

Final Staff Assessment - Part 1

# MORRO BAY POWER PLANT PROJECT

Application For Certification (00-AFC-12)  
San Luis Obispo County

**CALIFORNIA  
ENERGY  
COMMISSION**

**STAFF REPORT**

**NOVEMBER 2001  
(00-AFC-12)**



Gray Davis, Governor

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**CALIFORNIA  
ENERGY  
COMMISSION**

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# EXECUTIVE SUMMARY

Kae C. Lewis

## INTRODUCTION

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This Final Staff Assessment (FSA) Part 1 contains the Energy Commission staff's analysis and recommendation on the Morro Bay Power Plant project (MBPP) in all areas except alternatives, biological resources, cultural resources, land use and soil and water resources. The MBPP 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 agency (Pub. Resource Code §25519(c)) under the California Environmental Quality Act (Pub. Resource Code §§21000 et seq.), and prepares an environmental analysis that is 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 1201 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.).

The staff is an independent party in the proceedings and this FSA presents staff's independent analyses. It examines engineering and environmental aspects of the MBPP, based on information available at the time of document creation. The FSA contains analyses similar to those contained in Environmental Impact Reports required by the California Environmental Quality Act (CEQA). It is not a Committee document nor is the FSA a final or proposed decision on the proposal. The FSA presents staff's conclusions and proposed conditions that apply to the design, construction, operation, and closure of the proposed facility, if certified.

This Part I of the FSA contains the index of comments on the Preliminary Staff Assessment (PSA) that were received from other agencies and members of the public from June until mid-September. This index, along with copies of the comments, are included in an appendix.

A discussion of environmental justice is contained in the Socioeconomics section of this FSA Part 1. The purpose of the environmental justice analysis is to determine whether there exists a low-income and/or minority population within the potential affected area of the proposed project. If such a population exists in the project area, staff must determine if any significant impacts that may be attributed to the MBPP falls disproportionately on that population.

## **PROJECT LOCATION AND DESCRIPTION**

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On October 23, 2000 Duke Energy Morro Bay LLC (Duke Energy or applicant) filed an Application for Certification (AFC) seeking approval from the California Energy Commission (Energy Commission) to construct and operate the proposed 1,200-megawatt (MW) Morro Bay Power Plant Project (MBPP) on the site of the existing (formerly PG&E-owned) power plant in the City of Morro Bay (County of San Luis Obispo). Off-site construction laydown and parking areas that are located several miles south of the power plant are also part of the project.

The new units will replace currently operating generation units 1-4 with two 600 MW combined cycle units. Each new unit will consist of two gas-fired turbines and one steam turbine. Each new unit will have two, 145 foot tall stacks in place of the existing plant's three 450 foot tall stacks. To control emissions of air pollutants, the MBPP's combined cycle units will use the best available control technology (BACT), including selective catalytic reduction (SCR) for control of nitrogen oxides (NOx) and an oxidation catalyst for control of carbon monoxide. The SCR system consists of the reduction catalyst and an aqueous ammonia injection system.

Natural gas will continue to be delivered from Pacific Gas and Electric Company's Kettleman Compressor Station through PG&E pipeline 306. The MBPP will continue to interconnect with the electrical grid at the existing PG&E switchyard located on the plant site. The combined cycle units are expected to use a maximum of 475 million gallons per day (gpd) of seawater for cooling and boiler makeup. MBPP's freshwater usage will be about 10,000 gpd from its onsite wells for routine operation and maintenance.

Duke Energy proposes construction of the new generating units in a single construction phase lasting 21 months. Based on construction beginning in late 2002, commercial operation will begin in late 2004. The project will include demolition of the on-site fuel oil tank farm, all existing power plant equipment (boiler-steam turbine complex), and removal of three 450 feet tall exhaust stacks. The capital cost of the MBPP is expected to be \$650 million. All construction and demolition at MBPP should be complete by year 2007-08.

## **STAFF'S ASSESSMENT**

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Each technical area assessment in the FSA 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.

### **PART I OF THE FINAL STAFF ASSESSMENT (FSA)**

Staff's FSA will be completed in two parts. Part 1 consists of the following 15 technical areas, which staff considers complete:

Air Quality	Socioeconomics
Efficiency	Traffic & Transportation
Facility Design	Trans. Line Safety & Nuisance
Geology & Paleontology	Trans. System Engineering
Hazardous Materials	Visual Resources
Noise & Vibration	Waste Management
Public Health	Worker Safety & Fire Protection
Reliability	General Conditions/Compliance

In each of these technical areas staff believes that if recommendations and conditions of certification are implemented, the MBPP project will be in compliance with the applicable LORS, and no significant adverse direct, indirect, or cumulative impacts will occur.

All of these technical areas were subjects of workshop discussions during the year 2001. Staff has received written comments from various parties on these subjects. Staff's conclusions, recommendations and proposed conditions of certification for these topic areas reflect those workshop discussions and written comments. Staff does not expect there to be major controversy in these topic areas.

## **PART II OF THE FINAL STAFF ASSESSMENT (FSA)**

Four technical areas have not been included in Part I because the information needed to complete the analysis is not yet available to staff: These technical areas include biological resources, cultural resources, land use, and soil and water resources. In addition, the alternatives section cannot be concluded until all other technical sections are completed. The staff is developing an evaluation on cooling water options to mitigate biological impacts to aquatic species. Along with these sections, this report will be included in Part II of the FSA as an appendix to the Biological Resources section.

The need for additional information in the technical areas below was partially generated by the applicant's submittal of project modifications on October 19, 2001. These modifications are the following: 1) changes in the installation method of the gas pipeline, 2) changes in the locations of on-site parking and construction laydown areas, and, 3) construction of a temporary pedestrian bridge over Willow Camp Creek. The unresolved issues in related technical areas are presented below:

- **Biological Resources**

There are three outstanding issues in biological resources: 1) the staff has requested additional information concerning the project modifications proposed by the applicant on October 19; 2) staff is awaiting information from the US Fish and Wildlife Service (USFWS) concerning the status of the Section 7 (of the Endangered Species Act, or ESA) consultation for species potentially impacted by the project; and, 3) staff is completing the report on cooling water options and compensation to mitigate the impacts of the project on aquatic species.

Biology staff have submitted requests for additional information on project modifications related to the installation of the high pressure gas pipeline. The concern expressed by staff and other agencies (California Department of Fish and Game, National Marine

Fisheries Services (NMFS), and California Coastal Commission) relates to proposed changes in installation methods and their impact on sensitive species and designated environmentally sensitive habitat areas at the project site. Staff expects information from the applicant by late November and a resolution of this issue with the applicant and other agencies soon after.

The applicant has resubmitted its Biological Assessment to the US Environmental Protection Agency (USEPA) during the week of November 5. Upon receiving the Biological Assessment from the USEPA, the NMFS and the USFWS will decide whether to initiate a formal consultation in accordance with Section 7 of the ESA. If the necessary consultation is deemed *formal* the resulting process will be more comprehensive and will result in a Biological Opinion (and incidental take permit) which the staff must incorporate in their FSA. Likewise, if the consultation is deemed *informal* staff will incorporate in their FSA any agreement between the USFWS, NMFS and the applicant on mitigation to impacts of any terrestrial and aquatic species of concern.

The staff of the Energy Commission continues to work cooperatively with the staff of the Central Coast Regional Water Quality Control Board (CCRWQCB) which is issuing the MBPP's National Pollutant Discharge Elimination System (NPDES) permit. The analyses of both staff (and their joint Technical Working Group) has resulted in an identification of significant impacts to aquatic species as a result of the existing MBPP's once-through cooling water system that draws from Morro Bay. The CCRWQCB staff has requested that the Energy Commission provide them with a site-specific CEQA analysis of cooling water and compensation options before issuing their draft NPDES permit. The scope of this evaluation, which is necessary to the completion of both the Energy Commission's FSA and the CCRWQCB's NPDES, was presented in the staff's Preliminary Staff Assessment (PSA). The staff expects the analysis to be concluded by late November.

- **Cultural Resources**

Ground disturbance due to project construction has the potential to adversely affect both previously identified and currently unknown Native American cultural resources. The applicant has engaged in cultural resources surveys to identify impacts and has proposed mitigation, which includes the avoidance of certain locations on the plant site. Staff is concerned that the proposed project modifications, and especially the changes in the on-site parking and laydown areas, may impact identified cultural sites denoted by CA-SLO-16 and CA-SLO-239. Cultural staff has requested details concerning construction locations and methods from the applicant that they expect to receive by late November.

- **Land Use**

Staff has requested additional information from the applicant about changes in the temporary parking area. The specific concern is an impact to land designated in the Morro Bay Coastal Land Use Plan as environmentally sensitive. Staff expects to receive this information by late November.

- **Soil and Water Resources**

With the project modifications the applicant proposes new locations for clearing, grading, and trenching activities. Staff has requested necessary revisions to the MBPP's Stormwater Pollution Prevention Plan (SWPPP) submitted by the applicant in June 2001

which may be necessary due to these modifications. In addition, the applicant must indicate to staff if permits will be required by these modifications and provide written confirmation from the appropriate agencies. Staff expects to receive this information by late November.

- **Alternatives**

The alternatives analysis cannot be completed until the identification of significant impacts in all technical areas is complete. When the technical areas mentioned above are complete and any significant impacts are identified, staff can complete its evaluation of whether project alternatives would mitigate these significant impacts.

## **STAFF'S RECOMMENDATION**

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For each of the technical areas in Part I of the FSA, staff believes that if recommendations and conditions of certification are implemented, the MBPP project will be in compliance with the applicable LORS, and no significant adverse direct, indirect, or cumulative impacts will occur.

Staff has not completed its analyses for the following technical areas: alternatives, biological resources, cultural resources, land use, and soil and water resources. These will be completed after the staff obtains additional information from the applicant and other agencies. Their conclusions and recommendations will be presented in Part II of the MBPP's FSA which will be available at a later date.

**MORRO BAY POWER PLANT PROJECT (00-AFC-12)  
FINAL STAFF ASSESSMENT**

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# INTRODUCTION

Kae C. Lewis

## PURPOSE OF THIS REPORT

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

- the project and the existing environmental setting;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (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 FSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The FSA 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, § 21000 et seq.).

