.

An NPDES application which combines the new Unit 8 discharge with that of Units 6, and 7 was requested by CEC staff, and has been submitted to the CVRWQCB. The application for the current NPDES permit renewal did not originally include the addition of the Unit 8 discharge as part of any combined discharge. It is necessary for the CVRWQCB to determine if the combined units 6, 7, and 8 discharge is a new or existing discharge for NPDES permit purposes, which also included compliance with the thermal plan limits in the existing permit. Should the addition of unit 8 cause the discharge to be considered a new source under the Clean Water Act, the project may have to comply with more stringent waste discharge limits. A draft NPDES permit, which includes Units 6, 7 and 8, was requested from the Applicant at least 30 days prior to the date scheduled for the Final Staff Assessment.

STATE WATER RESOURCES CONTROL POLICY 75-58

This policy states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. The policy also states 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 wastewaters of low total dissolved solids, and other inland waters. This policy also defines cooling water discharge prohibitions. As noted below, there is insufficient recycled water from the Delta-Diablo wastewater Treatment Facility to provide cooling tower makeup for the proposed project. Given the location of the proposed project, irrigation return flows and ocean waters are not available. Of other sources of inland water, only the Contra Costa Water District has sufficient capacity available. However, this water supply is also from the San Joaquin River or the State Water Project and therefore, provides no advantage over the proposed project.

WET/DRY AND DRY COOLING ALTERNATIVES

SWRCB Policy 75-58 states "…studies associated with power plants should include an analysis of the cost and water use associated with the use of alternative cooling facilities employing dry, or wet/dry modes of operation." Cooling towers reject heat from a power plant's steam cycle to condense the steam exiting the steam turbine and to maintain the lowest possible condenser vacuum. The heat rejection mechanism in wet cooling towers is primarily the evaporation of water to the atmosphere. Dry cooling towers transfer heat convectively through heat exchangers, while wet/dry hybrid cooling towers use combinations of the two mechanisms to reject heat to the atmosphere. Cooling towers use forced or induced draft fans to move ambient air through the tower. The ambient air temperature, humidity, velocity, and mass flow rate affect the heat transfer rate and, ultimately, the efficiency of the cooling tower. The cooling tower heat rejection efficiency and pump and fan loading affect the overall power plant thermal efficiency and output.

The fundamental differences between wet, wet/dry hybrid, and dry cooling towers are initial capital costs and heat rejection effectiveness. Dry cooling towers are two to three times more expensive than a wet system. Hybrid systems fall in the range between the two, depending upon the ratio of "wet-to-dry" cooling in the hybrid design. In general, the cost differences are due to the dry condenser, or heat exchanger, and taller and larger structures for dry and hybrid cooling systems. Despite the significant cost differences, dry and hybrid cooling systems are occasionally employed because they use less water and reduce the occurrence of visible plumes compared to wet systems. For the Sutter Power Project (97-AFC-2), a combined cycle project, the switch from conventional wet cooling towers to dry cooling represented a 95 percent reduction in project water demand. For wet/dry hybrid systems, the reduction in water use is dependent upon the percentage of dry versus wet. Dry and hybrid cooling systems are, however, less efficient in rejecting heat, and generally have higher parasitic (i.e., fans) electrical loads and can create a higher pressure (temperature) in the steam turbine condenser. Both of these factors decrease the thermal efficiency and power output of the project. The effects

are not as significant on a combined cycle project as compared to a steam-cycle only project, in that the cooling system only affects the steam side of the combined cycle project and not the performance of the gas turbine. The effect would be greater at higher ambient temperatures because the relationship is non-linear. Additional fuel can be burned to overcome some or all of the loss of output, but the fuel will be an additional operating cost and will produce additional air pollutant emissions. Other characteristics include, for example, higher noise impacts for dry or hybrid cooling systems relative to a wet system due to larger fans to move more ambient air through the tower.

A comparison of dry, hybrid, and wet cooling towers ultimately depends on the specific needs of the proposed application. Dry and hybrid-cooling systems provide benefits in the areas of water use and plume visibility, but with some performance degradation and additional costs. Additionally, dry and hybrid cooling can be noisier, use additional fuel, or be a more visually obtrusive structure.

Staff considers this policy as only advisory to insure that alternative sources of cooling water are considered in power plant projects using wet cooling technology. For this project, a change to a wet/dry or dry technology offers small benefits for water use reduction compared to costs since the applicant has proposed to reuse water from the Unit 6 and 7 cooling water system. Furthermore, alternative water sources such as recycled water or irrigation return flows are not readily available for the project. Therefore, staff concludes that the proposed project complies with this policy.

CALIFORNIA WATER CODE SECTION 13550

California Water Code Sections 13550, 13551 et seq. prohibits the use of potable water if recycled water is available and meets certain conditions. Although San Joaquin River water requires treatment prior to domestic use, California Water Code Section 13551 references the use of water of quality suitable for potable uses. For certain periods that San Joaquin River water is of quality suitable for potable uses. San Joaquin River water represents 60 percent of the City of Antioch's water supply.

The Delta-Diablo Wastewater Treatment Facility is the nearest wastewater treatment plant. Average daily dry weather flows for this facility are approximately 12 MGD. Total facility capacity is approximately 16 MGD. Tertiary treated effluent from this facility has been committed to two other power plant projects: the Delta Energy Center (DEC) and the Los Medanos Energy Center (LMEC) in the City of Pittsburg. These two power plants will normally have a combined requirement of approximately 7.7 MGD average and 11.0 MGD maximum during peak use. Even with cycling the recycled water through the cooling towers five to six times, insufficient recycled water flows are available from this facility to meet project demand.

BEST TECHNOLOGY AVAILABLE

The Clean Water Act (CWA) under Section 316(b) requires that the location, design, construction and capacity of the cooling water intake structures reflect the "Best

Technology Available (BTA)" for minimizing adverse environmental impacts. Although the definition of this standard has been a matter of debate, it is generally agreed that it is intended to reflect an approach that minimizes the negative impacts of the cooling water system on aquatic life. Aquatic life can be impacted in the plant cooling water system by impingement and entrainment or entrapment. Impingement occurs when fish or other sea life becomes trapped in the cooling water system and entrainment/entrapment where aquatic organisms such as larvae and fish eggs are drawn into the facilities cooling system. (Refer to the Biological Resources Section for more information on aquatic resources.)

The CCPP project will not require a new intake structure as it is proposed to make use of the existing cooling water from Units 6 and 7 to provide makeup to the Unit 8 cooling tower. This concept will not necessitate any additional flow into the Unit 6 and 7 cooling water system. However, it remains to be determined by the RWQCB whether this additional use of the system will trigger the requirement for an assessment of BTA. Such an assessment would require an evaluation of alternative technologies for minimizing the impacts of the cooling water system on aquatic life. Such an assessment would include a review of technologies including behavioral barriers, physical barriers, diversion systems, fish collection and conveyance, and maintenance and operational practices.

By proposing to use a cooling tower for CCPP Unit 8, the plant will not change the intake conditions of the existing cooling water system. Additionally, under the NPDES Permit Southern has agreed to constraints in operation during periods when plant operation could impact certain fish species. These practices minimize withdrawal of river water to reduce entrainment and impingement effects. In an effort to eliminate these operating restrictions, Southern is proposing to install a demonstration project that would utilize a physical barrier to reduce the entrainment and impingement losses. This new demonstration project will be the installation of an aquatic filter intake barrier (AFB) screen known as a Marine Life Exclusion System by Gunderboom, Inc.

The goal of the project is to physically prevent aquatic species from entering the plant's circulating water system. (Southern 2000o, page 115-1) The Gunderboom technology consists of polyester fiber strands that are pressed into a water permeable fabric mat. It is then made into a curtain that is floated and anchored to block the impingement of fish. The system also has the potential for preventing entrainment of the earlier life stages of species (EPRI 1999).

CONCLUSIONS AND RECOMMENDATIONS

Staff does not have sufficient information at this time to make conclusions or provide any recommendations, except to identify information that is still needed for staff to finish its analysis.

WATER RESOURCES AND WASTEWATER DISCHARGE

It is unknown at this time what impacts to plant operations and/or water supply may be related to any Incidental Take Permit conditions required by ESA Section

(10)(a)(1)(B), and the HCP. Final or final drafts of the HCP and ITP are required for evaluation in the FSA. This permit and the HCP should be made available at least 30-days prior to the date scheduled for the FSA. For further discussion of this issue, please see the **Biological Resources** section of this PSA.

A draft NPDES permit which includes a combined discharge for Units 6, 7, and 8 is required for evaluation in the FSA. This permit should be made available at least 30-days prior to the date scheduled for the FSA.

EROSION AND SEDIMENTATION

Staff cannot make a determination that the proposed CCPP UNIT 8 project will not result in any significant adverse impacts to soil until a complete erosion and sedimentation control plan draft is developed and incorporates the CEC Proposed Mitigation Measures.

CONDITIONS OF CERTIFICATION

These conditions should not be considered as a complete list of COCs for the project. It is likely that additional COCs will be developed for the FSA as review and evaluation of the project continues.

SOILS & WATER 1: Prior to site mobilization for the proposed project and any ground disturbance activities associated with construction of any project linear element, the project owner shall obtain Energy Commission staff approval for a Storm Water Pollution Prevention Plan (SWPPP) as required under the General Stormwater Construction Activity Permit for the project.

Verification: Thirty days prior to the start of any site mobilization activities associated with the construction of the project and/or ground disturbing activities associated with construction of any project linear element, the project owner will submit a copy of the Storm Water Pollution Prevention Plan (SWPPP) to the Energy Commission Compliance Project Manager (CPM) for review and approval. Approval of the plan by the Energy Commission CPM must be received prior to the initiation of any site mobilization activities associated with construction of any project element.

SOILS & WATER 2: Prior to beginning any site mobilization activities associated with construction of the project and/or ground disturbance activities associated with construction of any project linear element, the project owner shall obtain staff approval for a final erosion control and revegetation plan that addresses all project elements. The final plan to be submitted for Energy Commission's approval shall contain all the elements of the draft plan with changes made to address any staff comments and the final design of the project.

Verification: The erosion control and revegetation plan shall be submitted to the Energy Commission CPM no later than thirty days prior to site mobilization and/or ground disturbance associated with construction of linear facilities. Approval of the

final plan by the Energy Commission CPM must be received prior to the initiation of site mobilization activities associated with construction of any project element.

SOILS & WATER 3: Prior to beginning any site mobilization activities and/or ground disturbance activities associated with construction of project linear facilities, the project owner/applicant shall submit an erosion and sediment control plan for staff approval.

Verification: The erosion control plan shall be submitted to the Energy Commission CPM for approval 30 days prior to the initiation of any site mobilization activities. The final plan shall contain all of the elements of the draft plan along with changes made to address staff comments provided in the mitigation section (above) of the PSA and the final design of the project.

SOIL & WATER 4: The project owner shall obtain the National Pollutant Discharge Elimination System Permit from the Central Valley Regional Water Quality Control Board for the Contra Costa Power plant prior to operation of CCPP Unit 8. 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 this permit, including any application for permit renewal.

Verification: Within 30 days following receipt of a National Pollutant Discharge Elimination System Permit from the Central Valley Regional Water Quality Control Board, the project owner shall submit a copy of the permit to the Energy Commission CPM. 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 Central Valley Regional Water Quality Control Board. The project owner shall notify the Energy Commission CPM in writing of any changes to and/or renewal of this permit.

REFERENCES

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31,2000.

Southern. 2000h. Supplemental information: CESA MOU and Management Authorization by and between PG&E and the CDFG; Draft Multispecies Habitat Conservation Plan for the Pittsburg and Contra Costa Power Plants, received in dockets April 18, 2000.

Southern. 2000i. Draft-Revision 5 Multispecies Habitat Conservation Plan: Pittsburg and Contra Costa Power Plants, Southern Energy. received in dockets August 18, 2000.

Southern. 2000o. Data responses to CEC data requests, received in dockets August 18, 2000.

Southern. 2000p. Data responses to CEC data requests, dated August 22, 2000

California Department of Water Resources, Office of State Water Project Planning. Sacramento-San Joaquin Delta Atlas. 2000. (http://rubicon.water.ca.gov/ delta_atlas.fdr/proacttwo.html). September 2000.

California State Water Resources Control Board. 2000. Construction Activities Stormwater General Permit (www.swrcb.ca.gov/stormwtr/construction.htm). September 2000.

California State Legislative Council. 2000. Official California Legislative Information.
2000. California Water Code. Chapter (http://www.leginfo.ca.gov/cgi-bin/). September 2000.

California State Legislative Council. 2000. Official California Legislative Information.
2000. The California Safe Drinking Water and Toxics Enforcement Act. (http://www.envirolaw.org/65Text.html). September 2000.

County of Contra Costa. 2000. Contra Costa County Construction and Development Code. Chapter 8. (http://www.co.contra-costa.ca.us/depart/bi/matrix5.htm). September 2000.

GEOLOGY AND PALEONTOLOGY

Robert Anderson

INTRODUCTION

The geology and paleontology section discusses the proposed Contra Costa Power Plant (CCPP) Unit 8 project's potential impacts regarding geological hazards, geological and paleontological resources, and surface water hydrology. The purpose of this 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. Energy Commission staff's objective 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 Application for Certification (AFC), in Sections 8.14, 8.15, and 8.16 (Southern 2000a). A brief description of the LORS for paleontological resources, geological hazards and resources, and surface water hydrology follows:

FEDERAL

There are no federal LORS for geological hazards and resources, or grading and erosion control. The CCPP Unit 8 is not located on lands owned by the United States Government.