## **ORGANIZATION OF THE FINAL STAFF ASSESSMENT (PART I)**

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This Final Staff Assessment (FSA) Part 1 contains the Energy Commission staff's analysis and recommendation on the Morro Bay Power Plant project (MBPP) in all areas except alternatives, biological resources, cultural resources, land use and soil and water resources which will be filed as FSA Part II at a later date. The FSA Part I contains an executive summary, introduction, and project description as well as sections dedicated to the following technical subjects: air quality, public health, worker safety and fire protection, transmission line safety and nuisance, hazardous materials management, waste management, traffic and transportation, noise and vibration, visual resources, socioeconomics, geology and paleontology, 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 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**

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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 Preliminary Staff Assessment (PSA) presents for the applicant, intervenors, agencies, other interested parties and members of the public, the staff's preliminary analysis, conclusions, and recommendations. The PSA for this project was filed on May 25, 2001.

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 conducts workshops to discuss their findings, propose mitigation, and propose compliance monitoring requirements. These workshops for the MBPP were held in Morro Bay during the month of June, 2001. Based on the workshops and written comments, staff refines their analysis, corrects errors, and finalizes conditions of certification to reflect areas where agreement has been reached among the parties. Responses to written comments on the PSA are 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 is considered by the Committee (two commissioners who have been assigned to a 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 are 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 is 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 is assembled from conditions contained in the FSA and other evidence presented at the hearings. The Compliance

Monitoring Plan and General Conditions is 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 FSA.

# PROJECT DESCRIPTION

Kae C. Lewis

## NATURE AND PURPOSE OF PROJECT

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On October 23, 2000 Duke Energy Morro Bay LLC filed an Application for Certification (AFC) seeking approval from the California Energy Commission (Energy Commission) to construct and operate the proposed net 1,200 megawatt (MW) natural-gas fired, combined cycle, combustion turbine Morro Bay Power Plant Project. (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 will be violated.) The project will add an additional net 198 MW to be generated at the site of the current net 1,002 MW Morro Bay Power Plant.

## PROJECT LOCATION

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The "modernization" Project is proposed to be located at the existing 107-acre Morro Bay Power Plant site that is owned and operated by Duke Energy. The project site is located within the City of Morro Bay, San Luis Obispo County, near Morro Bay Harbor, bordered on the west by Embarcadero Road and on the east by Highway 1. See **PROJECT DESCRIPTION Figures 1 and 2** for the regional and local vicinity setting of the project. Construction laydown and parking areas are proposed for both on-site and off-site locations.

## POWER PLANT FACILITIES

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The new units will replace currently operating generation Units 1 and 2 (326 megawatts [MW], 1950's technology) and Units 3 and 4 (676 megawatts [MW], 1960's technology) with two state-of-the-art 600 MW combined cycle units. Each new unit will be capable of producing 600 MW, so that upon completion, the Plant will be capable of producing a total of 1,200 MW. Each new unit will consist of two gas-fired turbines and one steam turbine driven by the heat produced by the other two turbines. Each new unit will have two, 145 foot tall stacks compared with the existing plant's three 450 foot tall stacks. See **PROJECT DESCRIPTION Figures 3 and 4** for the project site map and layout of the proposed Morro Bay Power Plant project.

The new units are expected to be used for intermediate load operations. The units' duct-fired design enables approximately 84 MW of additional peak capacity per combined cycle unit when required by the electrical system or market conditions. To control emissions of air pollutants, the MBPP's combined cycle units will use the best available control technology (BACT) including the selective catalytic reduction (SCR) for control of nitrogen oxides (NOx) and an oxidation catalyst for control of carbon monoxide. The SCR system consists of the reduction catalyst and an aqueous ammonia injection system.

## **NATURAL GAS PIPELINE**

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Natural gas will be delivered from Pacific Gas and Electric Company through pipeline 306, which was built for units 1-4. Pipeline 306, which is 20 inches in diameter, runs south from the Kettleman Compressor Station to Morro Bay. Natural gas at Kettleman originates from the south with El Paso Natural Gas in Arizona and from the north with PG&E/Northwest in Oregon. The project will require a new natural gas tie-in that is to be located onsite east of the existing natural gas regulating station and metering station.

## **WATER SUPPLY AND WASTEWATER**

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The combined cycle units are expected to use a maximum of 475 million gallons per day (gpd) of seawater for cooling and boiler makeup. The cooling water intake is proposed to continue at its existing location on Morro Bay although the intake building will be architecturally modified. The cooling water is discharged to the Pacific Ocean through a canal outfall entering Estero Bay, north of Morro Rock. MBPP's freshwater usage will be about 10,000 gpd for routine operation from its onsite wells. For short-term maintenance activities more than 80,000 gpd may be used. Wastewater streams consist of sanitary uses, process wash and stormwater. Some components of these streams will require treatment before disposal in the discharge outfall or local sewer system.

## **TRANSMISSION LINE FACILITIES**

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The MBPP will continue to interconnect with the electrical grid at the Pacific Gas & Electric Company's existing 230 kV switchyard located on the plant site. No new electric transmission lines are expected to be required.

## **OFF-SITE CONSTRUCTION LAYDOWN AND PARKING FACILITIES**

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Off-site construction laydown or staging areas are proposed for Camp San Luis Obispo (SLO) which is located eight miles southeast of Morro Bay. Camp SLO is owned by the State of California and used for Army National Guard activities. Three areas within Camp SLO which total 40 acres will be used for construction supplies and equipment. In addition, an off-site temporary parking area of approximately 11 acres is proposed to be located two miles south of Morro Bay in the Chorro Creek valley (see **PROJECT DESCRIPTION Figure 5**).

## **DEMOLITION, CONSTRUCTION AND OPERATION**

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Duke Energy proposes construction of two new generating units in a single construction phase lasting 21 months, with initial start-up to follow one month later. Based on construction beginning in late 2002, commercial operation will begin in late 2004. The capital cost of the Morro Bay Power Plant project is expected to be \$650 million.

The Project will include demolition of the on site fuel oil tank farm, all existing power plant equipment (boiler-steam turbine complex), and removal of three 450 feet tall exhaust stacks.

Stage one: demolition of the tank farm will take three months and should be complete by late 2002 or early 2003. Stage two: demolition of the three 450 foot stacks will begin after commercial operation of the new units and will take 9 months. Stage three: dismantling of the existing units will take 34 months. All construction and demolition at MBPP should be complete by year 2007-08.

The construction force necessary for the three construction stages are expected to be as follows: Stage I will require an average of 35 workers. Stage II will require roughly 900 workers during the peak months and 400 on average. Stage III will require 100 workers during the peak months and 40 on average. Once the new units are on line, the operational staff required is expected to be about 75 employees.

A series of traffic, landscaping and aesthetic project features are also proposed including Class I and II bike paths, installation of a bridge across Morro Creek, appropriate landscaping, and refurbishment of the cooling water intake structure on Morro Bay.

# **ENVIRONMENTAL ASSESSMENT**

# AIR QUALITY

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## INTRODUCTION

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This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the Morro Bay Power Plant Project. Criteria air pollutants are those for which a state or federal standard have been established. They include nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), ozone (O<sub>3</sub>) and its precursors nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC), and particulate matter less than 10 and 2.5 microns in diameter (PM<sub>10</sub> and PM<sub>2.5</sub>) and their precursors (NO<sub>x</sub>, VOC, and SO<sub>x</sub>.)

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

- Whether the Morro Bay Power Plant Project is likely to conform with applicable Federal, State, and San Luis Obispo County Air Pollution Control District (District or SLOAPCD) air quality laws, regulations and standards, as required by Title 20, California Code of Regulations, sections 1744(b) and 1744.5 (b),
- Whether the Morro Bay Power Plant Project is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, sections 1742(b) and 1742.5 (b), and
- Whether the mitigation proposed for the Morro Bay Power Plant Project is adequate to lessen the potential impacts to a level that is less than significant, as required by Title 20, California Code of Regulations, section 1742(b), and 1742.5(a).

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### FEDERAL

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

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

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

The U.S. Environmental Protection Agency (EPA) has reviewed and approved the District regulations and has delegated to the District the implementation of the Title IV including the acid rain program and NSR programs. The District implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations. However, PSD analysis will be performed by the EPA staff.

## **STATE**

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

The California Air Resources Board (CARB) promulgates state-level ambient air quality standards, which are, in general, more stringent than the national ambient air quality standards. Table 6.2-8 in the Application for Certification (AFC) presents a summary of the current national and state ambient air quality standards. The California Clean Air Act requires the establishment of allowable maximum ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by CARB, are typically lower (more protective) than the federal AAQS

## **LOCAL**

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the applicant for the Morro Bay Power Plant Project, 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 following District major rules.

### **District Rule NO. 113 - Continuous Emissions Monitoring (CEM)**

The requirements of this Rule are applicable to all the combustion equipment contained in these applications. CEMs will be installed, calibrated, maintained, and operated in accordance with EPA standards. Pollutants monitoring may include NO, O<sub>2</sub>, CO and ammonia (NH<sub>3</sub>).

### **District Rule NO. 203 - applications**

The District used the AFC as an application for the Morro Bay Power Plant Project. The AFC includes each permit unit and utilized the District's permit application forms as required by this Rule.

### **District rule no. 204 – requirements**

An Application for an Authority to Construct (ATC) can not be granted unless the new unit is equipped with the current Best Available Control Technology (BACT) for all air contaminants and can comply with all BACT, offsets, and operation requirements.

### **District rule no. 216 – federal part 70 permits**

This rule specifies the requirements and procedures by which a specific source, such as the proposed project, may obtain a Federally enforceable operating permit in accordance with the requirements of Part 70 to Title 40 of the Code of Federal Regulations (CFR).

### **District rule no. 217 – federal part 72 permits**

The provisions of this Rule shall apply to any acid rain source, as defined in 40 CFR Part 72.

### **District rule no. 403 – particulate matter emission standards**

A person shall not discharge into the atmosphere from any source particulate matter in excess of 0.3 grains per cubic foot of dry gas at standard conditions.

### **District rule no. 404 – Sulfur compounds emission standards, limitations and prohibitions**

A person shall not discharge elemental sulfur into the atmosphere from any new or modified recovery unit producing, effluent gas containing more than; a) 0.2 percent by volume of sulfur compounds calculated as sulfur dioxide, b) 10 ppm by volume of hydrogen sulfide, c) 200 pounds per hour of sulfur compounds calculated as sulfur dioxide.

### **District rule no. 405 – nitrogen oxides emission standards and limitations**

A person shall not build, erect, install or expand any non-mobil burning equipment unit unless the discharge into the atmosphere does not exceed 140 pounds per hour of nitrogen dioxide.

### **District rule no. 406 – Carbon monoxide emission standards and limitations**

A person shall not discharge into the atmosphere carbon monoxide in concentration exceeding 2000 ppm by volume measured on a dry basis.

### **District rule no. 601 – new source performance standards (nsps)**

This Rule applies to all new, modified or reconstructed stationary sources of air pollution. The most stringent provision shall apply whenever any source is subject to more than one rule, regulation, provision, or requirement relating to the control of any air contaminant.

### **ACID RAIN**

The Morro Bay Power Plant Project will be subject to the requirements of Title IV of the federal Clean Air Act. The requirements of the Acid Rain Program are outlined in 40 CFR Part 72. The specifications for the type and operation of continuous emission monitors (CEMs) for pollutants that contribute to the formation of acid rain are given in 40 CFR Part 75. District Rule 217 incorporates by reference the provisions of 40 CFR Part 72. Pursuant to 40 CFR Part 72.30(b)(2)(ii), Morro Bay Power Plant Project must submit an Acid Rain

Permit Application to the District at least 24 months prior to the date on which each unit commences operation. Pursuant to 40 CFR Part 72.2, "commence operation" includes the start-up of the unit's combustion chamber.

## **SETTING**

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### **METEOROLOGY AND CLIMATE**

The project site is dominated by the semi-permanent pacific high-pressure system centered off the coast of California. During the summer months, the high pressure moves to the north, which mostly results in a strong inversion and clear skies inland. The summer is typically mild with little precipitation. The onshore airflow typical in the summer over the cool ocean waters results in the fog and clouds common along the Northern California coast.

During the winter months, the high pressure moves towards the southwest which allows storms originating in the Gulf of Alaska to reach northern California. Most of the annual rainfall, ranging from 10 to 30 inches, occurs between November and March. During the winter, winds from the east are more frequent, resulting from land temperatures being cooler than the ocean temperatures. Annual wind roses can be found in the Application for Certification.

Temperatures at the site are moderated by the proximity of the ocean. In the summer, a daily temperature ranges between the low 50s to mid-70s degrees Fahrenheit. In the winter, the daily temperatures average lows are about 42 and the average highs are 60 degrees Fahrenheit.

Along with the winds, another climatic factor is atmospheric stability and mixing height. Atmospheric stability is an indicator of the air turbulence and mixing. During the daylight hours of the summer when the earth is heated and air rises, there is more turbulence, more mixing and thus less stability. During these conditions, there is more air pollutant dispersion and therefore usually fewer air quality impacts from a single air pollution source. During the winter months between storms, very stable atmospheric conditions can occur, resulting in very little mixing. Under these conditions, little air pollutant dispersion occurs, and consequently higher air quality impacts can result from stationary and mobile source emissions. Mixing heights are generally lower during the winter, along with lower mean wind speeds and less vertical mixing. For the Morro Bay Power Plant Project, the nearest upper level meteorological station is Vandenberg Air Force Base, which is located 45 miles southeast of the project site and 3 miles from the coast. The District agreed that this site is representative of the proposed project site. The data from that station show that during the summer and fall months, the mixing heights vary between 900 to 1450 feet, and 1700 to 3900 feet in the winter and spring months. That is because of higher wind on the coast during the winter than summer.

### **EXISTING AIR QUALITY**

The Federal Clean Air Act and the California Clean Air Act both require the establishment of allowable maximum ambient concentrations of air pollutants called ambient air quality

standards (AAQS). The state AAQS, established by CARB, are typically lower (more protective) than the federal AAQS, which are established by the federal Environmental Protection Agency (USEPA). The state and federal air quality standards are listed in **AIR QUALITY Table 1**. As indicated in **AIR QUALITY Table 1**, the averaging times for the various air quality standards (the duration over which they are measured) range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air ( $\text{mg}/\text{m}^3$  and  $\mu\text{g}/\text{m}^3$ ).

In general, an area is designated as attainment for a specific pollutant if the measured concentrations of that air contaminant do not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that standard is violated. Where not enough ambient data are available to support designation as either attainment or non-attainment, the area can be designated as unclassified. Unclassified areas are normally treated the same as attainment areas for regulatory purposes. An area can be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same contaminant. The entire area within the boundaries of a district is usually evaluated to determine the district's attainment status.

The proposed Morro Bay Power Plant Project (MBPP) is located on the site of the existing Morro Bay Power Plant, in the city of Morro Bay between State Highway 1 and the Pacific ocean. The District collects ambient air quality data at monitoring sites throughout the air basin. The data is used to determine attainment status and define air quality trends. This area is designated attainment for the state's CO, NO<sub>2</sub>, SO<sub>2</sub>, and SO<sub>4</sub> standards, and attainment for all federal air quality standards (ARB 1999). The area is also designated attainment for three federal ozone and PM<sub>10</sub> standards and non-attainment for the state standards. Pages 6.2-16 to 6.2-22 of the AFC presents details of the air quality trends in the project air basin. Summaries are presented below.

In July, 1997, the EPA promulgated new ozone and PM<sub>2.5</sub> (particulate matter less than 2.5 microns in diameter) ambient air quality standards, which are shown in **AIR QUALITY Table 1**. The new 8-hour ozone standard will replace the existing 1-hour standard. The PM<sub>2.5</sub> standards will be in addition to the existing PM<sub>10</sub> standards. Although the standards may be set, the EPA will first have to designate areas which violate these new standards, and then air districts with jurisdiction in those areas will have to prepare implementation plans to reach attainment of those standards.

**AIR QUALITY Table 1**  
**Federal and State Ambient Air Quality Standards**

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O <sub>3</sub> )	1 Hour	0.12 ppm (235 µg/m <sup>3</sup> )	0.09 ppm (180 µg/m <sup>3</sup> )
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m <sup>3</sup> )	9 ppm (10 mg/m <sup>3</sup> )
	1 Hour	35 ppm (40 mg/m <sup>3</sup> )	20 ppm (23 mg/m <sup>3</sup> )
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Average	0.053 ppm (100 µg/m <sup>3</sup> )	---
	1 Hour	---	0.25 ppm (470 µg/m <sup>3</sup> )
Sulfur Dioxide (SO <sub>2</sub> )	Annual Average	80 µg/m <sup>3</sup> (0.03 ppm)	---
	24 Hour	365 µg/m <sup>3</sup> (0.14 ppm)	0.04 ppm (105 µg/m <sup>3</sup> )
	3 Hour	1300 µg/m <sup>3</sup> (0.5 ppm)	---
	1 Hour	---	0.25 ppm (655 µg/m <sup>3</sup> )
Particulate Matter (PM <sub>10</sub> )	Annual Geometric Mean	---	30 µg/m <sup>3</sup>
	24 Hour	150 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>
	Annual Arithmetic Mean	50 µg/m <sup>3</sup>	---
Particulate Matter (PM <sub>2.5</sub> ) (Not in effect yet)	Annual Arithmetic Mean	15µg/m <sup>3</sup> 3-year average	
	24 Hour	65µg/m <sup>3</sup> 3-year average of 98 <sup>th</sup> percentile	
Sulfates (SO <sub>4</sub> )	24 Hour	---	25 µg/m <sup>3</sup>
Lead	30 Day Average	---	1.5 µg/m <sup>3</sup>
	Calendar Quarter	1.5 µg/m <sup>3</sup>	---
Hydrogen Sulfide (H <sub>2</sub> S)	1 Hour	---	0.03 ppm (42µg/m <sup>3</sup> )
Vinyl Chloride (chloroethene)	24 Hour	---	0.010 ppm (26 µg/m <sup>3</sup> )
Visibility Reducing Particulates	1 Observation	---	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

## **Ambient Ozone**

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted air pollutants. In the presence of sunlight (ultraviolet radiation), nitrogen oxides (NO<sub>x</sub>) and hydrocarbons (volatile organic

compounds (VOCs) interact to form ozone. The reaction can take several hours to occur, so ozone generally forms downwind and/or lags the timing of the emissions peaks.

**AIR QUALITY Table 2** summarizes the best representative ambient air quality data collected from three different monitoring stations close to the project site. The Morro Bay Monitoring Station is located in the city of Morro Bay where the project will be constructed. San Luis Obispo Monitoring Station is located southeast of the proposed project location. Atascadero Monitoring Station is located northeast of the proposed project location. All three Monitoring Stations are capable of gaseous and particulate monitoring.

Generally, the ozone formation is high in the summer time and low in the winter time. The Project site air basin is classified as a nonattainment area for ozone because it violates California Ambient Air Quality State Standards (CAAQS) but is in attainment for the federal one hour standard. The table also shows the maximum hourly concentration and the number of days above the State standards.

**AIR QUALITY Table 2**  
**South Central Coast**  
**1-hour Ozone Ambient Air Quality Data (ppm)**

Monitoring Station	1-hour Measurements	1994	1995	1996	1997	1998	1999	2000
Morro Bay	Max. concentration (ppm)	0.06	0.08	0.07	0.06	0.07	0.10	0.06
	# days exceed State standard	0	0	0	0	0	1	0
San Luis Obispo	Max. concentration (ppm)	0.07	0.08	0.08	0.07	0.07	0.09	0.08
	# days exceed State standard	0	0	0	0	0	0	0
Atascadero –Lewis Ave	Max. concentration (ppm)	0.10	0.10	0.10	0.09	0.10	0.09	0.08
	# days exceed State standard	2	1	7	0	2	0	0

California Ozone Ambient Air Quality Standard(CAAQS): 0.09 ppm (1-hour average)  
National Ozone Ambient Air Quality Standard (NAAQS): 0.12 ppm (1-hour average)  
Source: CARB & San Luis Obispo County Air Pollution Control District (SLOAPCD)

## Ambient PM10

PM10 can be emitted directly as a product of natural gas combustion, or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NOx, SOx, and VOC from turbines, and NH3 from NOx control equipment can, given the right meteorological conditions, form particulate matter known as secondary particulates. They are secondary particulates because they are not directly emitted from the stack but are formed through complex chemical reactions in the atmosphere. As **AIR QUALITY Table 3** indicates, the project area experiences a number of violations of the state 24-hour PM10 standard. NOx emissions contribute significantly to the formation of secondary particulate nitrate in the region, and ammonium nitrate is the largest contributor to PM10 levels during the winter when ambient PM10 levels are at their highest. In Morro Bay, where the project will be built, there is only one violation of the State Standards (in 1997) during the last seven

years. According to the District, this violation was due to a fire in the area. San Luis Obispo County is expected to be attainment for the federal PM2.5 standard, so, no PM2.5 state implementation plan will be required for this area.