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). The CBC supplements the UBC's grading and construction ordinances and regulations.

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 (SVP 1994) 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 CCPP Unit 8 is proposed to be a 530 megawatt combined cycle natural gas-fired power plant addition to the existing CCPP facility. Unit 8 will be located on the existing power plant site. The proposed unit will utilize the existing natural gas supply line.

The project is located at the existing CCPP Unit 8 facility along the south shore of the San Joaquin River, approximately 1 mile northeast of the City of Antioch, in Contra Costa County, California. The site is located in the San Joaquin River delta, which in turn is located in the Coast Range physiographic province. The site is mantled in artificial fill and deltaic deposits. Portions of the north end of the CCPP facility are within the 100-year flood zone for the San Joaquin River; however, the facility has not experienced any significant flooding during the operation of the existing power plant. No known faults cross the CCPP facility footprint.

Artificial fill at the site is located primarily in the northeastern portion of the proposed facility, however, some fill is scattered throughout the site. The deltaic deposits are recent in age and are made up of silty sands, muck, peat and gravels of the upper Montezuma Formation.

ANALYSIS AND IMPACTS

GEOLOGICAL HAZARDS

FAULTING AND SEISMICITY

Energy Commission staff reviewed the California Division of Mines and Geology publication "Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions," dated 1994 (CDMG 1994). Energy Commission staff visited the project site on September 6, 2000, and did not observe any surface faulting at the proposed power plant site. No active faults are known to cross the power plant footprint. The project is located within seismic zone 4 as delineated on Figure 16-2 of the 1998 edition of the CBC. The closest known active fault is the Pittsburg-Kirby Hills fault, which is located 8 kilometers (km) west of the proposed power plant. The estimated peak horizontal ground acceleration for the

power plant is 0.4g based upon a moment magnitude 6.75 earthquake on the Pittsburg-Kirby Hills fault. The potential of surface rupture on a fault at the power plant footprint is considered to be very low, since no faults are known to have ruptured the ground surface of the project site.

LIQUEFACTION, HYDROCOMPACTION, SUBSIDENCE, AND EXPANSIVE SOILS

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. One of the parameters used to assess the potential for liquefaction is the depth to ground water at the site under study. The depth to groundwater at the site varies between approximately 7 feet below existing grade at low tide to approximately 0.4 feet below existing grade at high tide. Portions of the site along the San Joaquin River, are overlain with approximately six feet of fill. Below the fill lies approximately 120 feet of interbedded sands, silts, clay and peat. The combination of saturated soils of varying density and a potential for a moderately high peak horizontal ground acceleration points to a moderate potential for liquefaction at the site. Lateral spreading is a related condition where soil is ruptured without being on a fault plane due to the cyclic shearing of the soil during an earthquake. The fill and deltaic soils along the San Joaquin River front are considered to be potentially prone to lateral spreading due to their low unit weight, low shear strength and the unconfined slope fronting the San Joaquin River. Liquefaction and lateral spreading are to be accounted for during the final design of the project's foundation.

Hydrocompaction is the process of the loss of soil volume upon the application of water. The soils at the site are dense enough and are relatively saturated so that hydrocompaction is not considered to be a significant problem.

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 and the clay must have a high shrink-swell potential and a high plasticity index. The near surface soils at the project site beneath the fill is represented locally by the Joice muck and the Delhi sand. The Joice muck has a high shrink potential but a low potential for expansion. The Delhi sand soil unit has a negligible potential for expansion.

LANDSLIDES

Landsliding potential at the power plant site is considered to be low, since the project is located along the banks of the San Joaquin River and there are no significant slopes near the project site. Both the existing site and the proposed expansion are to have a slope of 1percent.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

No geological resources have been identified at the power plant location, the natural gas supply line route, or the water supply line route. However, the northern most one third of the power plant footprint is located in mineral resource zone (MRZ) MRZ-1 and the rest of the footprint is zoned MRZ-3 (CDMG 1987). The MRZ-1

designation means that there are no known mineralogical resources while the MRZ-3 designation indicates that there are known mineralogical resources, but the existing available geologic data is not sufficient to assess the significance of the mineralogical resources. Mineralogical resources in the vicinity of the project include sand, gravel, and gas.

The proposed expansion site footprint is highly disturbed. During the construction of the original Contra Costa Power plant, on-site soils were disturbed and used as fill throughout portions of the site. Monitoring for paleontological resources during the original construction period did not reveal any significant paleontological resources. Energy Commission staff has reviewed the applicants report entitled "Paleontological Resources Assessment Contra Costa Power Plant Unit 8 Project Contra Costa County, California Antioch North 7.5' USGS Quadrangle" (Southern 2000b). The assessment included notes from a field survey and archives search. The paleontological resources archive search did indicate that the deltaic deposits in the region of the project have yielded fragments of camels and bison, and an unidentified marine mammal. This indicates that the paleontological significance of the deltaic earth units is high but the potential for encountering significant paleontological resources at the project site and related linear facilities is low. The archives search did not indicate that any paleontologic resources were known to be located at the project site. A paleontological resources field survey was conducted at the project site and one mile west of the site on December 14, 1999. The western survey area was included due to notes made during the paleontological archives search. No significant paleontological resources were encountered during the field survey.

SURFACE WATER HYDROLOGY

The northern portion power plant footprint is partially located in a 100 year flood zone as it is located in flood zone designation "A2," with a 100 year flood elevation of seven feet above mean sea level as depicted on the Federal Emergency Management Agency Flood Insurance Rate Map sheet no. 060025-0145 B, panel 145. The balance of the power plant footprint is located in an area designated as "C" (minimal flooding and not within the 100 year flood zone). Minimum grade for the power plant area will be 1 percent and all drainage will be directed away from buildings within the footprint. The 100-year 24-hour storm event precipitation amount is 5.0 inches (NOAA 1973). 1

SITE SPECIFIC IMPACTS

Minor excavations, drilling, clearing and brushing operations, and grading of alluvium and/or fanglomerate at the power plant site associated with construction of the project are considered to be a minor potential impact to paleontological resources. However, as of the time that this document was prepared, the site was not known to have any fossils located on it. The adoption and implementation of the proposed conditions of certification for paleontological resources should mitigate any potential impacts to paleontological resources associated with the construction of this project.

The site is located adjacent to an area of known geological resources: sand, gravel, oil and gas. The project is not expected to have a significant impact on the rate of flow of the San Joaquin River. Potential impacts with respect to water quality are deferred to the **Soils and Water Resources** section of this document. Storm water run-off is proposed to be managed through the proposed power plant's drainage control plan and by complying with the proposed conditions of certification for the **Soils and Water Resources** section of this document. None of the geological hazards identified by the applicant or by Energy Commission staff are considered to be significantly impacted by the construction and operation of the proposed project. In conclusion, the project is not likely to have any significant impact on geological or paleontological resources, surface water hydrology, or geological hazards.

CUMULATIVE IMPACTS

It is staff's opinion that the potential for a significant adverse cumulative impacts on paleontological resources, geological resources, or surface water hydrology is unlikely, if the CCPP Unit 8 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.

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.

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 the waste water pipelines. 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 compliance with LORS applicable to geological hazards, geological and paleontological resources, and surface water hydrology for the project.

CONCLUSION AND RECOMMENDATIONS

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 proposes 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, and the conditions of certification for surface water hydrology which are located in the **Soils and Water Resources** section of this document.

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 Compliance Project Manager (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 Chief Building Official (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 of the site for the intended use 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 CBO, and to the CPM on request.

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 resource 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.

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 do not satisfy the above requirements, the project owner shall submit another individual's name and qualifications for consideration.

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.

In addition to the project owner's adoption of the guidelines of the Society of Vertebrate Paleontologists (SVP 1994), 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.

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 or designee 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 the 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

CDMG (California Division of Mines and Geology). 1987. Mineral Land Classification: Aggregate Materials in the San Francisco- Monterey Bay Area Part II Classification of Aggregate Resource Areas South San Francisco Bay Production-Consumption Region. Special Report No. 146, Part 11.

CDMG (California Division of Mines and Geology). 1992. Geologic Map of California, San Francisco-San Jose Quadrangle, Scale 1:250,000.

CDMG (California Division of Mines and Geology). 1994. Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions, Scale: 1:750,000.

FEMA (Federal Emergency Management Agency).1987. Flood Insurance Rate Map No. 060025-0145 B, panel 145, dated July 16, 1987.

NOAA (National Oceanic and Atmospheric Administration). 1973. Precipitation-Frequency Atlas of the Western United States, Volume XI-California, Figure 31.

SVP (Society of Vertebrate Paleontologists). 1994. Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures. October 1994.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000b. Confidential filing—Paleontological Resource Assessment, received in dockets January 31, 2000.

FACILITY DESIGN

Steve Baker, Al McCuen and Kisabuli

INTRODUCTION

Facility Design encompasses the civil, structural, mechanical and electrical engineering aspects of the project. The purpose of the Facility Design analysis is to verify that the laws, ordinances, regulations and standards (LORS) applicable to the design and construction of the project 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 identifies the design review and construction inspection process and establishes conditions of certification that will be used to ensure compliance with 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 criteria that are essential to ensuring protection of the environment and public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable LORS;
- Identification of the Energy Commission's design review and construction inspection process, which is used to ensure compliance with applicable LORS and protection of the environment and public health and safety; 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

Southern Company (Southern or applicant) proposes to construct and operate the Contra Costa Power Plant, Unit 8 (CCPP8 or the project). The project will be a nominal 530-megawatt (MW), natural gas-fired, combined cycle, electric generation facility. The Contra Costa Power Plant (CCPP) site complex is approximately 200 acres. The project will be located at the northeast corner of the complex and will occupy about 20 acres. The CCPP site is on Wilbur Avenue, one mile northeast of Antioch. Highway 4 and the Antioch Bridge are just east of the site.

The CCGGP8 consists of two natural gas-fired combustion turbine generators, two heat recovery steam generators , and a steam turbine generator. Additional project facilities include two 195-foot tall exhaust stacks, a 10-cell water cooling tower, a turbine building, storage tanks, a control building, and electrical power transformers and transmission facilities to interconnect with the existing PG&E switchyard on the CCPP site complex. For more information on the site and related project description, please see the **Project Description** section.
The site is in seismic zone 4, the highest seismic shaking zone in the country. Additional engineering details of the proposed project are contained in the Application for Certification (AFC), in Appendix B2 (Southern 2000a).

The natural gas fuel for Unit 8 will be supplied by an existing gas pipeline, while cooling water will be supplied by re-use of the cooling water from the existing Units 6 and 7. Southern proposes to start construction in early 2001, and start operation by late 2002 or early 2003. The capital cost of the project is estimated at between $250 and $300 million. During the peak of the 22-month construction period, approximately 285 construction workers will be employed.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The applicable LORS for each engineering discipline, civil, structural, mechanical and electrical, are included in the application as part of the engineering appendices, Appendix B, Applicable LORS for construction and design (Southern 2000a). A summary of these LORS includes: Title 24, California Code of Regulations, which adopts the current edition of the California Building Code (CBC) as minimum legal building standards; the 1998 CBC for design of structures; American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code; and National Electrical Manufacturers Association (NEMA) standards.

ANALYSIS

The basis of this analysis is the applicant‘s proposed analysis methods, construction methods and the list of LORS and design criteria set forth in the AFC. Applicable engineering sections from the AFC include:

Section 1.5	Project Schedule
Section 1.6	Project Ownership
Section 2	Project Description

Section 4	Facility Closure
Section 5	Electrical Transmission
Section 6	Natural Gas Supply
Section 7	Water Supply
Section 10	Engineering

Appendices

Appendix B1	Civil Engineering and Foundation Design Criteria
Appendix B2	Structural and Seismic Design Criteria
Appendix B3	Electrical Engineering Design Criteria
Appendix B4	Chemical Engineering Design Criteria
Appendix B5	Mechanical Engineering Design Criteria
Appendix B6	System Control Engineering Design Criteria
Appendix B7	Engineering Drawings

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, 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 will likely comply with all applicable site preparation LORS, and proposes conditions of certification included 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 (**GEN-2** below).

The AFC contains a list of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable LORS, and which staff believes are essential to ensuring that the project is designed in a manner that protects the environment and public health and safety.

PROPOSED MODIFICATIONS

The AFC (Southern 2000a, Appendix B) identifies some LORS applicable to the project. 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 CCPP8 is submitted to the Chief Building Official (CBO)[1] for review and approval when the

[1]The CBO is the CEC’s duly appointed representative, who may be the City or County Chief Building Official, or other appointed representative.

successor to the 1998 CBC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

CBC LATERAL FORCE REQUIREMENTS

The procedures and limitations for the seismic design of structures by the 1998 CBC are determined considering seismic zoning, site characteristics, occupancy, structural configuration, structural system and height. Different design and analysis procedures are recognized in the 1998 CBC for determining seismic effects on structures. The dynamic lateral force procedure of Section 1631 is always acceptable for design. The static lateral force procedure of Section 1630 is allowed under certain conditions of regularity, occupancy and height as determined under Section 1629. Nonbuilding structures (such as cooling towers, tanks and heat recovery steam generators) are included in Section 1634. Most of the structures in powerplant projects are considered nonbuilding structures.

STATIC LATERAL FORCE PROCEDURE

In seismic Zones 3 and 4, the static lateral force procedure of Section 1630 may be used for the following:

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 of vibration greater than 0.7 second require dynamic analysis.)

Irregular structures not more than five stories or 65 feet in height.

DYNAMIC LATERAL FORCE PROCEDURE

In seismic zones 3 and 4, the dynamic lateral force procedure of Section 1631 shall be used for all other structures, including the following:

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.)