**AIR QUALITY Table 3  
South Central Coast  
24-hour PM10 Ambient Air Quality (mg/m3)**

Monitoring Station	Standard	1993	1994	1995	1996	1997	1998	1999	2000
Morro Bay	Highest 24-hour measurements	64	48	40	42	57	33	39	47
	# of days above	2	0	0	0	1	0	0	0
San Luis Obispo	Highest 24-hour measurements	57	37	51	39	55	32	42	44
	# of days above	1	0	1	0	2	0	0	0
Atascadero – Lewis Ave	Highest 24-hour measurements	78	44	52	39	55	47	43	67
	# of days above	5	0	3	0	1	0	0	2

- PM10 measurements only occur every 6 days, so the actual number of days that violate the standard can be 6 times greater than the number shown here.

- CAAQS is 50 (µg/m3)

Sources: CARB & SLOAPCD

## Ambient Air Quality CO, NO2, SO2

The project area is designated attainment for the state's CO, NO2, SO2, and SO4 standards, and attainment for the federal SO2, CO, and NO2 standards (ARB 1999). **Air Quality Table 3-A** shows the data collected are below the standards for for the last eight years.

**AIR QUALITY Table 3-A  
South Central Coast  
CO, NO2, SO2 Ambient Air Quality**

Pollutant/Monitoring Station	Averaging Time	Units of Measure	1993	1994	1995	1996	1997	1998	1999	2000
	<b>Carbon Monoxide (CO)</b>									
<b>SAN LUIS OBISPO</b>	1-hour	ppm	9	6	6	5	7	4	5	*
	#days std. exceed		0	0	0	0	0	0	0	*
	8-hour	ppm	3.2	3.2	3.1	2.9	2.6	2.3	3.1	*
	#days std. exceed		0	0	0	0	0	0	0	*
<b>Nitrogen Dioxide (NO2)</b>										
<b>San Luis Obispo</b>	1-hour	ppm	0.10	0.07	0.07	0.06	0.07	0.06	0.06	*
	#days std. exceed		0	0	0	0	0	0	0	*
<b>ATASCADERO</b>	1-hour	ppm	0.10	0.07	0.06	0.06	0.07	0.06	0.07	0.06
	#days std. exceed		0	0	0	0	0	0	0	0
<b>Sulfur Dioxide (SO2)</b>										
<b>MORRO BAY</b>	1-hour	ppm	0.01	0.01	0.038	**	**	**	**	**
	24-hour	ppm	0.000	0.000	0.005	**	**	**	**	**
#days std. exceed			0	0	0	**	**	**	**	**

Source: SLOAPCD

Notes: \* Data are not available.

\*\* Monitoring Terminated;

## PROJECT DESCRIPTION

### CONSTRUCTION PHASE

The construction phase includes the demolition of the existing fuel storage tanks which is expected to take three months. MBPP is planning to utilize the existing ancillary facilities (i.e., roads, transmission lines, and pipelines for reclaimed water, natural gas, and water). Any new required ancillary facilities will be limited to the project site and will not extend outside the fence line. The construction of the proposed power plant will result in temporary emissions for approximately 20 months. All construction scheduling is based on a 40-hour workweek. The construction activities will include site preparation including cleaning, grading and excavation for the foundation. After the site preparation is completed, the construction of the foundations will follow. Installations and assembly of the major equipment will begin soon after the foundation work is completed.

Fugitive dust will be emitted primarily during the site preparation, grading and excavation, vehicles travelling on the unpaved surfaces, and during the loading and unloading of soil from/to the site. Criteria pollutants also will be emitted during the construction of the project from combustion emissions. These emissions are primarily exhaust from the diesel construction equipment used in all phases of the site preparation, exhaust from water trucks, welding equipment, workers vehicles, delivery trucks, generators and compressors.

Appendix 6.2-5 in the AFC presents detailed construction emission estimates for fugitive dust, PM<sub>10</sub>, NO<sub>x</sub>, CO, SO<sub>x</sub>, and VOC emissions from vehicles. The Applicant's assumptions and emission factors are based on control measures, which are used to limit fugitive dust and vehicle emissions. Staff believes that the Applicant used the correct assumptions to calculate the fugitive dust and emission factors used to calculate the equipment emissions. These assumptions are described in the MITIGATION SECTION. It is important to understand that construction emissions are temporary, unavoidable and speculative. Detailed activity data can not be forecasted accurately and the emission factors used in these estimations are known to be worst case estimates. Therefore, the air emissions associated with the construction activities and their impact identified in this FSA are conservative.

### **COMMISSIONING AND OPERATIONAL PHASES**

"Commissioning" is the technical term used to describe, in general, all the initial operations of the power plant once it has been physically installed but is not yet in commercial operation. Commissioning starts with the first firing of fuel in the gas turbine. During commissioning the control systems are tested, the burners are tuned up, and the control systems are installed after determining that there are no contaminants in the gas turbines that may damage the surfaces of the catalyts. During the commissioning period, which can last for several weeks, the power plant may or may not operate without emission controls. Commissioning ends with the start of commercial operation. Permit to Operate (PTO) from the local air district is issued when the facility successfully passed the required source test.

The existing facility at Morro Bay consists of four boilers and generates approximately 1002 MW. The proposed facility will have two combined-cycle units. Each combined cycle unit is 600 MW and is equipped with two gas turbines rated 180 MW each, one heat recovery steam generator (HRSG) and a duct burner which will provide steam to the steam generator, and one steam turbine that generates 240 MW.

The Applicant expects that each combustion turbine will run for 8400 hours during the year. Of those 8400 hours of operation, each turbine may have up to 400 hours of starting up or shutting down. Each duct burner burns 426 MMBtu/hour of natural gas and may operate up to 16 hours per day and 4000 hours per year. Also, each combined cycle will be equipped with an oxidation catalyst to control CO and reduce VOC emissions, and a Selective Catalytic Reduction system (SCR) to control NO<sub>x</sub> emissions. Seawater will be used instead of cooling towers for this project.

The Morro Bay Power Plant Project will burn only natural gas, with no provisions for an alternative backup fuel. The exclusive use of natural gas, an inherently clean fuel, compared to oil or coal, will limit the formation of VOC, PM<sub>10</sub>, and SO<sub>x</sub> emissions. The combustion turbines will be equipped with dry low-NO<sub>x</sub> combustors and SCR technology to minimize NO<sub>x</sub>

formation. Continuous emissions monitoring system (CEMS) will be required and installed to closely monitor NO<sub>x</sub>, CO and O<sub>2</sub> levels. The proposed project's hourly, daily and annual emissions are presented in **Air Quality Table 4**. MBPP will utilize the existing emergency generator and the fire pump engines.

Due to the large combustion turbines used in this project and the need to control NO<sub>x</sub> 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 NO<sub>x</sub>; 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 or 14.4 lb/hour starting the third year of operation. In the first two years of operation, the District will allow the ammonia slip to be limited to 10 ppm initially but limited to 5 ppm starting the third year of operation. In actual operation, staff expects an ammonia slip concentration of less than 5 ppm for the proposed facility. MBPP will utilize the existing fire pump and the emergency unit from the existing facility in the new facility. MBPP is not planning on modifying the number of operating hours for these units. The air emissions associated with these units are part of the existing ambient air quality. There will not be any net increase of air emissions from these units.

**AIR QUALITY Table 4  
Maximum Project Emissions**

	NO <sub>x</sub>	CO	VOC	PM10	SO <sub>x</sub>
GT (lb/hr) <sup>1</sup>	13.38	8.14	2.71	11.00	1.30
GT w/ duct burner (lb/hr) <sup>1</sup>	15.46	9.42	5.39	13.30	1.45
Start-up Emission Levels(lb/hr) <sup>1</sup>	80	620	16.0	11.0	1.3
<b>Total Facility Daily Emissions (lb/day)<sup>2</sup></b>					
	2483.2	10653	644	1,203	134.4
<b>Total Facility Annual Emissions (Ton/year)<sup>3</sup></b>					
	292.3	917.4	77.6	203.2	23.0
GT : Gas Turbine. 1. All gas turbines have identical start-up and shut-down emissions, and identical hourly emissions. 2. Daily emissions are based on each turbine has : four hours of starting up, operates at full load with duct burner for 16 hours, at full load for the remaining hours. 3. Annual emissions are based on 8400 hours per turbine per year, with 400 out of the 8400 identified for start up or shut- down, and 4000 hours of the 8400 hours identified as including the use of the duct burner per year for each combined cycle.  Source: Section 6.2 and Appendix 6.2-1 of the AFC.					

### **Existing Facility Demolition**

Duke is planning to remove two large fuel tanks from the existing site in Morro Bay and build the new facility (the proposed project). The new facility will replace the currently operating generation units 1 through 4. Just prior to the completion of the construction of the new

facility, Duke will shut down the existing units 1 through 4 to tie in the existing infrastructure and to prepare for demolition of the existing facility. Duke is planning to remove the existing facility including the generation units and the oil tanks and existing stacks by the end of year 2007. The demolition activities are part of this project. The types of air emissions associated with the demolition activities are similar to air emissions associated with the construction activities and include fugitive dust and air emissions from the heavy and light equipment will be emitted. These emissions and their potential impacts are analyzed in the Data Responses dated February 9, 2001. **AIR QUALITY Table 4-A** summarizes the annual emissions during the demolition in tons per year. Furthermore, **AIR QUALITY Table 7-A** summarizes the modeled maximum demolition impacts which includes the operation of the new facility and the demolition activities in the same time.

**AIR QUALITY Table 4-A**  
**Estimated Maximum Annual Emissions**  
**During Demolition Activities (Tons/year)**

	NOx	CO	VOC	SOx	PM10
Onsite Demolition Equipment, Fugitive Dust	34.7	31.7	3.0	0.2	3.0
Offsite Workers travel, Trucks and Rail deliveries	2.8	9.2	0.9	0.1	0.2
<b>Total Emissions</b>	<b>37.5</b>	<b>41</b>	<b>5.1</b>	<b>0.3</b>	<b>3.2</b>

Source: Duke Energy, Data Responses, August 17, 2001

## PROJECT IMPACTS

The air quality impacts assessment of project construction and operation are shown in the following sections. Staff has reviewed all the modeling protocol and the analysis of the proposed project during start-up, construction and operation phases and find them acceptable.

### Modeling Approach

The Applicant used the SCREEN model to select the worst case turbine configuration that would produce the highest emission impacts. The SCREEN model, which is approved by EPA, is designed to provide conservative estimates of emission impacts. Based on the results of the SCREEN model, the Applicant modeled the four gas turbines and HRSGS configuration, using the EPA approved Industrial Source Complex (ISC) model for more refined modeling analysis. The applicant also has used the ISC model to estimate the impact from the construction and demolition activities.

## CONSTRUCTION IMPACTS

The Applicant estimated the impacts of construction-related emissions using the ISC model. The model estimates the 1-hour, 3-hours, 8-hours, and 24-hours impacts, which are based on the potential highest emission rates. The annual impacts are based on annual average for all modeled pollutants. **AIR QUALITY Table 5** provides a summary of the revised modeling analysis of the maximum estimated impacts. The modeling results indicate that the construction-related emissions under the Applicant's worst case conditions would not cause violations of the one-hour NO<sub>2</sub> standard. However, the impact of the daily and annual

PM10 emissions will violate the standards. The Applicant's worst case conditions are defined as the highest emissions of a particular pollutant during a one month period, converted to a gram per second emission rate for the model. It is important to note that these are temporary impacts that would only occur during the construction phase of the project, and they reflect the implementation of some construction related mitigation measures which are included in the conditions of certification proposed by Energy Commission staff to minimize emissions.

As **AIR QUALITY Table 5** (PM10 – all receptors) shows, project-related construction activities would cause a violation of the state 24-hour and annual average PM10 standards without consideration of existing background air quality. In reviewing the modeling output files, the project's construction impacts are not occasional or isolated events, but are over an area within a few hundred meters of the project site. The majority of the PM10 impacts (over 90 percent) from construction activities are from fugitive dust and 10 percent is from construction equipment exhaust. The modeling analysis also shows the maximum-modeled PM10 impacts in residential areas are much lower than the maximum project impact (**AIR QUALITY Table 5** – residential receptors). The maximum impact in residential areas exceeds the state 24-hour standard only when the maximum background (existing) concentration is included. The state annual PM10 standard is not exceeded in residential areas even when background levels are included.

There is a high magnitude of predicted construction PM10 impacts for a number of reasons.

**AIR QUALITY Table 5**  
**Maximum Estimated Construction-Related Incremental Impacts**

Pollutant	Averaging Time	Facility Maximum Impact ( $\mu\text{g}/\text{m}^3$ )	Maximum Background ( $\mu\text{g}/\text{m}^3$ )	Maximum Total Impacts ( $\mu\text{g}/\text{m}^3$ )	State Limiting Standard ( $\mu\text{g}/\text{m}^3$ )	Federal Limiting Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard (%)
NO <sub>2</sub>	1-hour	156.4	122	278	470		59.1
	Annual	12.2	25	37.2	-	100	37.2
CO	1-hour	1211.1	6988	8199	23000	40000	36
	8-hour	421.1	3444	3865	10000	10000	39
PM10 Residential receptors	24-hour	28.6	57	85.6	50	150	171
	Annual	2.2	20.6	22.8	30	-	76
PM10 All receptors	24-hour	128.3	57	185	50	150	370
	Annual	42	20.6	63	30	-	210
SO <sub>2</sub>	1-hour	32.1	104	136	650	-	21
	24-hour	14.3	13	27.3	109	365	25
	Annual	0.6	0	0.6	-	80	0.0

Source: AFC Appendix 6.2-5; Duke Energy, Data Responses, March 9 and August 17, 2001.

First, some of the sources of combustion emissions (the bulldozers and trucks) are mobile sources, not stationary sources as input into the model. Therefore, as mobile sources, the air quality impacts would not always be at the same locations, so the model results are overstated. Second, it was assumed that all the equipment identified for the modeling evaluation would be running simultaneously. It is doubtful that all the major equipment would all be operating at one time, and thus the impacts are overstated. Finally, the

emissions inputs to the model were from the highest monthly emissions assumed during the 20 months construction period. During the other months of construction work, considerably less emissions generating equipment will be used and thus the impacts will be lower.

Although several of the modeling assumptions combine to overestimate impacts, as described above, other assumptions serve to underestimate impacts. Most notably, the height of the construction equipment exhaust is overestimated, which would result in overstating the amount of dispersion, in turn leading to lower (less conservative) impacts.

Staff's conditions of certification AQC-1 and AQC-2 are designed to mitigate the construction impacts to the extent feasible, as reflected in the construction modeling. Condition of Certification AQC-3, recommended by the SLOAPCD and accepted by staff, requires short-term monitoring of NO<sub>2</sub> and PM<sub>10</sub> near the boundaries of the construction area and additional mitigation if impacts are found to exceed standards. AQC-3 reflects the fact, that under most circumstances, the facility's maximum construction impacts and the ambient levels of PM<sub>10</sub> in Morro Bay (highest 24-hour measurements) are expected to be lower than the modeled assumptions which lead to significant impacts. Thus, AQC-3 serves as a safety measure to ensure that worst case conditions do not result in significant impacts.

## FUMIGATION IMPACTS

During the early morning hours before sunrise, the air is usually very stable. During such stable meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed. When the sun first rises, the air at ground level is heated, resulting in a vertical (both rising and sinking air) mixing of air for a few hundred feet or so. Emissions from a stack that enter this vertically mixed layer of air will also be vertically mixed, bringing some of those emissions down to ground level. Later in the day, as the sun continues to heat the ground, this vertical mixing layer becomes higher and higher, and the emissions plume becomes better dispersed. The early morning air pollution event, called fumigation, usually lasts approximately 30 to 90 minutes. The applicant used the SCREEN3 model, which is an EPA approved model, for the calculation of fumigation impacts. NO<sub>2</sub>, CO and SO<sub>2</sub> levels are at their highest during start-up. The results of the modeling analyses show that fumigation impacts will not violate the NO<sub>2</sub>, CO or SO<sub>2</sub> 1-hour standards.

Another type of fumigation is referred to as shoreline fumigation. In general, land surfaces tend to heat up and cool down faster than water. Shoreline fumigation tends to occur during sunny days when the cooler air over the water displaces the warmer air and lighter air over the land. The unstable air over the land will increase gradually in depth with inland distance during the land sea breeze. The stable air over the water, unstable air over the land and wind speed determine if the plume will go down to the ground before much dispersion. The SCREEN3 model was used to calculate both types of fumigation impacts. The results are summarized in **AIR QUALITY Table 6**. The start-up modeling impact includes two turbines in start-up mode and two turbines at maximum load with duct burners firing. These assumption is consistent with the maximum daily operating scenario.

**AIR QUALITY Table 6**  
**CTG Fumigation Modeling Maximum 1-Hour Impacts**

<b>POLLUTANT</b>	<b>Averaging Time</b>	<b>Fumigation Impact (mg/m<sup>3</sup>)</b>	<b>Start-up Impact (mg/m<sup>3</sup>)</b>	<b>Shoreline Fumigation</b>	<b>State Standards (mg/m<sup>3</sup>)</b>
NO2	1-hour	13.3	185.9	105.1	470
CO	1-hour	19.5	8615.4	153.6	23000
SO2	1-hour	1.03	11.9	8.1	650
PM10	24-hour	3.6	-	4.6	50

## **OPERATIONAL IMPACTS**

The impact of the operation of the facility has been assessed using EPA-approved air quality dispersion models and guidelines without considering the offsets that will be provided. Staff finds the Applicant's analysis of the operational impact to be acceptable. The AFC presents the refined ISC modeling analyses. The impact analyses were used to determine the worst case ground level impacts of the facility. The one-hour start-up emissions were modeled to establish the highest impact from the project. The results show that the facility, by itself, does not violate the State or Federal ambient air quality standards for any pollutant.

However, the PM10 impact from the facility, when added to the existing background levels, which are already above the State Standard, will further violate the 24-hour State Standard. Also, as presented in **AIR QUALITY Table 3**, the background levels that are used in analyzing all project impacts are very conservative because it is the highest emission concentration level in the last seven years. Staff is using that conservative approach to show the level of violation if the events of that particular year caused this violation to occur will be repeated again in the life time of the proposed project. Furthermore, the background used includes the existing Morro Bay Power Plant emissions which it will be demolished. So, by adding the new MBPP impact to that background the results becomes even more conservative.

Staff considers PM10 impact to be significant if left unmitigated. The applicant will mitigate the project's PM10 impact by providing emission offsets as discussed in the mitigation section below. By providing the offsets, staff believes that the PM10 impact will be less than significant. **AIR QUALITY Table 7** presents a summary of the ISC modeling results for the proposed MBPP. The maximum impact of this project is located on Morro Rock. On November 9, 2000, the Applicant provided the isopleths to specify the impact for different pollutants at different locations around the facility. The isopleths show that the project impact is much less than the data presented in **AIR QUALITY Table 7**.

### AIR QUALITY Table 7 ISC Modeling Results

Pollutant	Averaging Time	Facility Maximum Impact ( $\mu\text{g}/\text{m}^3$ )	Maximum Background ( $\mu\text{g}/\text{m}^3$ )	Maximum Total Impacts ( $\mu\text{g}/\text{m}^3$ )	State Limiting Standard ( $\mu\text{g}/\text{m}^3$ )	Federal Limiting Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard (%)
NO <sub>2</sub>	1-hour	214.1	122	336	470		71.5
	Annual	2.6	25	27.6	-	100	27.6
CO	1-hour	8615.4	6988	15603.4	23000	40000	67.8
	8-hour	1508.3	3444	4952.3	10000	10000	49.5
PM10	24-hour	24.2	57	81.2	50	150	162
	Annual	2.7	20.6	23.2	30	-	77.3
SO <sub>2</sub>	1-hour	17.3	106	123.3	650	-	19
	24-hour	2.7	13	15.7	109	365	14.4
	Annual	0.23	0	0.23	-	80	3.6

Source: AFC Section 6.2, Duke Energy, Data Responses, March 9, 2001

### SALVAGE AND DEMOLITION IMPACT ANALYSIS

The Applicant is planning to remove the existing boilers after the construction and starting the operation of the new facility. The sources of the air emissions during this phase are similar to the construction air emission sources and the new facility operation air emissions, which is summarized in Table 4. To estimate the ambient air quality impacts from emissions during the demolition activities, the air dispersion model ISC was used, emissions from the operation of the new facility and sources of emissions during demolition (vehicle and equipment exhaust and fugitive dust) were included in the modeling.

Based on the emission rates for the criteria pollutants and the meteorological data, the ISC model calculates the hourly and annual ambient impacts from each pollutant. The annual impacts are based on the annual average emission rates of these pollutants. However, the short-term ambient impacts are based on the worst, case daily emission rates. **Air Quality Table 7-A** summarizes the impact for each pollutant on the ambient air. The table identifies an exceedance of the PM10 standard when the background concentration is added. The Applicant will employ all mitigation measures that are recommended during construction to reduce the impact to less than significant. Staff believes that PM10 impact is insignificant because of the temporary nature of these emissions and the conservative choice of the background as discussed in the operational impact section.