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.)

Structures, regular or irregular, located on Soil Profile Type S_F, that have a period greater than 0.7 seconds.

RIGID STRUCTURES LATERAL FORCE DESIGN

Rigid structures (those with a fundamental period of vibration less than 0.06 second) and their anchorage shall be designed using procedures consistent with the requirements of Section 1634.3 and any other applicable provisions of Section 1634.

TANKS WITH SUPPORTED BOTTOMS

Flat bottom tanks or other tanks with supported bottoms founded at or below grade shall be designed consistent with Section 1634.4 and any other applicable provisions of Section 1634.

OTHER NONBUILDING STRUCTURES

Nonbuilding structures not covered by Sections 1634.3 and 1634.4 shall be designed consistent with the requirements of Section 1634.5 and any other applicable provisions of Section 1634.

ENSURING THE APPROPRIATE LATERAL FORCE PROCEDURE

In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Proposed Condition of Certification **STRUC-1** below, which in part requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

CIVIL/STRUCTURAL FEATURES

The applicant proposes, and staff concurs that small, lightly loaded structures, not subject to vibratory loading be supported on shallow footings or mat foundations on properly compacted fill or undisturbed native soils. Foundation depth should extend to at least 12 inches below lowest adjacent grade. If any portion of the foundation bears on bedrock, the entire foundation should be deepened to bear on bedrock. Large, heavily loaded structures, and structures subjected to vibratory loading, should be constructed on deepened foundations that bear on bedrock. Such foundations may include deepened footing or concrete reinforced pier and grade beams. The powerplant and related facilities shall be designed to meet the seismic requirements of the latest edition of the California Building Code.

MECHANICAL SYSTEMS

The major features of the 530 MW power plant include two natural gas-fired, F-class combustion turbine generators (CTG), operating in combined cycle mode. The CTGs will be installed in a two-on-one configuration with one 209 MW steam turbine generator (STG). The heat from hot exhaust gas, which flows from each CTG through a heat recovery steam generator (HRSG), will be extracted to produce steam to power the STG. The CCPP8 will employ a 10-cell water-cooling tower. The cooling tower is expected to be standard, induced draft counter-flow type. The 65-foot tower will incorporate plume abatement coils and high efficiency drift eliminators.

Other features of the project include: water and wastewater treatment facilities; pressure vessels, piping systems and pumps; aqueous ammonia storage, handling

and piping system; air compressors; fire protection systems; and heating, ventilation, air conditioning (HVAC), potable water, plumbing and sanitary sewage systems.

MECHANICAL LORS AND DESIGN CRITERIA

The application (Southern 2000a, Appendix B5) 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

Major electrical features of the project other than transmission include generators, power control wiring, protective relaying, grounding system, cathodic protection system and site lighting (Southern 2000a, Appendix B3).

Power and Control Wiring. In general, conductors will be insulated based on a normal maximum conductor temperature of 90ºC in 40ºC ambient air with a maximum emergency overload temperature of 130ºC and a short circuit temperature of 250ºC. In areas with higher ambient temperatures, larger conductors will be used or higher temperature rated insulation will be selected.

Protective Relaying. These relays protect equipment in the auxiliary power supply system, generator terminal systems, 230 kV system, 4.16 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.

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’s National Fire Protection Association/American National Standards Institute (NFPA/ANSI), Section C1.

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.

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 277 volts.

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.

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 as required.

The AFC (Southern 2000a, Appendix B3) 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 (Southern 2000a, Appendix B3). Staff has proposed conditions of certification (**ELEC-1** and **ELEC-2**, below) to monitor this compliance.

ANCILLARY FACILITIES

CCPP8 will use the existing facilities from the complex, and no new ancillary facilities will be necessary.

PROJECT QUALITY CONTROL

The AFC (Southern 2000a, § 2.4.6) 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. 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 ensure that the project is designed, procured, fabricated and installed in accordance with LORS.

COMPLIANCE MONITORING

THE ENERGY COMMISSION'S DESIGN REVIEW AND CONSTRUCTION INSPECTION PROCESS

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the

power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and ensure that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegate agents typically include the local building official and independent consultants hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff has completed, or will complete, the following to ensure the design review and construction inspection process is consistent with the applicant's timing of the project:

Staff will meet with the local building department to discuss the Energy Commission's compliance process and the potential involvement of the local building official as delegate agent.

Staff will propose a memorandum of understanding (MOU) with Contra Costa County outlining the roles and responsibilities of the County and its subcontractors as delegate agents appointed by the Energy Commission to ensure compliance with the CBC and facility design conditions of certification.

Staff will meet with the County and its subcontractor (if applicable) to discuss the details of the design review and construction inspection process, fees, types of submittals required of the process and timing of the review.

Staff has developed conditions of certification (see the section below, titled "Proposed Conditions of Certification") to ensure compliance with LORS and protection of the environment and public health and safety. Some of these conditions address the roles, responsibilities and qualifications of CCPP8's 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 proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility with construction activities, these conditions are written to require that no element of construction of permanent facilities, which is difficult to reverse, may

proceed without prior approval of plans from the CBO. For those elements of construction that are not difficult to reverse and are allowed to proceed without approval of the plans, the applicant shall have the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's plan review and approval process.

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 the end of 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 Contra Costa County 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 Section.

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. Staff has proposed a Condition of Certification (**GEN-9**) to ensure that these measures are included in the Facility Closure Plan.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

Currently there are no public or agency comments.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- The laws, ordinances, regulations, and standards (LORS), identified in the AFC and supporting documents, are those applicable to the project.
- 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.
- 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 to ensure satisfactory performance.
- The Energy Commission design review and construction inspection process will be in place for the project and will allow construction to start as scheduled if the project is certified. The process will provide the necessary reviews to ensure compliance with applicable facility design LORS and conditions of certification.
- 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:

- 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, and assure public health and safety;
- The project should be designed and built to the 1998 CBC (or successor standard, if such is in effect); and
- The CBO shall 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. The CBC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification TSE-1, TSE-2 and TSE-3 in the **Transmission System Engineering** Section of this document.

Protocol: In the event that the CCPP8 is submitted to the CBO when a successor to the 1998 CBC is in effect, 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 California Energy Commission Compliance Project Manager (CPM) a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy.]

GEN-2 The project owner shall furnish to the 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 of, and a list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major structures and equipment in

[2] The Sections, Chapters, Appendices and Tables, unless otherwise stated, refer to the Sections, Chapters, Appendices and Tables of the 1998 California Building Code (CBC).

Table 1: Major Equipment List below). To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Table 1: Major Equipment List

Equipment/System	Quantity Plant	Size/ Capacity*	Remarks
Combustion Turbine (CT) Generator	2	170 MW each	Dry Low NO_X combustion control. Either train can operate independently
Steam Turbine (ST)	1	200 MW	Single shaft HPT, IPT and LPT (2x1 configuration
Generators	3		Included with CT and ST
STG Main Transformer	1		1 @ 100%
CT Inlet Air Filter	2	3,600,000 lb/hr	
Inlet Air Cooling	2		Evaporative/Refrigeration/Fogging
Air Compressor	3		3 @ 50%
Fuel Gas Filter – Separator	2	150,000 lb/hr	
Heat Recovery Steam Generator (HRSG)	2	550,000 lb/hr	HP, IP, LP with reheat
HRSG Stack	2		18'-0" dia.x195' high
Condensate Pump	2		2 @ 100%
Ammonia Injection Skid	2		Two blowers per HRSG
Ammonia Storage Tank	1	20,000 gal	Double walled
HP/IP HRSG feedwater pumps	2	1,700 gpm	HP with interstage bleed
Make-up Water Storage Tank	1	2,300,000 gal	Includes firewater storage
Demineralized Water Pumps	2	170 gpm	
Demineralized Water Treatment Package	1	350 gpm	
Demineralized Water Storage Tank	1	500,000 gal	
Condensate Pump	3	1300 gpm	1 spare per condenser
Circulating Water Pumps	3	60,000 gpm	
Cooling Tower Bank	1		Ten-celled mechanical draft design
Fire Water Pump Skid	1	3,000 gpm	
Auxiliary Cooling Water Pumps	2	750 gpm	
Plant Air Compressors & Dryers	2	750 cfm	
Step-up Transformers	2	18/20 kV	To electrical grid

***All capacities and sizes are approximate and may change during project final design.**

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 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 fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities).]. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification TSE-1, TSE-2 and TSE-3 in the **Transmission System Engineering** Section of this document.

- The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

Monitor construction progress to ensure compliance with LORS;

- Ensure that construction of all the facilities conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;
- 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;
- 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;
- 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
- 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 fully competent and proficient in the design of powerplant structures and equipment supports; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.]. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification TSE-1, TSE-2 and TSE-3 in the **Transmission System Engineering** Section of this document.

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, powerplant 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.

Protocols:

A: The civil engineer shall:

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

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.

B: The geotechnical engineer or civil engineer, experienced and knowledgeable in the practice of soils engineering, shall:

Review all the engineering geology reports, and prepare final soils grading report;

- 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;
- 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;
- Recommend field changes to the civil engineer and RE;
- 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
- 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.]

C: The design engineer shall:

- Be directly responsible for the design of the proposed structures and equipment supports;
- Provide consultation to the RE during design and construction of the project;
- Monitor construction progress to ensure compliance with LORS;
- Evaluate and recommend necessary changes in design; and
- Prepare and sign all major building plans, specifications and calculations.

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.

E: The electrical engineer shall:

- Be responsible for the electrical design of the project; and
- 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, Section, 1701.5 Type of Work (requiring special inspection), and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification TSE-1, TSE-2 and TSE-3 in the **Transmission System Engineering** Section of this document.

The special inspector shall:

- Be a qualified and certified person who shall demonstrate competence, to the satisfaction of the CBO, meet the requirements of Section 1701 of the 1998 CBC, for inspection of the particular type of construction requiring special or continuous inspection;
- Observe the work assigned for conformance with the approved design drawings and specifications;
- Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and
- 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 by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

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-7 The project owner 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 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 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.

The closure plan shall include a discussion of the following:

- The proposed closure/decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- 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;
- Activities necessary to restore the site if the CCPP8 decommissioning plan requires removal of all equipment and appurtenant facilities; and
- 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 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:

- Design of the proposed drainage structures and the grading plan;
- An erosion and sedimentation control plan;
- Related calculations and specifications, signed and stamped by the responsible civil engineer; and

- 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, Chapter 1, 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.

Protocol: 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 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 proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for:

- Major project structures;
- Major foundations, equipment supports and anchorage;
- Large field fabricated tanks; and
- Turbine/generator pedestal.

In addition, the project owner shall, prior to the start of any increment of construction, get approval from the CBO of the lateral force procedures proposed for project structures to comply with the lateral force provisions of the CBC.

The project owner shall:

- Obtain approval from the CBO of lateral force procedures proposed for project structures;
- 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];
- 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 (or a lesser number of days mutually agreed to by the project owner and the CBO), 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
- 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:

- 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);
- Concrete pour sign-off sheets;
- Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
- Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results), welder qualifications, certifications, and qualified procedures; and
- 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 the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO‘s approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall

advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 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 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:

The proposed final design plans, specifications and calculations conform with all of the piping requirements set forth in the Energy Commission's Decision; and

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 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 above listed documents 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:

- 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
- 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.

Protocol: 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.]

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 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.]

The project owner shall design, fabricate and install:

- 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
- 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.

ELEC-1 For the 480 volts and higher 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.] All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification TSE-1, TSE-2 and TSE-3 in the **Transmission System Engineering** Section of this document.

The following activities shall be reported in the Monthly Compliance Report:

- receipt or delay of major electrical equipment;
- testing or energization of major electrical equipment; and

- 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 for electrical equipment and systems 480 volts and greater, 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.] All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification TSE-1, TSE-2 and TSE-3 in the **Transmission System Engineering** Section of this document.

Protocols:

A. Final plant design plans to include:

- one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems;
- system grounding drawings;
- general arrangement or conduit drawings; and
- other plans as required by the CBO.

B. Final plant calculations to establish:

- short-circuit ratings of plant equipment;
- ampacity of feeder cables;
- voltage drop in feeder cables;
- system grounding requirements;
- coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
- system grounding requirements;
- lighting energy calculations; and
- 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 Energy 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 electrical equipment and systems 480 volts and greater 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

Southern (Southern Company). 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Submitted to the California Energy Commission, January 31, 2000.

Southern. 2000c. Phase II Environmental Site Assessment, received in dockets February 29, 2000 (dated June, 1998).

CEC (California Energy Commission). 2000a. Data Adequacy Recommendation, February 29, 2000.

POWER PLANT RELIABILITY

STEVE BAKER

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While Southern Company (Southern) has predicted a level of reliability for the power plant (see below), staff believes Southern should not be held responsible for achieving this goal, so long as the plant's reliability matches or exceeds 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 (see **Setting** below).

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). The Cal-ISO is a recently-formed entity that will work with the California Power Exchange (PX) to purchase, dispatch and sell electric power throughout the state. How Cal-ISO will ensure system reliability is currently being determined; protocols are being developed and put in place that are designed to allow sufficient reliability to be maintained under the competitive market system. "Reliability must-run" power purchase agreements and "participating generator" agreements are two mechanisms being employed to ensure an adequate supply of reliable power (Mavis 1998, pers. comm.).

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO (Detmers 1999, pers. comm.).

The Cal-ISO's mechanisms to ensure adequate power plant reliability 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 on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants 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 are accustomed.