**AIR QUALITY Table 7-A  
Demolition Maximum Modeling Impacts**

Pollutant	Averaging Time	Impact From Turbines and Demolition ( $\mu\text{g}/\text{m}^3$ )	Maximum Background ( $\mu\text{g}/\text{m}^3$ )	Maximum Total Impacts ( $\mu\text{g}/\text{m}^3$ )	State Limiting Standard ( $\mu\text{g}/\text{m}^3$ )	Federal Limiting Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard (%)
NO <sub>2</sub>	1-hour	164.3	122	286	470		61
	Annual	6.0	25	31	-	100	31
CO	1-hour	915	6988	7903	23000	40000	34
	8-hour	1517.5	3444	4962	10000	10000	50
PM10	24-hour	25.5	57	83	50	150	166
	Annual	3.1	20.6	23.7	30	-	79
SO <sub>2</sub>	1-hour	17.3	106	121	650	-	19
	24-hour	11.9	13	27	109	365	25
	Annual	0.2	0	8	-	80	10

Source: Duke Energy, Data Responses, August 17, 2001

## EXISTING FACILITY AND NEW PROJECT IMPACTS

The following is a comparison between the boilers' baseline operational emissions impacts of the existing facility and that of the proposed project. The impact analysis is conservative because the new facility impact is based on the worst case assumption for the operation of the new turbines. On the other hand, the old (existing) facility impact is based on the actual operation of the boilers. As shown in **AIR QUALITY Table 7-B** the new facility's worst case impacts are higher than those of the existing facility's typical boilers' operation for all the pollutants except for the one-hour NO<sub>2</sub> emissions. The Applicant is providing local offsets to mitigate new project impacts for all emissions. A summary of these offsets is provided in the mitigation section of this FSA. Because of the conservative assumptions used to drive the worst case scenario, staff expects the impact from the normal operation of the proposed facility will be less than the maximum project impact modeled. However, staff can not reach a conclusion that the proposed facility's impact will be lower than the old facility.

**AIR QUALITY Table 7-B  
Comparison Between Facility vs New Facility Impacts**

Pollutant	Averaging Time	New Facility Maximum Impact ( $\mu\text{g}/\text{m}^3$ )	Old facility Impact ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	1-hour	214.1	222.7
	Annual	2.6	2.0
CO	1-hour	8615.4	416.2
	8-hour	1508.3	224.4
PM10	24-hour	24.2	11.4
	Annual	2.7	0.33
SO <sub>2</sub>	1-hour	17.3	3.22
	24-hour	2.7	0.90
	Annual	0.23	0.03

Source: AFC Table 6.2-35

## **SECONDARY POLLUTANT IMPACTS**

### **Ozone impacts**

The proposed project's gaseous emissions, primarily NO<sub>x</sub> 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 model 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<sub>x</sub> and VOC emissions to ozone formation, staff believes that the emissions of NO<sub>x</sub> and VOC from MBPP do have the potential to contribute to higher ozone levels if not mitigated. MBPP'S NO<sub>x</sub> and VOC contribution to the regional ozone problem is not considered to be significant, because the applicant has proposed to purchase emission reduction credits of NO<sub>x</sub> and VOC to fully trade off and mitigate for the emission increases by the proposed facility.

### **Secondary PM<sub>10</sub> impacts**

The project's NO<sub>x</sub>, VOC, NH<sub>3</sub> and SO<sub>x</sub> emissions can contribute to the formation of secondary PM<sub>10</sub>. Not all hydrocarbons (VOC) can form secondary PM<sub>10</sub>. Hydrocarbons with six or less carbon atoms in the chain will not participate in the formation of the carbon based PM<sub>10</sub>. The project's VOC emissions 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<sub>10</sub>. Concerning ammonium nitrate, staff believes that the project's ammonia emissions have a potential to contribute to the ammonium nitrate emissions downwind from the project. The chemical reaction between ammonia and NO<sub>x</sub> will take few hours before the formation of ammonium nitrate. Concerning sulfates as PM<sub>10</sub>, staff believes that the project 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. According to District Rules, the Applicant must provide offsets for the net increases in SO<sub>x</sub> from the proposed facility, which will reduce the impact to less than significant. For all other formation of secondary PM<sub>10</sub>, including those caused by ammonia, they are very limited and staff does not believe that they are significant.

## **VISIBILITY IMPACTS**

The applicant has provided, as part of their PSD analysis, a visibility impact analysis. This evaluation shows that the project is not expected to exceed any significant visibility impairment increment inside any nearby (San Rafael Wilderness) PSD Class I areas. Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective.

## **CUMULATIVE IMPACTS**

The Energy Commission staff provided the Applicant with a modeling protocol to conduct the cumulative impact analysis. The major component of the protocol required the Applicant to include modeling of all known future projects that emit more than five tons per year of air emissions within six miles of the proposed facility. The modeling results (impacts) would be added to the ambient background levels to establish the total impact. The District conducted

a comprehensive review and determined that there are no planned facilities within the six miles that are eligible for modeling. Therefore, there is no cumulative impact assessment necessary for this project.

## **ENVIRONMENTAL JUSTICE**

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed Morro Bay power plant (please refer to Socioeconomics Figure 1 in this Staff Analysis). In addition, Socioeconomics staff has not identified any substantial pocket of minority persons within the six-mile radius, and based on 1990 Census data, the low-income population within the six-mile radius does not exceed the greater than 50 percent threshold. Considering these factors, an environmental justice evaluation is not warranted.

## **MITIGATION**

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### **APPLICANT'S PROPOSED MITIGATION**

#### **Construction Phase**

The applicant proposes that it would implement Best Available Control Measures (BACM) during construction of the project. These 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 five 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.

## **Operation Phase**

The applicant 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- NO<sub>x</sub> combustion design, Selective Catalytic Reduction (SCR) and high-temperature CO oxidation catalyst technology for each of the combined cycle turbine trains to minimize its NO<sub>x</sub> and CO emissions. The proposed control devices are designed to maintain the turbine/duct burner emissions to 2.0 ppm NO<sub>x</sub>, 6 ppm CO, and 2 ppm VOC. 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 PM<sub>10</sub> and SO<sub>x</sub> emissions. Below is a brief description of the emission control technologies that are proposed for MBPP.

## **CONTROL OF NOX EMISSIONS**

The project's NO<sub>x</sub> emissions consist primarily of nitric oxide (NO) and a small percentage of nitrogen dioxide (NO<sub>2</sub>). Thermal NO<sub>x</sub> is the product of the oxidation of N<sub>2</sub> (present in the air used for combustion) at the temperatures present in the combustion process. Some NO<sub>x</sub> is formed from the oxidation of nitrogen present in the fuel. Nitrogen is not present in significant quantities in natural gas, so most of the NO<sub>x</sub> emissions from this project are due to thermal NO<sub>x</sub>.

Combustion chamber NO<sub>x</sub> can be controlled by, reducing the flame temperature in the combustion chamber through quenching steam and dilution using water and steam injection. Additionally, thermal NO<sub>x</sub> can be controlled with combustor designs that premix the air and fuel and stage the combustion process (a reducing atmosphere followed by an oxidizing atmosphere). NO<sub>x</sub> emissions from the MBPP will be controlled through the use of dry low NO<sub>x</sub> combustors in the CTGs and the use of SCR as a post-combustion emission control. The turbines will be equipped with a number of dry low-NO<sub>x</sub> combustors to ensure optimal uniform temperature distribution in the primary air zone. A reduction in NO<sub>x</sub> emissions is also achieved by raising the mean air/fuel ratio. The use of dry low-NO<sub>x</sub> combustors produces emissions as low as 25 ppm when natural gas is burned before entering the SCR.

In addition, MBPP proposes an SCR system to control NO<sub>x</sub> emission levels to 2.0 ppm corrected @ 15 percent O<sub>2</sub>. SCR is a process that chemically reduces NO<sub>x</sub> by injecting ammonia (NH<sub>3</sub>) over a catalyst in the presence of oxygen (O<sub>2</sub>). The process is termed selective because the NH<sub>3</sub> reducing agent preferentially reacts with NO<sub>x</sub> rather than O<sub>2</sub> to form N<sub>2</sub> in the presence of excess O<sub>2</sub> at temperatures in the range of 400 to 750 °F. If the temperature is lower than 400 °F, the ammonia reaction rate is low, and therefore, NH<sub>3</sub> emissions (called ammonia slip) will increase.

MBPP is proposing NO<sub>x</sub> emissions to be at 2.0 ppm over one hour averaging time and ammonia slip of 5 ppm to comply with the recent EPA guidelines on NO<sub>x</sub> emission BACT limit.

## **CONTROL OF CARBON MONOXIDE (CO) AND VOLATILE ORGANIC COMPOUNDS (VOC)**

Good operating and maintenance practices and the use of an oxidation catalyst are the only measures proposed for this project to limit the project's CO and reduce VOC emissions. Combustion turbines inherently emit low CO and VOC emissions when burning natural gas. High combustion temperatures, fuel/air mixing and excess air inherent in the CTG's combustion process favor complete combustion of fossil fuels. These conditions will lead to higher NO<sub>x</sub> emissions. Current CTG designs attempt to balance achieving low NO<sub>x</sub> emissions (from the CTG prior to post-combustion controls) while keeping CO and VOC emissions low. With respect to CO, MBPP is proposing to install a CO catalyst. They propose to achieve the lowest CO limit of 6 ppm or equivalent in mass emissions during all operating scenarios.

## **CONTROL OF PM<sub>10</sub>**

Natural gas fuel contains only trace quantities of noncombustible material. Particulate emissions (PM<sub>10</sub>) will be, controlled by burning only natural gas and the use of inlet air filtering for the combined cycle CTG and HRSG unit. This is considered in the industry the best control technology available for this purpose.

## **SULFUR DIOXIDE EMISSIONS CONTROL**

The MBPP SO<sub>2</sub> emissions will be, controlled by burning only natural gas, which typically contains only traces of sulfur. The emissions from the project's CTGs are expected to be very small without the use of any additional post-combustion SO<sub>2</sub> control equipment. MBPP is using natural gas fuel with sulfur content not to exceed 0.25 grains per 100 standard cubic feet.

## **EMISSION OFFSETS**

Emission reduction credits (ERCs) can be created when existing permitted emission sources cease operation or reduce their operation below permitted levels. The ERCs are reviewed and approved by the local air district and recorded in their "bank" for future use. District's Regulation 204 requires MBPP to provide ERC for all net facility emission increases. To fully mitigate the facility's potential emission increases, MBPP plans to purchase ERCs from the District's ERC bank according to District's Rule 211. The MBPP mitigation package is in compliance with Rule 213 calculation method.

Offsets, in the form of ERCs, are required for PM<sub>10</sub> in order to assure that the project will not interfere with District's future "attainment" plans for PM<sub>10</sub>. The District Rules also requires offsets for NO<sub>x</sub>, SO<sub>x</sub>, VOC and CO air emissions. MBPP is providing all the required offsets at 1:1 ratio as required by District rules. Furthermore, District's Rule 211 allows MBPP the use of the inter-pollutant (where the Applicant uses an air emission to offset another air emission) trading ratio of 1:1 between SO<sub>x</sub> for PM<sub>10</sub>.

The District, in its Air Quality Management Plan (AQMP), includes banked ERCs in its planning emissions inventories for future years as actual ongoing emissions. Therefore, the future effects due to emission increases from new sources are already taken into account in

the AQMP, including the use of ERCs as a source of mitigation or offsets. The new source will not detract from the District attainment strategy. Consequently, we believe that banked offsets in this case constitute real mitigation of potential impacts from the proposed project in the context of the District overall attainment strategy. The following **AIR QUALITY Table 8** shows the amounts of ERCs that are provided sources of the ERCs, and the ratio of mitigation.

**AIR QUALITY Table 8** shows that the Applicant has secured enough ERCs to fully mitigate the project NOx emissions of 292.3 tons per year. Furthermore, MBPP has secured 116.20 tons per year of PM10 and is using 87 tons per year of SOx to fully mitigate the project's PM10 emissions increase. SOx, VOC and CO are fully mitigated.

**AIR QUALITY Table 8  
Valid Emission Reduction Credits  
Proposed By MBPP (Ton/Year)**

<b>Company Name</b>	<b>NOx</b>	<b>VOC</b>	<b>PM10</b>	<b>SOx</b>	<b>CO</b>
Morro Bay Shutdown of the four Boilers	294.69	70.23	97.05	7.66	1158.75
Elimination of Oil firing from the existing Boilers	8.19	0.0	17.23	107.94	0.0
Chevron ERC	22.92	32.88	1.92	1.24	2.62
<b>Total Available Emission Reduction Credits</b>	<b>325.80</b>	<b>103.11</b>	<b>116.2</b>	<b>116.84</b>	<b>1161.37</b>
<b>Project Emissions</b>	<b>292.3</b>	<b>77.6</b>	<b>203.2</b>	<b>23.0</b>	<b>636.94</b>
Excess offsets / (required offsets)	33.80	25.51	(87.0)	93.84	524.43
Interpollutant Trading @ 1:1 Ratio (Rule 211)			SOx for PM10 <b>87.0</b>		
<b>Residual ERCs</b>	<b>33.80</b>	<b>25.51</b>	<b>0</b>	<b>6.84</b>	<b>524.43</b>

Source: AFC Section 6.2; SLOAPCD, Preliminary Determination of Compliance (PDOC), May 15, 2001

### **Demolition mitigation**

The applicant proposes to use the same mitigation measures that were recommended in the construction phase of the project during the demolition phase to control the fugitive dust and equipment emissions. Staff evaluated the proposed mitigation measures and agrees with them. The conditions of certification AQC-1 and AQC-2 will apply to the construction and demolition phases of the project to minimize the air emission impact during these periods.

### **ADEQUACY OF PROPOSED MITIGATION**

#### **CONSTRUCTION PHASE MITIGATION**

As mentioned earlier in the impact section, the construction of the project will cause PM<sub>10</sub> emissions impacts that will add to the existing violations of the ambient PM<sub>10</sub> air quality standard. Therefore, the project PM<sub>10</sub> emission impacts due to construction of the project are significant. Staff believes that the implementation of the applicant's proposed specific

mitigation measures in combination with those proposed by staff (AQC-1 through AQC-3) during construction of the facility will reduce the short-term impacts to a level of less than significant.

## **OPERATIONAL PHASE MITIGATION**

The project emissions will be controlled using BACT (clean burning using natural gas, SCR and oxidation catalyst systems) in accordance with the District NSR. The applicant has proposed adequate emission reduction credits to offset the facility's new NO<sub>x</sub>, VOC, CO, SO<sub>x</sub> and PM<sub>10</sub> emissions as required by the District's Rules and Regulations. The project will not cause new violations of any NO<sub>2</sub>, SO<sub>x</sub>, or CO ambient air quality standards, and therefore, its NO<sub>x</sub>, SO<sub>x</sub> and CO emission impacts are not significant.

## **FACILITY CLOSURE**

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Eventually the MBPP 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, all sources of air emissions would cease and thus all impacts associated with those emissions would no longer occur.

The Permit to Operate, issued by the District, is required for operation of the facility and is usually renewed on a five-year schedule. However, during those five years, the applicant must still pay permit fees annually. If the applicant chooses to close the facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the project could not restart and operate unless the applicant obtains a new District's Permit to Operate. If the MBPP were to decide to dismantle the project, there would likely be fugitive dust emissions associated with this dismantling effort. The Facility Closure Plan to be submitted to the Energy Commission Compliance Project Manager should indicate that the applicant will comply with the applicable construction related permit conditions included in the Conditions of Certification, which includes the control of fugitive dust emissions.

## **COMPLIANCE WITH LORS**

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### **FEDERAL**

EPA has the authority to implement its Prevention of Significant Deterioration (PSD) and Non-attainment New Source Review (NSR) requirements. The EPA will issue its PSD analysis in the near future. The EPA has delegated to the District the authority to implement the federal Clean Air Act Title V operating permit program. This operating permit is issued only after a facility is in operation and will be included in the District's Permit to Operate. Therefore, compliance with the District's rules and regulations should result in compliance with federal requirements.

### **STATE**

The project complies with the District's rules and regulations as the District interprets them and therefore, with Section 41700 of the California State Health and Safety Code.

## LOCAL

The District issued its FDOC on August 31, 2001. Based on a review of the FDOC, and the District's interpretation of their rules, District's staff determined that the project complies with applicable District rules and regulations.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

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### City of Morro Bay

**CMB-1 Carbon Monoxide:** Please verify whether CO<sub>2</sub> "hot spot" modeling was done (i.e., "caline" analysis). The area of concern is the Atascadero Road corridor in front of Morro Bay High School and at the intersection of Highway 1 and Main Street. If results show potential for significant impact, please provide a list of all feasible mitigation measures to address this impact and describe the measures that will be implemented to ensure compliance.

**Response:** Under the District Rules, MBPP is required to mitigate Carbon Monoxide (CO) emissions. See **AIR QUALITY Table 8**, which shows the sources and quantity of these offsets. Carbon dioxide (CO<sub>2</sub>) is not a criteria pollutant and the analysis and modeling of that pollutant was not performed by staff.

**CMB-2 Nitrogen Dioxide:** Please comment on the feasibility of using a non-ammonia based system for reducing NO<sub>x</sub> emissions from the project (such as SCONOX). Explain the advantages and disadvantages of such a system including the feasibility of modifying the plant to use non-ammonia technology post-construction.

**Response:** The technology for non-ammonia based system is not available commercially for the proposed size turbines. Staff is not aware of any project similar to the proposed size that has installed the SCONOX technology. However, the District's FDOC provides a discussion on this issue.

**CMB-3 Particulates:** Please explain what local mitigation's are under consideration to reduce the impact of increases in local particulate emissions.

**Response:** The project's particulate emission offsets are presented in **AIR QUALITY Table 8** which shows that most of the offsets are provided from the existing boilers of the MBPP. Mitigation requirements for particulate emissions emitted during the construction and demolition phases of the project are presented in AQC-1 through AQC-3.

**CMB-5 Ground Level Concentrations in Morro Bay:** Please provide analysis of the significance of increases to local ground level pollutant concentrations under typical plant operating conditions. Include a comparison with ground level emissions from the existing plant under similar operating assumptions. Address whether the increase in ground level concentrations of certain pollutants should be considered to be a significant environmental impact.

**Response:** Please see the operation impact analysis above and the comparison between the existing and proposed power plants. Staff has not performed an analysis based on similar operating assumptions, however, it has been determined that no impacts exist using “worse case” assumptions.

**CMB-6 Greenhouse Gases:** Please provide an analysis of the project's emissions of CO<sub>2</sub> and a comparison of such emissions from the existing plant under typical operating conditions.

**Response:** CO<sub>2</sub> is not a criteria pollutant and CO<sub>2</sub> emissions were not analyzed in this section. However, staff does not believe that the proposed project will have a significant impact on greenhouse gases. The proposed project will generate much less air emissions while burning natural gas than a similar project that burns coal or oil.

**CMB-7 Construction Period Impacts:** Please identify all feasible mitigation's that can be applied to the project to reduce construction period impacts and describe the measures that will be implemented to ensure compliance. Include an analysis of emission reductions that can be achieved through transportation demand management measures (e.g. ride share, busing, carpools, etc). Include use of reclaimed wastewater for dust suppression where feasible.

**Response:** See the Construction Phase section and Construction impact section above, and the Condition of Certification AQC-1 through AQC-3.

**CMB-8 Permit Vesting:** Please explain for what period of time the project will be vested with respect to emission control measures/equipment once an FDOC is issued by the APCD. Does this vesting period conform to APCD rules and regulations or is a variance/exception proposed? Confirm that the proposed conditions of certification accurately reflect the appropriate vesting period.

**Response:** There is no vesting period to the control equipment. During the regular operation and maintenance for the facility, all the control equipment will be, examined by the operator and parts will be replaced as needed. This project will conform to all future District's BACT rules. Any new District's BACT rules may apply to the proposed project as well.

### **San Luis Obispo County/Morro Bay Citizens**

**POST – 2:** Improve air emissions by eliminating duct firing, using SCONOX.

**Response:** In evaluating the MBPP project impact, the modeling analysis has included the duct firing emissions and shows that the project impact is not significant. The SCONOX is not commercially available and tested for turbines with the proposed size.

Walter Wolf

**WHW –1:** Lower stack height and more stacks with an increase load would result in more hazards to nearby residents.

**Response:** In the MBPP project, the impact from increasing the load and lowering the stacks, were estimated and the air quality impact was assessed. The results show that the air quality impact is less than significant given the proposed mitigation measures and the condition of certifications.

Don Boatman

**DB-2** Duct firing is poor practice due to the relative inefficiency of producing the last 100 MW of power. Duct firing uses 150% more gas per 100 MW than the base 500 MW unit, increasing global warming frivolously. Duct firing will produce 150% more air pollutants to produce the 100 mw between 500 MW and 600 MW.