Southern proposes to operate the 530 MW Contra Costa Power Plant, Unit 8 (CCPP8) at baseload, selling energy and capacity on the market and via bilateral contracts. In addition, the CCPP8 will provide load following and peaking power (Southern 2000a, AFC §§ 1.1, 1.4, 2.4.1). The project is expected to operate at an annual average capacity factor from 75 percent to 85 percent, and an annual availability from 92 to 95 percent (Southern 2000a, AFC §§ 1.4, 2.4.1).

ANALYSIS

A reliable power plant is one that is available when called upon to operate. Throughout its intended life, the CCPP8 will be expected to perform reliably in baseload, load following and peaking duty. Power plant systems must be able to operate for extended periods (sometimes months on end) without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the CCPP8 will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

QA/QC PROGRAM

The applicant describes a QA/QC program (Southern 2000a, AFC § 2.4.6.2) typical of the power industry. Equipment will be purchased from a list of qualified suppliers, based on technical and commercial evaluations. Suppliers' capabilities and experience will be evaluated, considering personnel, production capability, past experience and performance, seismic experience and QA program. Southern will perform receiving inspection, construction inspection and audits, and will execute independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

EQUIPMENT REDUNDANCY

A generating facility 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.

Southern plans to provide appropriate redundancy of function for the combined cycle portion of the project (Southern 2000a, AFC §§ 2.2.4.3, 2.2.7.1, 2.2.12.1, 2.4.3; Table 2-17). The fact that the project consists of two trains of gas turbine generators/heat recovery steam generators (HRSGs) provides inherent reliability. Failure of a non-redundant component of one train should not cause the other train to fail, thus allowing the plant to continue to generate (at reduced output). In addition, the cooling system is designed to allow steam bypass from both HRSGs, allowing either or both gas turbine generators to operate even if the steam turbine is

out of service. Further, the plant's distributed control system (DCS) will be built with typical redundancy. Emergency DC and AC power systems will be supplied by redundant chargers. Other balance of plant equipment will be provided with redundant examples, thus:

- four 50 percent boiler feed pumps;
- two 100 percent condensate pumps;
- two 50 percent circulating water pumps;
- two 100 percent service air compressors; and
- two 100 percent instrument air filters and dryers.

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

MAINTENANCE PROGRAM

Southern proposes to expand the plant maintenance program of the existing Contra Costa Power Plant units, a program typical of the industry (Southern 2000a, AFC §§ 1.1, 2.4.1, 2.4.6.2). Staff expects that the project will thus be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

FUEL AVAILABILITY

The CCPP8 will burn natural gas from the existing Pacific Gas and Electric Company (PG&E) Line 400 36-inch diameter backbone gas line that traverses the Contra Costa plant site. Gas will be supplied to the project via a new 12- to 16-inch diameter line that lies entirely within the Contra Costa site (Southern 2000a, AFC §§ 1.2, 1.7, 2.2.5, 2.2.5.1, 2.4.4). This natural gas system, which connects gas fields in Canada to the nearby Antioch terminal, ultimately provides access to gas from the Rocky Mountains, Canada and the Southwest, representing a resource of considerable capacity. Should the pipeline from the north be out of service, the plant could acquire gas from the Antioch terminal, which has redundant supply sources. This system offers access to far more gas than the plant would require (Southern 2000a, AFC §§ 1.7, 2.2.5.1, 2.2.5.2, 2.4.4; Table 2-3). 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

The CCPP8 will obtain water for cooling and other plant uses from existing Contra Costa Power Plant systems (Southern 2000a, AFC §§ 1.3, 1.7, 2.1, 2.2.6, 2.2.6.1,

2.2.6.2, 2.2.6.4, 2.4.5, 7.0). Makeup water for the evaporative cooling towers will be drawn from the existing Units 6 and 7 supply that takes water from the San Joaquin River. Other plant water uses, such as steam cycle makeup water and potable water, are also supplied by river water; when river water quality is poor, the City of Antioch provides backup supply. Staff believes this source yields sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see that portion of this document entitled **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 flooding and seismic shaking (earthquake) present credible threats to reliable operation (Southern 2000a, AFC §§ 2.3.1) (see those portions of this document entitled **Facility Design** and **Geology and Paleontology**).

FLOODING

The northern portion of the project site lies within a 100-year flood zone (Southern 2000a, AFC § 2.3.1.2). Maximum floodplain elevation is seven feet above msl.[1] All structures below nine feet above msl will be designed to accommodate flooding, in accordance with the Contra Costa County Building Code. This should constitute an adequate response to the threat of flooding. For further discussion, see that portion of this document entitled **Geology and Paleontology**.

SEISMIC SHAKING

The site lies within Seismic Zone 4 (Southern 2000a, AFC §§ 2.3.1.1; Appendix B2); see that portion of this document entitled **Geology and Paleontology**. The project will be designed and constructed to the latest appropriate LORS (the 1998 California Building Code and the Contra Costa County Building Code). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking, compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

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

[1] Mean sea level.

periodically summarizes and publishes the statistics on the Internet (http://www.nerc.com). NERC reports the following summary generating unit statistics for the years 1994 through 1998 (NERC 1999):

For Combined Cycle units (All MW sizes)
Availability Factor = 91.49 percent

The 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 from 92 to 95 percent (Southern 2000a, AFC §§ 1.4, 2.4.1) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new, large machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Further, since the plant will consist of two 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. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, cannot impact project reliability. 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 of 92 to 95 percent, which staff believes is achievable in light of 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. No Conditions of Certification are proposed.

REFERENCES

Southern (Southern Company). 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Submitted to the California Energy Commission, January 31, 2000.

Detmers, Jim. 1999. Director of Maintenance and Reliability, California Independent System Operator. Interview with Steve Baker (California Energy Commission), July 13, 1999.

GTW (Gas Turbine World). 1999. *Gas Turbine World*, September-October 1999, pp. 20-23.

Mavis, Steve. 1998. Transmission Planner, California Independent System Operator. Telephone conversation with Steve Baker (California Energy Commission), January 23, 1998.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. *Operational Experience in Competitive Electric Generation, an Executive Report*, 1994.

NERC (North American Electric Reliability Council). 1999. 1994-1998 Generating Availability Report.

POWER PLANT EFFICIENCY

Steve Baker

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the Contra Costa Power Plant, Unit 8 Project (CCPP UNIT 8) 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 CCPP UNIT 8'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 advers0e 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

Southern Company (Southern) proposes to construct and operate a (nominal) 530 MW combined cycle merchant power plant to generate baseload, load-following and peaking power, selling directly to customers through bilateral contracts or on the spot market (Southern 2000a, AFC §§ 1.1, 1.2, 1.4, 2.2.2). (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity will differ from, and may exceed, this figure.) The CCPP UNIT 8 will consist of two General Electric Frame 7F combustion turbine generators with evaporative inlet air coolers and steam injection producing approximately 167 MW each, two triple pressure heat recovery steam generators (HRSGs) with duct burners, and one 190 MW reheat steam turbine generator, arranged in a combined cycle train, totaling approximately 530 MW. The gas turbines will be equipped with dry low-NOx combustors, and the HRSGs with selective catalytic reduction, to control air emissions (Southern 2000a, AFC §§ 1.2, 1.4, 2.2.2, 2.2.3.1, 2.2.3.2, 2.2.3.3, 2.4.3).

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 CCPP UNIT 8 will burn natural gas at a nominal rate up to 95.3 billion Btu per day LHV[1] (Southern 2000a, AFC § 2.2.5.2). 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 full load efficiency of approximately 54.1 percent LHV (Southern 2000a, AFC § 1.4); compare this to the average fuel efficiency of a typical utility company baseload power plant at approximately 35 percent LHV.

[1] Lower heating value.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the CCPP UNIT 8 (Southern 2000a, AFC §§ 1.2, 1.7, 2.2.5, 2.2.5.1, 2.4.4). The project will burn natural gas from the existing Pacific Gas and Electric Company (PG&E) backbone Line 400 that passes through the Contra Costa Power Plant site on its way from Canada to the Antioch terminal. The gas supply infrastructure is extensive, offering access to vast reserves of gas from the Rocky Mountains, Canada and the Southwest. This source represents far more gas than would be required for a project this size. Energy Commission predictions are that natural gas supplies will be adequate for many years into the future. It is therefore highly unlikely that the CCPP UNIT 8 could pose a substantial increase in demand for natural gas in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project by a new 12- to 16-inch diameter pipeline tapping the existing PG&E Line 400 that passes through the power plant site (Southern 2000a, AFC §§ 2.2.5.1, 2.4.4). This 36-inch diameter backbone pipeline, operating at 500 psig,[2] is expected to provide adequate access to natural gas fuel. Should the supply of gas from the north be interrupted, the project could take gas from the Antioch terminal, which has other supply avenues. There is thus no real likelihood that the CCPP UNIT 8 will require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the CCPP UNIT 8 or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

The CCPP UNIT 8 could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

PROJECT CONFIGURATION

The CCPP UNIT 8 will be configured as a combined cycle power plant, in which electricity is generated by two gas turbines, and additionally by a steam turbine that operates on heat energy recuperated from the gas turbines' exhaust (Southern 2000a, AFC §§ 1.2, 1.4, 2.2.2, 2.4.3). 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

[2] Pounds per square inch, gauge.

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 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 gas turbine. This allows the plant to generate at less than full load while maintaining optimum efficiency, suitable for a plant meant for flexible generation, such as load-following and peaking duty. Loads down to 50 percent of full load allow one gas turbine, operating at full load, and the steam turbine to operate at peak efficiency. Additional flexibility will be added by incorporating steam bypasses that allow either or both gas turbine generators to operate with the steam turbine generator out of service (Southern 2000a, AFC § 1.4, Table 2-17).

EQUIPMENT SELECTION

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The F-class gas turbines to be employed in the CCPP UNIT 8 represent some of the most modern and efficient such machines now available. The applicant will employ two General Electric Frame 7FA gas turbine generators (Southern 2000a, AFC §§ 1.2, 1.4, 2.2.2). Offered in a two-on-one configuration as the S207FA, this configuration is nominally rated at 530 MW and 56.5 percent efficiency LHV at ISO[3] conditions (GTW 1999b).

One possible alternative machine is the ABB Alstom Power KA 24, an F-class gas turbine nominally rated at 271 MW and 57.6 percent efficiency at ISO conditions in a one-on-one combined cycle configuration (GTW 1999b).

Another alternative is the Siemens-Westinghouse 501F, nominally rated in a two-on-one combined cycle at 550 MW and 55.8 percent efficiency LHV at ISO conditions. This machine is functionally equivalent to the GE Frame 7FA.

While the KA 24 promises slightly higher fuel efficiency (57.6 percent at ISO conditions) (GTW 1999b) 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 power trains, with one gas turbine and one steam turbine paired on a single shaft, generating a nominal 271 MW (Orsini 1999, pers. comm.). The GE and Siemens-Westinghouse machines, which can be configured more flexibly, offer an advantage.

[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).

EFFICIENCY OF ALTERNATIVES TO THE PROJECT

The project objectives include the flexibility to generate baseload, load following and peaking power for sale on the spot market or via bilateral contracts (Southern 2000a, AFC §§ 1.1, 1.4, 2.4.1).

Alternative Generating Technologies

The applicant addresses alternative generating technologies in its application (Southern 2000a, AFC §§ 9.4, 9.5). Natural gas-, oil- and coal-burning, solar, hydroelectric, biomass and geothermal technologies are all considered. Given the project objectives, location and air pollution control requirements, staff agrees with the applicant that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-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.

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 lowest available fuel costs, but at the same time sells for the lowest per-kilowatt capital cost.

One possible alternative to an F-class gas turbine is a G-class machine, such as 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 (GTW 1999b), 1.5 percentage points higher than the 7FA, the G machine in a one-on-one combined cycle produces 365 MW to the 7FA's two-on-one configuration at 530 MW. A 520 MW (nominal) power plant would thus be impractical; a 365 MW power plant, without redundant gas turbines, would restrict operating flexibility. Additionally, the 501G is brand new; the first such machine only recently began operation at a site in Florida owned by Lakeland Electric and Water (Power 1999), and a second such machine is in construction at PG&E Generating's Millennium project in Charlton, Massachusetts. Given the minor efficiency improvement promised by the G-class turbine, the likelihood that the plant may frequently be dispatched at less than full load, and the lack of a proven track record for the 501G, the applicant's decision to purchase F-class machines is a reasonable one.

Another possible alternative to the F-class gas turbine is an H-class machine. The first such plant is now in the permitting stage; Sithe Energies will build an 800 MW facility in Scriba, New York, based on two General Electric Frame 7H gas turbine generators in a two-on-one configuration (GTW 1999a). Claimed fuel efficiency is 60 percent LHV at ISO conditions (GTW 1999b). This high efficiency is achieved through a higher pressure ratio and higher firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application is not expected to enter service until the end of 2002. Given the lack of proven performance, and the reduction in operating flexibility from fewer gas turbines (one 7H combined cycle would produce 400 MW), staff agrees with the applicant's decision to employ F-class machines.

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 power output by cooling the gas turbine inlet air. A mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ evaporative cooling, in conjunction with gas turbine steam injection, for power augmentation at high temperatures (Southern 2000a, AFC §§ 1.2, 1.4, 2.2.2, 2.2.3.1). Steam injection is a well proven power augmentation technique for machines such as these. Given the climate at the project site and the relative lack of clear superiority of one inlet air cooling system over the other, staff agrees that the applicant's choice of evaporative cooling will yield no significant adverse energy impacts.

In conclusion, the project configuration (combined cycle) and generating equipment (F-class gas turbines) chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

There are several nearby power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the CCPP UNIT 8. The existing Contra Costa Power Plant Units 6 and 7, the existing Pittsburg Power Plant, and the Los Medanos Energy Center (98-AFC-1) and Delta Energy Center (98-AFC-3) projects, now under construction, are in addition to several much smaller cogeneration power plants at nearby industrial facilities. The supply of natural gas to this area, however, is sufficient (see discussion above) to cause no concern of supply inadequacies. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the CCPP UNIT 8 will not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the CCPP UNIT 8. California's electric power will be generated by those power plants that bid most successfully to sell their output to the California Power Exchange. Since other equally efficient power plants are envisioned to compete against the CCPP UNIT 8, no indirect impacts on fuel consumption are likely.

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 CCPP UNIT 8, if constructed and operated as proposed, would generate 520 MW (nominal) of electric power at an overall project fuel efficiency around 54.1 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. No energy standards apply to the project. Staff therefore concludes that the CCPP UNIT 8 would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

RECOMMENDATION

From the standpoint of energy efficiency, staff recommends certification of the CCPP UNIT 8. No Conditions of Certification are proposed.

REFERENCES

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Submitted to the California Energy Commission, January 31, 2000.

GTW (Gas Turbine World). 1999 a. *Gas Turbine World*, November/December 1999, page 42.

GTW (Gas Turbine World). 1999 b. *Gas Turbine World 1999-2000 Performance Specs*, volume 19. December 1999.

Orsini, S. 1999. Applications Engineer, ABB Power Generation Systems, Inc. Telephone conversation with Steve Baker (California Energy Commission), February 18, 1999.

Power (Power Magazine). 1994. "Operating and maintaining IPP/cogen facilities," *Power*, September 1994, p. 14.

Power (Power Magazine). 1999. "Huge and tiny turbine projects move forward," *Power*, September/October 1999, p. 5.

TRANSMISSION SYSTEM ENGINEERING

Richard Minetto, P.E. and Laiping Ng

INTRODUCTION

The Transmission System Engineering (TSE) analysis provides the basis for the findings in the Energy Commission's decision. This preliminary staff assessment indicates whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations and standards (LORS) required for safe and reliable electric power transmission.

The applicant Southern Energy Delta, LLC (Southern) proposes to install a new combined-cycle generating facility within the area currently owned by Southern. The property and project are referred to as the Contra Costa Power Plant Project (CCPP) Unit 8. Figure 2, shows an overall location for the project and the major existing transmission lines in the area. Southern proposes to interconnect the generating facility to the electrical grid through Pacific Gas and Electric Company's (PG&E) 230 kV bus at the Contra Costa Power Plant Switching Station. The California Independent System Operator (Cal-ISO) is responsible for ensuring electric system reliability for all participating transmission owning utilities and determines both the standards necessary to achieve reliability and whether the proposed project conforms to those standards. The Energy Commission will rely on the Cal-ISO's determinations to make its finding related to applicable reliability standards, the need for additional transmission facilities, and environmental review of the whole of the project. In this case, staff is primarily a facilitator, coordinating the Cal-ISO's process and results with the certification process and the Energy Commission decision. The Cal-ISO will provide testimony at the Energy Commission's hearings.

Staff's analysis also evaluates the power plant switchyard, outlet line, termination facilities and outlet alternatives identified by the applicant and provides proposed conditions of certification to ensure that the project complies with applicable LORS during the design, construction, operation and potential closure 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 action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, Title 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 the California 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 ensures adequate service and safety to persons engaged in the construction, maintenance, operation or use of overhead electric lines and to the public in general.
- CPUC Rule 21 provides standards for the reliable connection of parallel generating stations connected to participating transmission owners.
- Western Systems Coordinating Council (WSCC) Reliability Criteria provides the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the 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 (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).
- North American Electric Reliability Council (NERC) Planning Standards 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. 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 1998).
- 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.

- Cal-ISO Scheduling Protocols and Dispatch Protocols require conformance with NERC, WSCC, and Local Area Reliability and Planning Criteria. These standards will be applied to the assessment of the system reliability implications of the CCPP Unit 8 project. Also of major importance to projects that may sell through the California Power Exchange (Cal-PX) are 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 the operation of power plants not violate system criteria when market participants request 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 total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine the actual net power output required by the generating units to meet their scheduled obligations. (Cal-ISO 1998a, Cal-ISO 1998b).
- Cal-ISO Participating Generator Agreement consists of detailed explanations of the requirements in the Cal-ISO Tariff pertaining to the paralleled generating unit.

PROJECT DESCRIPTION

Figure 1 shows an overall one-line diagram submitted by the applicant for the CCPP Unit 8. The CCPP Unit 8 provides an additional nominal electrical output of 530 MW, with a maximum output of 590 MW to the PG&E 230 kV grid. The Detailed Facilities Study[1] modeled the output at the maximum 590 MW for purposes of contingency and stability analysis. The applicant proposes operations at partial load be accomplished by using a “two on one” approach. Under light loading scenarios, output may be reduced by turning down output from one or both combustion turbine generators (CTG), shutting down the steam turbine generator (STG) and/or shutting down one of the combustion turbine generators. Under these conditions, the minimum output would be approximately 190 MW. The site is an existing power plant and the CCPP Unit 8 project proposes the addition of unit 8 to the site. Units 1-3 at the existing site are retired, and the addition of unit 8 brings the total output of the plant to approximately 1200 MW. The proposed project site is located in unincorporated Contra Costa County, adjacent to the City of Antioch.

The generation addition has been proposed to consist of two combustion turbine generators, and one steam turbine generator. The CTGs will be fueled by natural

[1] Detailed Facilities Study (DFS) submitted by Pacific Gas and Electric Company to the California Energy Commission on July 12, 2000.

gas and air, and the STG will be driven by exhaust from the CTGs. The output of each generator will be connected to the high voltage system through a dedicated 18/230 kV step-up transformer.

The applicant plans to construct approximately 1,500 feet of overhead 230 kV line to interconnect the plant output with the existing PG&E switchyard. The switchyard is located within the boundaries of the plant and connects to the electrical grid through a number of 230 kV lines.

PROJECT SWITCHYARD

The existing switchyard is proposed for interconnection of the plant output. An existing circuit breaker (CB580) is proposed for protection of the interconnection. This breaker is rated for a continuous current of 2,000 amperes and has an interrupting rating of 63,000 amperes. All equipment for control and protection for the generating units and unit transformers will be furnished and installed by the applicant.

TRANSMISSION LINE CHARACTERISTICS

The short tie line within the boundaries of the plant/switchyard proposed for the interconnection of the generation is proposed to be 230 kV and double-bundled 1431 AAC conductors. The tie line is proposed as a single tie for the output of all three units. The line will be designed, built, owned, and maintained by the applicant.

EXISTING FACILITIES AND RELATED SYSTEMS

The existing site has two units (4 and 5) that operate as synchronous condensers for support of the transmission system, and two units (6 and 7) that produce electricity for the grid. Units 1-3 were previously retired. The output from the proposed CCPP unit 8 is proposed to consist of two GE Frame 7A natural gas-fired combustion turbine generators and a heat recovery system supplying a single steam turbine generator. The output of this new generating station will be available at the PG&E 230 kV switchyard through an existing breaker. To identify the potential impacts to the existing transmission system, power flow analyses were performed with and without the addition of this project. The DFS prepared by PG&E provides the basis for analysis of any impacts from such a project. The DFS also includes the modeling of other transmission and generating projects in the Northern California Area that are operational at the time of the proposed generating facility connection.

ANALYSIS

SYSTEM RELIABILITY

INTRODUCTION

A Detailed Facilities Study has been prepared by PG&E for the CCPP Unit 8. This study determines the effects of connecting a new power plant to the existing electric

grid. The study identifies the potential impacts and the proposed mitigating measures. Any new transmission facilities such as the power plant switchyard, the outlet line, and, or downstream facilities[2], required for connecting a project to the grid are considered part of the project and are subjected to the full AFC review process.

DETAILED FACILITIES STUDY SUMMARY

The DFS which studied the effects of Unit 8 on the transmission interconnection and system, has the following components:

- Steady State Power Flow Study: These studies were conducted using PG&E's 2003 Summer peak and 2003 Summer Partial peak base cases. The study analyzed adverse impacts to normal operating conditions. Further studies were conducted taking single and multiple lines out of service for contingency analysis.
- Generation Sensitivity Study: This study used the same base cases described above and then analyzed the system for various scenarios with simultaneous operation of the CCPP Unit 8 project and other proposed generation projects within the Bay Area. Specifically, these included removal of Calpine/Bechtel's 600 MW Metcalf Energy Center (MEC), removal of the MEC and Calpine/Bechtel's 880 MW Delta Energy Center (DEC), and addition of the Newark Energy Center project.
- Dynamic Stability Study: This study was conducted to assess whether the CCPP Unit 8 would cause system instability under various critical contingencies.
- System Protection Study: This study was conducted to evaluate whether the addition of Unit 8 would cause any overstress on the existing fault interruption devices.

As with all system studies, various assumptions were made and detailed in the DFS. The intent of the DFS is to analyze the CCPP Unit 8 as well as other proposed generation projects and determine the impacts on the transmission grid. These studies provide the basis for determining any system modifications or Remedial Action Schemes (RAS) necessary to approve the interconnection of the generation to the electrical transmission grid. Conclusions drawn from the DFS are highlighted by section below:

- Steady State and Contingency Power Flow Study:
- CCPP Unit 8 has no impact on the transmission facilities during normal operating conditions.

[2] Downstream facilities are those that are beyond the point where the line emanating from the power plant joins with the (existing) interconnected system (California Public Utilities Commission v. California Energy Resources Conservation and Development Commission (1984) 150 Cal. App 3d 437, 197 Cal. Rptr. 866).

- CCPP Unit 8 has no significant impact on the transmission facilities during single contingency conditions. Minor thermal overloads on the identified 115 kV and 230 kV transmission lines can be mitigated either by re-rating the line to a higher emergency capability or by congestion management which would require a small amount of generation curtailment.
- During multiple contingencies, CCPP Unit 8 has certain adverse impacts on the area transmission facilities. At this time the applicant is not required by PG&E or the Cal-ISO to mitigate these multiple-contingency impacts, but may be required to participate in special operating procedures and special protection schemes to mitigate these overloads. The applicant will consider all RAS Schemes if they are deemed necessary to mitigate these contingencies.
- Generation Power Flow Sensitivity Study:
- This study was conducted to determine the impact of the proposed Delta Energy Center (DEC), Metcalf Energy Center (MEC), and the Newark Energy Center (NEC) projects on the transmission system.
- There was no adverse impact during normal and single-contingency cases for CCPP Unit 8 when considered in conjunction with these other projects.
- During multiple contingencies there were more substantial overloads identified. However, the applicant at this time is not required to mitigate multiple contingency overloads, but may be required to be responsible for the costs operating procedures and/or special protection schemes (i.e., RAS schemes) to mitigate such overloads.
- Dynamic Stability Study:
- The DFS shows that system instability is present with the CCPP Unit 8 for faults at certain 230 kV bus sections of the Contra Costa Substation. At this time, the Cal-ISO is requesting an additional assessment to determine whether the dynamic instability is an existing problem, or if it is caused by the addition of the CCPP Unit 8 generating project. If the dynamic instability is an existing problem, then the transmission owner is responsible for the mitigation. If it is a new problem caused by the addition of the CCPP Unit 8 generating project, then the generation developer would be responsible for the cost of implementing the mitigation measure. The solution would require modification of the bus differential relay to achieve a 6 cycle clearing time. The Cal-ISO has requested additional transient stability studies to determine if this impact was present prior to the CCPP Unit 8.
- System Protection Study:
- Short circuit studies result in the conclusion that the CCPP Unit 8 has no adverse impacts on any existing PG&E facilities.

CAL-ISO SUMMARY

On October 2, 2000, the California ISO issued a preliminary approval to connect the CCPP Unit 8 to the Contra Costa Power Plant Switchyard (Attached as Exhibit "A")[3]. The CAL-ISO requires the following additional information to grant final approval:

- The applicant must provide the required generation curtailment to mitigate thermal overloads on the transmission facilities under the single-element or double-element contingencies identified in the DFS. This entails analyzing the rating of specific transmission lines to higher emergency capabilities or by congestion management provisions.
- The applicant must verify that proposed transmission projects T-447 and T-667 proposed in the PG&E 2000 Transmission Expansion Plan would mitigate certain contingency overloads. These projects identify specific actions including re-rating or transmission configuration options that may mitigate overloads identified by the DFS.
- The applicant must perform transient stability analysis under summer partial peak conditions for cases before and after the proposed unit is placed in service. These studies are intended to identify whether instability identified in the DFS was an existing problem or due to the proposed generation addition. If the instability is identified as being related to the proposed generation, the applicant would then be responsible for all bus relay modification to ensure a 6 cycle clearing time.

DEPARTMENT OF WATER RESOURCES

The Department of Water Resources has asked that further review of short circuit impacts be developed to determine whether the CCPP Unit 8 increases available fault currents at the Banks Pumping Plant, Barker Slough Pumping Plant, and Cordelia Pumping Plant (Attached as Exhibit "B")[4]. The DFS concluded that no adverse impacts on existing PG&E equipment ratings were identified. The applicant must ensure through further assessment of all short circuit fault currents, that there are no adverse impacts.

STUDY CONCLUSIONS

The DFS indicates that there are no major adverse transmission impacts with the interconnection of the Contra Costa Power Project. Minor overloads identified through single contingency analysis may be mitigated with proposed or completed transmission projects, or will require generation curtailment. In cases where there are adverse impacts due to multiple-element contingency, the applicant is not required to be responsible for pertinent transmission upgrades, but may be required to be responsible for the costs of operating procedures and/or special protection schemes, such as RAS, to mitigate the overloads on the transmission facilities. At

[3] Letter from Jeff Miller, Regional Transmission Manager of the California ISO dated October 2, 2000 to Terry Coggins of Southern Energy.

[4] Letter from Henry Ramirez, Chief Department of Water Resources dated August 29, 2000 to Kae Lewis, Project Manger for the California Energy Commission.

such a time that these multiple contingency cases warrant attention, the Cal-ISO and the Participating Transmission Owner (PTO), PG&E, and the Project Owner, which may or may not be the applicant, would provide the necessary mitigation scheme to ensure system integrity. The Cal-ISO has requested information from the Project Owner to determine the operational constraints that would be present during multiple contingencies.

With regards to the identified stability problems associated with the bus section outages at the Contra Costa switchyard, additional studies were requested by the Cal-ISO to determine whether it is an existing problem, or a new one caused by the addition of the CCPP Unit 8 generating project. The study results will help identify whether the PTO or the project owner is responsible for the cost of the proposed mitigation measures.

Overall, the staff concludes that the CCPP Unit 8 has no adverse transmission impacts and could be approved with the necessary accommodations to ensure adequate design and installation of the facilities proposed. Final approval by the Cal-ISO will be granted upon satisfactory submittal of additional information as requested by the Cal-ISO in the October 2, 2000 letter to Southern Energy. The Condition of Certification, TSE-1e, provides for Commission review of this information.

FACILITY CLOSURE

PLANNED CLOSURE

This type of closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which 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 PTO to assure (as one example) that the PTO's system will not be closed into the outlet thus energizing the project substation. Alternatively, the owner may coordinate with the PTO to maintain some power service via the outlet line to supply critical station service equipment or other loads.[5]

UNEXPECTED TEMPORARY CLOSURE

An 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 establishing an on-site contingency plan (see General Conditions Including Compliance Monitoring and Closure Plan).

[5] These are mere examples, many more exist.

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 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's preliminary findings indicate that no significant additional new transmission facilities are required for the interconnection of the CCPP Unit 8 project to meet NERC, WSCC, and Cal-ISO reliability criteria.
- The Cal-ISO has provided preliminary approval of the CCPP Unit 8 interconnection, and has identified additional studies required to grant final approval of the project.
- The power plant switchyard, outlet lines, and termination are acceptable and will comply with LORS assuming the conditions of certification are implemented.
- The issuance of the Cal-ISO's final interconnection approval will assure conformance with NERC, WSCC and Cal-ISO reliability criteria. Conditions of Certification TSE-1e and TSE-1f provide for Energy Commission review of the Cal-ISO's final interconnection approval letter and the PG&E/applicant Facility Interconnection Agreement.

RECOMMENDATIONS

Staff proposes the following conditions of certification to insure system reliability and conformance with LORS.

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 listed below. The substitution of Compliance Project Manager (CPM) approved "equivalent" equipment and equivalent switchyard configurations are acceptable.

- The power plant switchyard, outlet line and termination shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General

Order 95; Title 8, California Code of Regulations; Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; National Electric Code (NEC); and related Industry Standards.

- Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
- The project interconnection will be through a single 230 kV tie and existing breaker in the switchyard. The tie will use conductors similar to double-bundled 1431 AAC.
- Termination facilities at the interconnection shall comply with applicable Cal-ISO and PG&E interconnection standards (PG&E Interconnection Handbook and CPUC Rule 21).
- The Project Owner shall provide an executed Generator Special Facilities Agreement (GSFA) for the transmission interconnection with PG&E and the additional information requested by the Cal-ISO in the October 2, 2000 letter to Southern Company. The GSFA shall be coordinated with the Cal-ISO.
- The Project Owner shall provide a letter from the California ISO indicating final approval of the project.

Verification: At least 60 days prior to start of construction of transmission facilities, the project owner shall submit for approval to the CPM:

- Design drawings, specifications and calculations conforming with CPUC General Order 95 and related industry standards, where applicable, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.
- For each element of the transmission facilities as identified above, the submittal package to the CPM shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions" and a statement by the registered engineer in responsible charge (signed and sealed) that the transmission element(s) will conform with CPUC General Order 95; Title 8, California Code of Regulations; Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; the NEC; PG&E Interconnection Handbook; CPUC Rule 21 and related industry standards.
- Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements a through e above. 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 1e of TSE-1, and have not received CPM approval, and shall 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 60 days prior to construction of transmission facilities, the project owner shall inform the CPM of any impending changes which may not conform to requirements 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 General Order 95; Title 8, California Code of Regulations; Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; the NEC; PG&E Interconnection Handbook; CPUC Rule 21 and related industry standards. 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 first synchronization of the project, the project owner shall transmit to the CPM:

- "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC General Order 95; Title 8, California Code of Regulations; Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; the NEC; PG&E Interconnection Handbook; CPUC Rule 21 and related industry standards, and these conditions shall be concurrently provided.
- An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge.
- A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in responsible charge.

REFERENCES

Cal-ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

Cal-ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol posted April 1998.

Cal-ISO (California Independent System Operator) 2000a. Cal-ISO Preliminary Approval Letter for CCPP Unit 8, sent to Southern Energy California and submitted to the California Energy Commission on October 2, 2000.NERC (North American Electric Reliability Council). 1998. NERC Planning Standards, September 1997.

WSCC (Western Systems Coordinating Council) 1997. Reliability Criteria, August 1998.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

Southern. 2000e. Various confidential filings—archaeological resources and emissions offsets data, received in dockets April 18, 2000.

PG&E (Pacific Gas and Electric) 2000. Detailed Facilities Study. Submitted to the California Energy Commission on July 12, 2000.

DEFINITION OF TERMS

AAC — All Aluminum conductor.

Ampacity — Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere — The unit of current flowing in a conductor.

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.

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.

Loop — An electrical cul de sac. A transmission configuration which interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

Megavar — One megavolt ampere reactive.

Megavars — Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)

A unit of apparent power, 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.

Multiple Contingencies
A condition that occurs when more than one major transmission element (circuit, transformer, circuit breaker, etc.) or more than one generator is out of service

Normal Operation/ Normal Overload
When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition
See Single Contingency.

Outlet Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis
A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power
Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action Scheme (RAS)
A remedial action scheme is an automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

SF6 Sulfur hexafluoride is an insulating medium.

Single Contingency
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.

Switchyard A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating
See ampacity.

TSE Transmission System Engineering.

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.

Figure 1
One Line Diagram: Interconnection With PG&E Switchyard

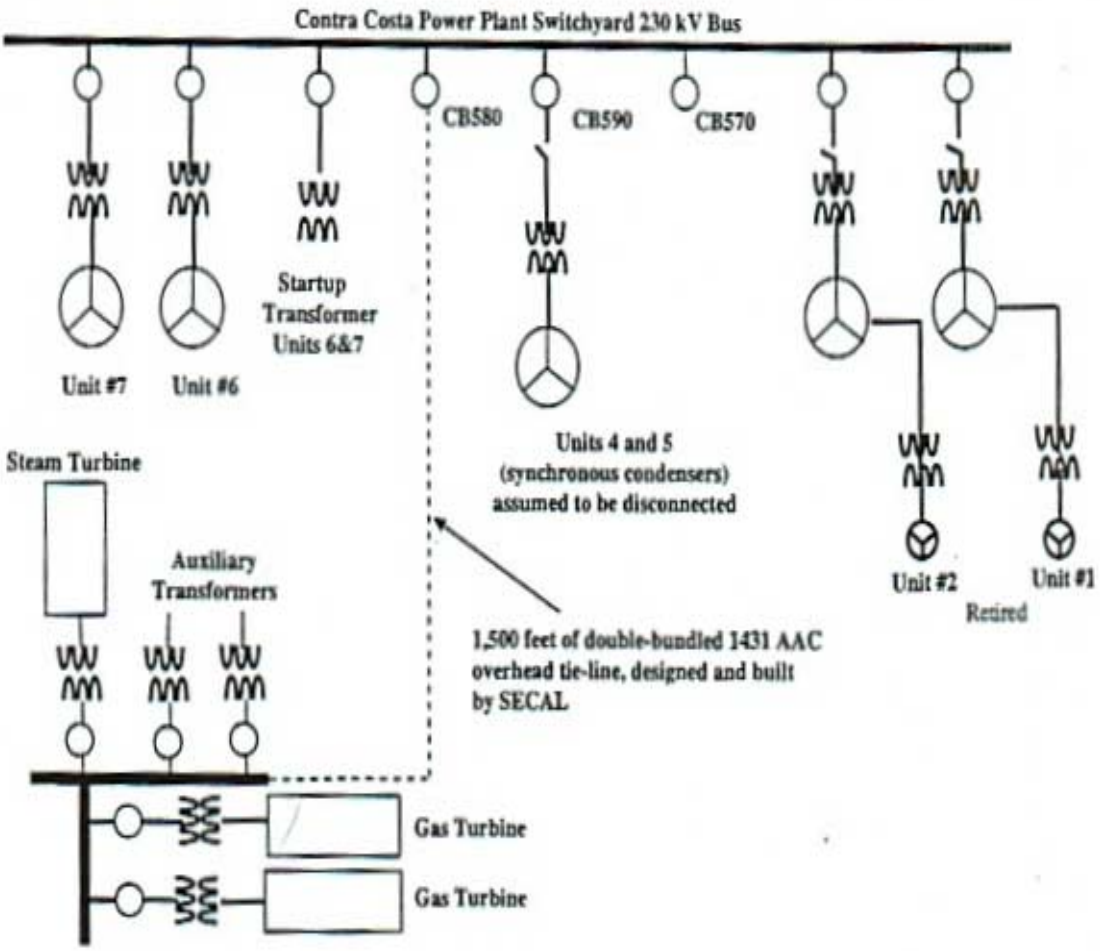

Figure 2

ALTERNATIVES

Cheri Davis and Kae Lewis

INTRODUCTION

Energy Commission staff is required by Title 20, California Code of Regulations, Section 1765 (the Energy Commission's siting regulations) to examine the "feasibility of available site and facility alternatives to the applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment." The "Guidelines for Implementation of the California Environmental Quality Act" (CEQA), Title 14, California Code of Regulations, Section 15112(d), provides further direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the project objectives."

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.

CEQA requires an analysis of alternative sites only if "the significant effects of the project would be avoided or substantially lessened by putting the project in another location." Staff has concluded that with mitigation there are no significant adverse environmental impacts. However, in the proposed CCPP Unit 8 project a contribution to a significant adverse cumulative impact in visual resources has been identified. Staff's initial analysis of the applicant's (Southern Energy or Southern) alternative sites is based on a review of the project objectives and the contribution to significant cumulative impacts identified in this document. Staff found that developing a similar project at an identified alternative site would not substantially lessen nor avoid this contribution.

METHODOLOGY

To prepare this alternatives analysis, staff used the methodology summarized below:

- Identified the basic objectives of the project;
- Provided an overview of the project and potentially significant adverse impacts;
- Evaluated the "no project" alternative;
- Identified and evaluated feasible alternative electricity generation technologies;
- Identified screening criteria;

- Conducted a screening analysis to assess the feasibility of the alternative sites mentioned by the applicant and staff;
- Determined whether the alternative technologies and sites reduced or avoided any significant impacts of the proposed project;
- Determined whether the alternative technologies and sites would cause one or more impacts that could be significant.

BASIC PROJECT OBJECTIVES

After reviewing the Contra Costa Power Plant (CCPP) Unit 8 Application for Certification (AFC), Energy Commission staff has developed the following project objectives:

- The construction and operation of a highly efficient merchant power plant in the Contra Costa County region that supplies economic, reliable and environmentally sound electrical energy and capacity in the newly deregulated power market;
- The generation of approximately 530 MW of electricity;
- The utilization of an existing power generation site and existing ancillary facilities;
- The location of the site near key infrastructure, such as transmission line interconnections (230-kV or greater), and supplies of process water and natural gas;
- The improvement of local electric reliability while reducing electric system losses.

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

In considering locational (or site) alternatives, the staff had to determine a reasonable geographical area. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area of locational alternatives to the Contra Costa County region. Locational alternatives beyond this region would be inconsistent with the project objectives. While none of these alternative sites has been subjected to an in-depth analysis similar to that conducted for the CCPP site, enough information is provided for the decision-makers consistent with CEQA and Energy Commission regulations.

SETTING

SITE AND VICINITY

The proposed project is located within the existing Contra Costa Power Plant, 1 mile northeast of the City of Antioch. The power plant site encompasses 200 acres and is surrounded by industrial uses to the south and west, the San Joaquin River to the north and a commercial marina, industrial uses, and open space to the east. The

project site is zoned Heavy Industrial with electric power plants being an allowable use. The project site consists of seven generating units (two of which operate as ISO must-run synchronous condensers and two of which currently generate electricity), nine exhaust stacks, eight fuel and ammonia storage tanks, water treatment and wastewater treatment systems, an ammonia storage and supply system, the Pacific Gas and Electric Company
(PG&E) Contra Costa switchyard, various buildings, and other related equipment. Southern Energy (SECAL) currently operates Units 6 & 7, which have a combined capacity of 680 MW.

The applicant chose the proposed site for the following reasons:

- Infrastructure for the power plant is already in place;
- The site is close to the PG&E Switchyard where the applicant will connect to the transmission system;
- The site contains existing once-through cooling water intake and discharge structures;
- The site would result in a lower level of environmental impact when compared to other site possibilities within Contra Costa County;

The applicant has requested certification to add 530 MW to the CCPP. This would bring the total output of the site to 1210 MW.

RELATED FACILITIES

Electricity generated by the CCPP Unit 8 would be transmitted to the adjacent PG&E Switchyard located on the CCPP site. The project does not require any additional transmission line construction, except for short onsite line segments necessary to convey power to the PG&E switchyard. The existing switchyard and power grid are adequately sized and maintained for the additional power generated by the project.

Cooling tower makeup water for operation of the Unit 8 cooling system will be provided from the condenser flow system of the existing Units 6 & 7 and reused in Unit 8, after which it will cycle through a 10-cell evaporative cooling tower to be built as part of Unit 8. The condensers for Units 6 & 7 currently use cooling water from the San Joaquin River and then discharge back into the river after a single pass through the system. Water diverted for use in Unit 8 will be reintroduced into the Unit 6 & 7 discharge at the existing surge chamber.

The project will use the existing PG&E Line 400 natural gas pipeline, which passes through the CCPP site, for fuel delivery.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

In the Issues Identification Report filed in June, 2000 staff identified the potential for significant environmental impacts in air quality, biological resources, environmental

justice, soil and water resources, transmission system engineering and visual resources (CEC 2000c, Pages 3-6). Since that time, additional information has caused staff to revise its assessment of some potential impacts. Staff's current assessment of the expected environmental consequences of the proposed project is summarized below for technical areas where issues have been identified. Staff's assessment of environmental impacts is presented in more detail in the individual sections of this PSA.

Air Quality: Staff's analysis shows that the proposed CCPP Unit 8 emissions of air pollutants (nitrogen oxide (NO_x), sulfur dioxide (SO_2) and carbon monoxide (CO) will not violate ambient air quality standards and the air quality impacts from these emissions would be insignificant. The project's air quality impacts from directly emitted particulate matter (PM_{10}) and of the ozone precursor emissions of NO_x, volatile organic compounds (VOC), and PM_{10} precursors of NO_x and SO_2 could be significant, however, if left unmitigated. The applicant will reduce these emissions to the extent feasible by using Best Available Control Technology, and will provide emission offsets for their NO_x, VOC, and PM_{10} emissions. These mitigation measures reduce the potential for impacts (including cumulative impacts) from directly emitted PM_{10}, as well as ozone and secondary PM_{10} formation to a level of insignificance.

At the time of the Issue Identification Report, the timing of ERC acquisition was a staff concern. However, the applicant indicates that they have obtained from local sources all of the ERCs necessary to offset the project emissions liability. The Bay Area Air Quality Management District (District) has completed their Preliminary Determination of Compliance for this project, which confirms Southern's acquisition of ERCs. Staff has incorporated the District's conclusions and appropriate conditions into the PSA.

Biological Resources: Unit 8 will utilize the existing cooling system for Units 6 & 7 for cooling makeup water. Their once-through cooling water system, which will be used by Unit 8, is a technology with critical impacts to Delta aquatic organisms from cooling water entrainment at the Contra Costa site that have resulted in "take" of endangered species, primarily Delta smelt and chinook salmon. The US Fish and Wildlife Service (USFWS) is requiring a Habitat Conservation Plan (HCP) which will identify specific impacts of the existing power plant and the proposed Unit 8 and will present mitigation requirements. While the HCP is still being developed, the USFWS at this juncture is not expecting Unit 8 to create impacts to aquatic resources in addition to those of the existing Units 6 & 7.

Environmental Justice: East Contra Costa County encompasses the cities of Antioch and Pittsburg, and the unincorporated community of Bay Point. East Contra Costa County is characterized largely by industrial uses. For this reason the staff performed a screening analysis to determine if environmental justice issues should be further addressed. EPA guidelines on environmental justice state that if 50 percent of the population affected by a project has minority or low-income status, it must be determined if these populations are exposed to disproportionately high and adverse human health or environmental impacts. The demographics for Contra Costa County indicate that about nine percent of those living within the area

affected by the CCPP (six-mile radius) are in a low-income economic status. Within the same geographic area minorities are about 31 percent of the total population. Since these percentages are below the EPA's threshold levels, it was determined that CCPP Unit 8 does not expose a minority or low-income population to a greater impact than a non-minority or higher-income population.

Soil and Water Resources: The existing Contra Costa Power Plant takes in approximately 8,000 acre feet of water per year, predominately for cooling water make-up. The primary source of water proposed for Unit 8 will come from the reuse of the supply for Units 6 & 7, which in turn comes from the San Joaquin River. This water is already diverted for once-through cooling and discharged by the existing Units 6 & 7. In the Issue Identification Report, staff expressed a concern that during days of heavy spring runoff, river water would be replaced with potable supplies from the City of Antioch. The applicant has since added a 500,000 gallon water storage tank to their plan, thus minimizing or eliminating the need for water supplies from the City of Antioch.

Staff has evaluated alternative sources of cooling water as well as alternative sources of cooling technology such as dry and wet/dry cooling which may minimize water consumption and wastewater discharge. At this time staff is not recommending any other alternatives.

At the time of the Issue Identification Report, Energy Commission staff expressed concern over the thermal discharge of wastewater from the proposed Unit 8. The applicant had filed an application with the Central Valley Regional Water Quality Control Board (CVRWQCB) to renew the National Pollutant Discharge Elimination System (NPDES) permit for the existing CCPP, and staff questioned if this permit application also addressed the proposed project. The applicant has since re-filed their application to include Unit 8.

Wastewater from Unit 8 will be addressed either through modification of the existing NPDES permit for the CCPP or through a new NPDES permit for Unit 8 and the existing units. A new NPDES permit will be required if the CVRWQCB considers CCPP Unit 8 a new source under the Clean Water Act. The CVRWQCB will likely treat Unit 8 as a modification of the existing NPDES permit, which is in the process of being renewed.

Transmission System Engineering: At the time of the Issue Identification Report, the concern was that the AFC submittal contained only a transmission interconnection planning report completed by a consultant. Since that time, the more critical document, the Detailed Facilities Study (DFS), was submitted by the private transmission owner, PG& E on July 12, 2000. Upon review of the DFS, the staff's preliminary findings are that no significant new transmission facilities are required for the interconnection of the CCPP Unit 8 project. The CAL-ISO has granted its preliminary approval of the CCPP Unit 8 project and identified additional studies required to grant final approval of the project.

Visual Resources: At the time of the Issue Identification Report concern existed about visual impacts. Staff have found that the project, as proposed, has the

potential to cause project-specific adverse visual impacts due to intrusion into certain view corridors, reduction of visual quality of certain sensitive views due to an increase in visually unattractive industrial features, vapor plumes of various sizes, and lighting. However, primarily because of the heavy industrial character of the area, project-specific impacts except for lighting are not expected to be significant, and proposed project-specific mitigation is expected to cause residual project-specific lighting impacts to be less than significant. Nevertheless, the project would intensify the industrial character of the area and add to the significant cumulative visual impacts that existing industry has caused. Implementation of Southern's proposed mitigation measures and staff's additional proposed mitigation measures, both specified in staff's recommended Conditions of Certification, would reduce the proposed project's contributions to most of these cumulative impacts. Staff is continuing to evaluate the magnitude of the contribution of the proposed project's cooling tower plumes to cumulative visual impacts.

The project would result in blockage of a view corridor to the Contra Costa Hills as seen from a portion of Antioch Regional Shoreline Park. Policy 1 of the Community Image Element of the City of Antioch General Plan states that views to the river, hills, and ridgelines should be preserved by prohibiting the siting of structures or landscaping that would block views from adjacent properties. Although the project could be construed to be inconsistent with this policy, the affected view corridor was considered in this analysis to be highly compromised by the existing power plant, and consequently of limited visual quality and value, therefore the view intrusion was found to be a less than significant visual impact. This effect on the park landscape was thus regarded to be of limited importance.

ANALYSIS

THE "NO PROJECT" ALTERNATIVE

The CEQA Guidelines state, "The purpose of describing and analyzing a no-project alternative is to allow decisionmakers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." (Cal. Code Regs., tit. §15126.6(e)). Toward that end, the no-project analysis considers "existing conditions" and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Ibid.)

The "no project" alternative assumes that the proposed project is not constructed. In this case, the "no project" alternative would be leaving the plant "as is." Units 1-3 would remain non-operational, units 4 & 5 would serve as synchronous condensers, and units 6 & 7 would remain in operation. No new combined-cycle unit would be added.

In the CCPP Application for Certification (AFC), Southern presented the "no project" alternative as not consistent with their business objectives. Southern also argues that the "no project" alternative would conflict with existing state policy objectives to foster a competitive market for generation in which the most efficient technologies would be developed. Without plants like the proposed Unit 8, Southern, argues that

California's high demand for electricity must be met through the deployment of older, less efficient power plants which would result in greater environmental impacts. Staff agrees that both the major electric deregulation legislation, AB 1890 (1996), and, more recently, SB 110 (1999), have emphasized the necessity for the siting new power plants which increase reliability, improve the environmental performance of the current electric industry, and reduce consumer costs.

Staff has concluded that CCPP Unit 8 contributes to a significant cumulative visual impact which results in the increased industrial character of the area. Since the "no project" alternative implies no modifications to the site of the existing CCPP it would avoid this contribution.

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 energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. The forecast that will address this issue is the Commission's California Energy Outlook. Thus, such alternatives are not included in this analysis.

NON-FOSSIL ALTERNATIVES

Staff compared various alternative technologies with the proposed project, and examined the principal electricity generation technologies that do not burn fossil fuels such as natural gas. These are geothermal, solar, hydroelectricity, wind, biomass, waste-to-energy. Staff also looked at coal and nuclear power generation to provide a thorough analysis of alternative generation technologies.

There are no viable geothermal resources in the Contra Costa County region. Solar, wind and hydroelectricity resources would require large land areas in order to generate 530 megawatts of electricity. Specifically, centralized solar projects using the parabolic trough technology require approximately 5 acres per megawatt; 530 megawatts would require approximately 2,650 acres, more than 13 times the amount of space taken by the current plant site and linear facilities. Photovoltaic arrays require similar acreage per megawatt. Centralized wind generation areas generally require 40-50 acres per megawatt, with 530 megawatts requiring 21,000-26,500 acres, more than 105 times the amount of space taken by the current plant site and linear facilities. Wind generation also has environmental effects. Large wind farms can have significant visual impacts and in some areas these have resulted in a large number of raptor deaths. The noise generated by the wind turbines might also be of concern. Large hydroelectric facilities capable of generating 530 megawatts would inundate thousands of acres with water, resulting in extensive biological and environmental impacts.

Biomass facilities do not require the extensive amount of land of the above alternatives. However, most biomass facilities are only in the range of 5-25 MW, which is insufficient for the objectives of this project. They also generate significant air emissions and require numerous truck deliveries to supply the plant with the waste. Also, in waste-to-energy facilities there is some concern regarding the

emission of toxic chemicals, such as dioxin, and the disposal of the resultant toxic ash.

Potential significant effects also arise in constructing transmission line interconnections to connect a renewable power facility to a nearby transmission line.

The alternative technologies discussed above have the potential for significant land use, biological and visual impacts. Consequently, staff does not believe that these technologies present any feasible alternatives to the proposed project.

COAL-FIRED ALTERNATIVE

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. For these reasons staff concluded that this alternative technology option is not superior to the proposed project.

NUCLEAR ALTERNATIVE

Staff did not consider the possibility of a nuclear power plant alternative. California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high-level radioactive waste has been demonstrated. Consequently, staff concluded that this alternative technology is not feasible.

SMALLER-SIZED ALTERNATIVE

Staff also considered the possibility of a smaller sized alternative, such as a 240 MW gas fired combined cycle project located at the CCPP site. This is less electricity than the applicant proposes to add, but is considered here as an alternative in order to facilitate a thorough analysis of project options. This smaller project would significantly reduce the amount of cooling water required for Unit 8, but would have no effect on the total amount of water taken from, and discharged into, the river.

ALTERNATIVE SITE SCREENING ANALYSIS

Alternative sites were identified through a review of the applicant's AFC which contained alternative sites within the existing CCPP plant site, sites in the vicinity of the existing plant, and sites at the Southern Energy owned Pittsburg plant which lies 8 miles to the west of the existing CCPP. Additional sites will be evaluated in the FSA if the contribution to a significant adverse cumulative impact which has been identified cannot be reduced.

In their AFC, Southern listed several key criteria required for reasonable selection of an offsite alternative. (Southern 2000a, AFC pages 9-1). Southern's main criteria for selection of an alternative is the maximum use of current assets. Alternatives not in close proximity to CCPP were not considered by Southern because they

would require the development of water supplies, new water treatment systems, new gas supply and new ammonia storage and supply systems, all of which Southern already has available. (Southern 2000a, AFC pages 9-7). Staff acknowledges that this criteria comports with Southern's objectives, but believes that it is too narrowly construed to allow a sufficient alternatives analysis. Therefore staff has compiled the following criteria in order to afford an objective alternatives analysis:

- The site would have to be large enough to support a 530 MW power plant. Staff estimates this to be approximately 20 acres.
- The site would have to have sufficient infrastructure or access thereto within a reasonable outlying distance to support a 530 MW power plant. This would include: (1) natural gas pipelines (24 inch or larger); (2) major roads to support deliveries and operations; (3) water for utilities and cooling (e.g. ground water, reclaimed water); and (4) reasonably close proximity to an existing transmission line system to facilitate connecting transmission lines and switching facilities (230-kv or higher and with the capacity for the new plant).

ALTERNATIVE SITES

I. ALTERNATIVE SITES WITHIN THE CONTRA COSTA POWER PLANT SITE

Description of Sites

The applicant has evaluated three undeveloped sites within the boundaries of the existing Contra Costa Power Plant which are large enough for a 530 MW generating facility. All of the sites are near the eastern part of the Pacific Gas and Electric Company switching station. The first site is south, the second is north, and the third is directly east of the switching station. Each of these sites has similar characteristics.

Advantages

- The sites are adequately sized and zoned for industrial uses
- Existing infrastructure of the CCPP (gas, water and transmission) can be utilized
- The same road system would be used as for the proposed project
- Owner has site control

Disadvantages

- The first and second sites are crossed by switching station transmission lines that would require relocation
- The first site contains an impoundment basin system for fuel oil storage tanks which would require relocation or reconfiguration

- The contribution of the proposed Unit 8 to the existing heavy industrial character of the viewshed is not reduced
- Additional visual impacts may be significant at this alternative site.

II. ALTERNATIVE SITES LOCATED WITHIN FACILITIES OWNED BY SOUTHERN ENERGY

Description of Sites

The applicant evaluated two possible sites not at the existing CCPP but owned by Southern Energy, the Potrero Power Plant in San Francisco and the Pittsburg Power Plant (previously owned by PG&E) in Pittsburg. The former was eliminated because at the time the AFC was filed for CCPP Unit 8, Southern had the Potrero AFC (currently 00-AFC-4) under consideration. The Pittsburg Power Plant which is located approximately 8 miles west of CCPP, contains over 1,800 undeveloped acres. Following are the characteristics of the alternative Pittsburg site:

Advantages

- The site is adequately sized and zoned for industrial uses
- Owner has site control
- The site has existing infrastructure (gas, water and transmission)
- The site has an accessible road system

Disadvantages

- A large portion of the site is wetland or constrained for other reasons
- Direct access to the PG&E substation is not available and relocation of transmission lines would be required
- Because all units are operating, infrastructure at Pittsburg does not have excess capacity and would have to be upgraded
- Additional visual impacts may be significant at this alternative site. At the very least, the contribution of the proposed Unit 8 to the existing heavy industrial character of the viewshed would be moved from the CCPP plant site to the Pittsburg plant site.

III. OTHER ALTERNATIVE SITES

Description of Sites

The applicant believed that they could also achieve project objectives with an electric generation facility which was located physically adjacent to property owned by the Southern Company. The two sites evaluated are adjacent to the existing CCPP site. The first site is located to the south of CCPP and the second is located west of CCPP within the boundaries of the Gaylord Container facility.

Advantages

- The site is adequately sized.
- Both sites can be connected to the P G&E substation within the CCPP with the same distance of interconnection construction as the proposed site

The first site is in the same proximity of gas lines as the proposed site

- The site has an accessible road system

Disadvantages

- Owner does not have site control
- Land for the first site is not zoned heavy industrial but rather open space and light commercial and is currently in agricultural and residential uses. This site would require a rezoning decision by the local jurisdiction.
- The sites are not as close to water and ammonia supplies as the proposed site
- The contribution of the proposed Unit 8 to the existing heavy industrial character of the viewshed is not reduced
- Additional visual impacts may be significant at this alternative site

SUMMARY OF ALTERNATIVE SITE ANALYSIS

Staff's analysis of the alternative sites is based on a review of the project objectives and the contribution to significant cumulative impacts identified in this document. Staff found that developing a similar project at an identified alternative site would not substantially lessen nor avoid this contribution. Furthermore, it would add to costs by making less efficient use of the existing site and infrastructure, which is one of the major objectives of the project. Also, use of the alternative sites may result in significant impacts in other areas, such as biological resources and land use.

CONCLUSION

CEQA requires the project alternatives to focus on measures that would mitigate a project's potential impacts to less than significant levels. In the proposed CCPP Unit 8 a contribution to a significant adverse cumulative impact in visual resources has been identified. It may be possible to reduce this contribution. Staff will evaluate any proposal from the applicant to provide additional landscape screening and report in the FSA its final recommendations.

Staff does not believe that energy efficiency measures and alternative technologies (geothermal, solar, wind, and hydroelectric) present any feasible alternatives to the proposed project.

REFERENCES

CEC. 2000c. Identification Report, June 9, 2000.

Southern. 2000a. Application for Certification, Contra Costa Power Plant Unit 8 Project (00-AFC-1). Received in dockets January 31, 2000.

COMPLIANCE MONITORING PLAN INCLUDING
GENERAL CONDITIONS AND THE CLOSURE PLAN

Jeri Zene Scott

INTRODUCTION

The Compliance Monitoring Plan (Compliance Plan) has been established as required by Public Resources Code section 25532. The plan provides a means for ensuring that the Contra Costa Power Plant, Unit 8 is constructed and operated in compliance 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:

- 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 requirement 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.
- Specific conditions of certification:

Specific conditions of certification that follow each technical area 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:

- ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Commission Decision;

- resolving complaints;
- processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
- documenting and tracking compliance filings; and
- 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 compliance telephone number of **1-800-858-0784** for the public to contact the Commission about power plant construction or operation-related questions, complaints or concerns.

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. Technical staff from both the Energy Commission and the project owner will meet to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification. They will confirm that all requirements have been met, or if they have not been met, 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. Pre-construction meetings held during the certification process may need to be publicly noticed unless they are confined to administrative issues and process.

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):

- all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- all Monthly and Annual Compliance Reports filed by the project owner;
- all complaints of noncompliance filed with the Energy Commission; and
- 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 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 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 reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate.

ACCESS

The CPM, responsible Energy Commission staff, and delegate agencies or consultants, shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

COMPLIANCE RECORD

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 be, upon request to the project owner, given unrestricted access to the files.

COMPLIANCE VERIFICATIONS

Each condition of certification is followed by a means of "verification." The verification section describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. Verification procedures, unlike conditions, may be modified as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

- 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;
- appropriate letters from delegate agencies verifying compliance;
- Energy Commission staff audit of project records; and/or

- Energy Commission staff inspection of mitigation and/or other evidence of mitigation.

Verification lead times (e.g., 90,60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
Contra Costa Power Plant, Unit 8 (00-AFC-1C)
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.

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 Compliance Reports.

COMPLIANCE MATRIX

The project owner shall submit a compliance matrix to the CPM along with each Monthly and Annual Compliance Report. The compliance matrix is intended to

provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

- the technical area,
- the condition number,
- a brief description of the verification action or submittal required by the condition,
- the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.),
- the expected or actual submittal date,
- the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable, and
- 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.

PRE-CONSTRUCTION MATRIX

Prior to commencing construction a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal. It will be in the same format as the compliance matrix referenced above.

START OF CONSTRUCTION

Construction shall not commence until this matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing the start of construction. Project owners frequently anticipate starting project construction as soon as the project is certified. In some cases it may be necessary for the project owner to file submittals prior to certification if the required lead-time extends beyond the day anticipated for the start of construction. It is important that the project owner understand that pre-construction activities initiated prior to certification are performed at their own risk. Failure to allow appropriate lead-time may cause delays in start of construction.

MONTHLY COMPLIANCE REPORT

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date that the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the Key Events List. The Key Events List is found at the end of this section.

During pre-construction and 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:

- 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;
- 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;
- 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);
- a list of conditions which have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;
- a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
- a cumulative listing of any approved changes to conditions of certification;
- a listing of any filings with, or permits issued by, other governmental agencies during the month;
- a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance conditions of certification;
- a listing of the month's additions to the on-site compliance file;
- any requests to dispose of items that are required to be maintained in the project owner's compliance file;
- a listing of complaints, notices of violation, official warnings, and citations received during the month; and
- a description of the resolution of any complaints which have been resolved, and the status of any unresolved complaints.

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 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:

- 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);
- a summary of the current project operating status and an explanation of any significant cha`nges to facility operations during the year;
- 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;
- a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
- an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
- a listing of filings made to, or permits issued by, other governmental agencies during the year;
- a projection of project compliance activities scheduled during the next year;
- a listing of the year's additions to the on-site compliance file;
- 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];
- a listing of complaints, notices of violation, official warnings, and citations received during the year; and
- a description of the resolution of any complaints which have been resolved, and the status of any unresolved complaints.

CONFIDENTIAL INFORMATION

Any information that 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 that 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 shall pay a filing fee in the amount of eight hundred and fifty dollars ($850). The payment instrument shall be provided to the Commission's Project Manager at the time of project certification and shall be made payable to the California Department of Fish and Game. The Commission's Project Manager will submit the payment to the Office of Planning and Research at the time of filing of the Notice of Decision pursuant to Public Resources Code Section 21080.5.

REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. The telephone number shall be posted at the project site and easily visible to passersby during construction and operation.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the Complaint Form which follows:

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME:
AFC Number:

COMPLAINT LOG NUMBER _____
Complainant's name and address:

Phone number:

Date and time complaint received:

Indicate if by telephone or in writing (attach copy if written):
Date of first occurrence:

Description of complaint (including dates, frequency, and duration):

Findings of investigation by plant personnel:

Indicate if complaint relates to violation of a CEC requirement:
Date complainant contacted to discuss findings:

Description of corrective measures taken or other complaint resolution:

Indicate if complainant agrees with proposed resolution:
If not, explain:

Other relevant information:

If corrective action necessary, date completed:
Date first letter sent to complainant: _____(copy attached)
Date final letter sent to complainant: _____(copy attached)

This information is certified to be correct.
Plant Manager's Signature: _____ Date:

(Attach additional pages and supporting documentation, as required.)

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting that 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

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

Unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or other emergency.

UNEXPECTED PERMANENT CLOSURE

Unplanned permanent closure occurs when the project owner closes the facility suddenly and/or unexpectedly on a permanent basis. This includes the scenario in which the owner remains accountable for implementing the on-site contingency plan as well as the scenario in which 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 will be undertaken that will provide for careful consideration of available options and applicable LORS, and local/regional plans in existence at the time of closure. 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:

- 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.
- 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;
- identify all facilities or 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 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 an indefinite period; and
- address conformance of the plan with all applicable LORS and local/regional plans in existence at the time of facility closure as well as applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the CPM for the purpose of discussing the specific contents of the plan.

Also, in the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Commission may hold public hearings as part of its approval procedure.

Prior to or during the closure plan process, the project owner shall take appropriate steps as necessary 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 steps necessary 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 that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the Annual Compliance Reports submitted to the Energy Commission, the project owner will review the on-site contingency plan and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days (unless other arrangements are agreed to by the CPM), the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

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 developed and submitted to the CPM within 90 days of the determination. The CPM and the project owner may agree to a period of time other than 90 days.

UNEXPECTED PERMANENT CLOSURE

The on-site contingency plan required for unexpected temporary closure shall also cover unexpected permanent facility closure. All of the requirements specified for unexpected temporary closure shall also apply to unexpected permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

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 where required, 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.

The specific action and amount of any fines the Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history and whether the cause of the incident involves willful disregard of LORS, inadvertence, and unforeseeable events.

Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, 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, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

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:

- immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

- secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;
- 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
- 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 General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et. seq.

Within 30 days after receipt of a written compliant or 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, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES

The project owner must petition 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; or 3) transfer ownership or operational control of the facility.

A petition is required for **amendments** and for **insignificant project changes**. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209. The criteria that determine which type of change process applies are explained below.

AMENDMENT

A proposed change will be processed as an amendment 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 PROJECT CHANGE

The proposed change will be processed as an insignificant project change if it does not require changing the language in a condition of certification, have a potential for significant environmental impact, or cause the project to violate LORS.

VERIFICATION CHANGE

Pursuant to Title 20, California Code of Regulations, section 1770 (d), the staff may modify the verification provisions as necessary to enforce the conditions of certification without requesting an amendment to the decision.

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 unlikely event that verification language contains technical requirements, the proposed change must be processed as an amendment.

KEY EVENT LIST

PROJECT _____ DATE ENTERED

DOCKET # _____ PROJECT MANAGER

EVENT DESCRIPTION	***DATE ASSIGNED***
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	
Completion of Water Supply Line Construction	
Start Implementation of Erosion Control Measures	
Complete Implementation of Erosion Control Measures	

PREPARATION TEAM

Executive Summary……Cheri Davis

Introduction..... ……Cheri Davis

Project Description ..... ……Cheri Davis

Air Quality.....Tuan Ngo

Public Health .....Michael Ringer

Worker Safety and Fire Protection.....Rick Tyler & Alvin J. Greenberg

Transmission Line Safety and Nuisance ..... Obed Odoemelam

Hazardous Materials.....Rick Tyler & Alvin J. Greenberg

Waste Management .....Michael Ringer

Land Use .....Jon Davidson

Traffic and Transportation .....Steven J. Brown

Noise .....Thomas M. Murphy

Visual Resources..... Bill Kanemoto

Cultural Resources .....Gary Reinoehl & Dorothy Torres

Socioeconomics ..... Amanda Stennick

Biology.....Jim Buchholz, Mary Hammer, Shannon Lucas & Richard Anderson

Water and Soils .. Jack Buckley, Joe Crea, James C. Henneforth & Richard Sapudar

Paleontological Resources ..... Robert Anderson

Facility Design .....M. Kisabuli, Steve Baker & Al McCuen

Reliability .....Steve Baker

Efficiency .....Steve Baker

Transmission System Engineering .....Laiping Ng & Richard Minetto

Alternatives..... Cheri Davis & Kae Lewis

Compliance Monitoring Plan and General Conditions.....Jeri Zene Scott

Glossary of Terms and Acronyms.....Cheri Davis

Project Secretary.....Chester Hong

Support Staff .....Luz Manriquez, Pat Owens & Mary Dyas