**Response:** Duct firing is a form of supplemental firing (available only in combined cycle plants) that is used in the heat recovery steam generator (HRSG) to create more steam, thus more power output. The practice is used when demand for electricity is very high, typically in the summer months. For MBPP, duct burning will cause a small decrease in fuel efficiency for the plant (about 4 percent) but the capability is considered very valuable to the overall electric system because it adds flexibility in meeting peak demands. The air emissions associated with the duct firing is included in the MBPP analysis.

Dale Howell

**DH-1** How will the reduced stack heights and plant renovations affect the air quality and the amount of pollutants that would fall on my property and affect the air I breathe? Please state the best and worst-case scenario, taking into consideration the northwest prevailing winds into the response.

**Response:** See the response to WHW-1. The worst case scenario is summarized in **AIR QUALITY Table 7** which shows that the worst case impact is less than significant when added to the existing ambient air quality. The more typical operating scenario will be even less significant.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Assuming the implementation of the following Conditions of Certification, including the conditions contained in the FDOC, the Commission staff agrees with the District's findings and concludes that the Morro Bay Power Plant Project will meet all applicable air quality requirements and will not cause any significant air quality impacts.

## **CONDITIONS OF CERTIFICATION**

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**AQ-C1** Prior to breaking ground at the project site, the project owner shall prepare a Construction Fugitive Dust Mitigation Plan that will specifically identify fugitive dust mitigation measures that will be employed for construction activities at the Morro Bay Power Plant Modernization Project site and related facilities.

The Construction Fugitive Dust Mitigation Plan shall specifically identify measures to limit fugitive dust emissions from construction of the project site and linear facilities. Measures that should be addressed include the following:

- the identification of the employee parking area(s) and surface of the parking area(s);
- the frequency of watering of unpaved roads and disturbed areas;
- the application of chemical dust suppressants;
- the use of gravel in high traffic areas;
- the use of paved access aprons;
- the use of sandbags to prevent run off;
- the use of posted speed limit signs limiting speed to 10 MPH;
- the use of wheel washing areas prior to large trucks leaving the project site;
- the methods that will be used to clean tracked-out mud and dirt from the project site onto public roads;
- the use of windbreaks at appropriate locations;
- the suspension of all earth moving activities under windy conditions; and,
- the use of on-site monitoring devices.

**Verification:** At least sixty (60) days prior to breaking ground at the project site, the project owner shall provide the California Energy Commission Compliance Project Manager (CPM) with a copy of the Construction Fugitive Dust Mitigation Plan for approval.

**AQ-C2** The, project owner shall mitigate, to the extent practical, construction related emission impacts from off-road, diesel-fired construction equipment. Available measures that may be used to mitigate construction impacts include the following:

- Catalyzed Diesel Particulate Filters (CDPF);
- Ultra-Low-Sulfur Diesel fuel, with a sulfur content of 15 ppm or less (ULSD);
- Diesel engines certified to EPA and CARB 1996 or newer off-road equipment emission standards.

Additionally, the project owner shall restrict idle time, to the extent practical, to no more than 10 minutes.

The use of each mitigation measure is to be determined in advance by a Construction Mitigation Manager (CMM), who will be available at the project site(s). The CMM must be approved by the CPM prior to the submission of any reports.

The CMM shall submit the following reports to the CPM for approval:

- Construction Mitigation Plan
- Reports of Change and Mitigation Implementation
- Reports of Emergency Termination of Mitigation, as necessary

#### **Diesel Construction Equipment Mitigation Plan:**

The Construction Mitigation Plan shall be submitted to the CPM for approval prior to rough grading on the project site, and must include the following:

1. A list of all diesel fueled, off-road, stationary or portable construction-related equipment to be used either on the project construction site or the construction sites of the related linear facilities. Equipment used less than a total of 10 consecutive days need not be included in this list.
2. Each piece of construction equipment listed under item (1) must demonstrate compliance with the following mitigation requirements:

Engine Size (BHP)	1996 CARB or EPA Certified Engine	Required Mitigation
< or =100	Yes or No	ULSD
>100	Yes	ULSD
>100	No	ULSD and CDPF, if suitable as determined by the CMM

3. If compliance can not be demonstrated as specified under item (2), then the project owner may appeal for relief to the CPM. However, the owner must demonstrate that they have made a good faith effort to comply as specified under item (2).

### Report of Change and Mitigation Implementation

Following the initiation of construction activities, and if changes to mitigation measures are necessary, the CMM shall submit a Report of Change and Mitigation Implementation to the CPM for approval. This report must contain at a minimum the cause of any deviation from the Construction Mitigation Plan, and verification of any Construction Mitigation Plan measures that were implemented.

The following is acceptable proof of compliance, other methods of proof of compliance must be approved by the CPM.

1. EPA or CARB 1996 off-road equipment emission standards:
  - a. A copy of the certificate from EPA or CARB.
2. Purchase and use of ultra-low-sulfur fuel (15 ppm or less).
  - a. Receipt or other documentation indicating type and amount of fuel purchased, from whom, where delivered and on what date; **and**
  - b. A copy of the text included in the contract agreement with all contractors and sub-contractors for use of the ultra-low-sulfur fuel in diesel burning construction equipment as identified in the Construction Mitigation Plan.
3. Installation of CDPF:

- a. The suitability of the use of CDPFs is to be determined by a qualified mechanic or engineer who must submit a report to the CPM for approval.
  - b. Installation is to be verified by a qualified mechanic or engineer.
4. Construction equipment engine idle time:
- a) A copy of the text included in the contract agreement with all contractors and sub-contractors to keep engine idle time to 10 minutes or less to the extent practical.

### **Report of Emergency Termination of Mitigation**

If a specific mitigation measure is determined to be detrimental to a piece of construction equipment or is determined to be causing significant delays in the construction schedule of the project or the associated linear facilities, the mitigation measure may be terminated immediately. However, notification containing an explanation for the cause of the termination must be sent to the CPM for approval. All such causes are restricted to one of the following justifications and must be identified in any Report of Emergency Termination of Mitigation. Any such report of termination of a mitigation measure shall be accompanied with appropriate mitigation as provided for in **Condition AQ-C3**.

1. The measure is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or power output due to an excessive increase in back pressure.
2. The measure is causing or is reasonably expected to cause significant engine damage.
3. The measure is causing or is reasonably expected to cause a significant risk to nearby workers or the public.
4. Any other seriously detrimental cause which has approval by the CPM prior to the change being implemented.

**Verification:** The project owner will submit to the CPM for approval the qualifications of the CMM at least 45 days prior to the due date for the Diesel Construction Equipment Mitigation Plan. The project owner will submit the Diesel Construction Equipment Mitigation Plan to the CPM for approval 30 calendar days prior to rough grading on the project site or start of construction on any associated linear facilities. The project owner will submit the Report of Change and Mitigation Implementation to the CPM for approval no later than 10 working days following the use of the specific construction equipment on either the project site or the associated linear facilities. The project owner will submit a Report of Emergency Termination of Mitigation to the CPM for approval, as required, no later than 10 working days following the termination of the identified mitigation measure. The CPM will monitor the approval of all reports submitted by the project owner in consultation with CARB, limiting the review time for any one report to no more than 20 working days.

**AQ-C3** To ensure that combustion emissions from construction activities do not result in violations of the State NO<sub>2</sub> or PM<sub>10</sub> ambient air quality standards, the project owner/operator shall employ the following measures:

1. Continuous ambient monitoring for NO<sub>2</sub> and PM<sub>10</sub> shall be conducted at the nearest feasible location to the highest pollutant concentration impact site identified in the project construction modeling presented in the AFC. Said monitoring shall be conducted throughout the duration of project construction unless an alternative timeframe is approved by the CEC and the District based on data supplied by the applicant which demonstrates the risk of an ambient standard violation is limited to a specific timeframe or specific construction activity. The project owner/operator shall prepare an Ambient Air Monitoring Plan for approval by the CPM and the District, which identifies the location, parameters, monitoring methods and timeframe for installation and monitoring.
2. The project owner/operator shall develop a Mitigation Contingency Plan to be implemented in the event that emissions from construction activities cause a measured exceedance of the State NO<sub>2</sub> or PM<sub>10</sub> standards. Said plan must be approved by the CPM and the District prior to the start of construction, and shall contain the following elements:
  - a. A construction activity management plan, which shows how construction activities will be modified to reduce emissions sufficiently to ensure that ambient air quality standards are not exceeded again.
  - b. An Offsite Mitigation Plan which demonstrates the ability to reduce local emissions of NO<sub>2</sub> and/or PM<sub>10</sub> sufficiently to offset the potential for additional exceedances of an ambient air quality standard. The project owner/operator, at their option, could implement this plan in lieu of full or partial implementation of condition 2.a. above, provided the offsite emission reductions could be accomplished in a timeframe suitable to ensure no further standard violations.
3. In lieu of implementing conditions 1 and/or 2 above, the project owner/operator may implement an Offsite Mitigation Plan designed to reduce emissions from local sources in an amount sufficient to offset the potential for construction emissions to cause a violation of the State NO<sub>2</sub> or PM<sub>10</sub> standards. This mitigation plan shall be approved by the CPM and the District and implemented at least 3 months prior to start of construction.

**Verification:** Not less than 120 days prior to breaking ground for construction activities, the owner/operator shall submit for approval to the CPM and the District either an Ambient Air Monitoring Plan with a Mitigation Contingency Plan or an Offsite Mitigation Plan.

#### Conditions Prior to Combusting Fuel

**AQ-1** The owner/operator shall submit to the San Luis Obispo County Air Pollution Control District (District) and the CPM all design criteria and specifications that affect air pollutant emissions or emission measurements systems, for the Selective Catalytic Reduction (SCR) system, the ammonia injection system, the oxidation catalyst and the continuous emission monitoring (CEM) systems, and shall receive Air Pollution Control Officer (APCO) approval prior to installation.

**Verification:** The project owner/operator shall submit all design criteria and specifications identified in this condition to the District and CPM at least 30 days prior to component deliveries on the project site.

**AQ-2** Pursuant to the requirements of District Rule 216, the owner/operator shall apply for and receive a revised Title V permit for the Morro Bay Power Plant prior to the first firing of the Gas Turbine Units.

**Verification:** The project owner/operator shall submit a copy of the revised Title V permit for the Morro Bay Power Plant to the District and CPM at least 30 days prior to the first firing of the gas turbine units.

**AQ-3** District approved continuous emission monitors (CEM) shall be installed, calibrated, and operational prior to the first firing of the Gas Turbines Units. After commissioning of the Gas Turbine units, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the normal range of Carbon Monoxide (CO), ammonia (NH<sub>3</sub>) and oxides of Nitrogen (NO<sub>x</sub>) emission concentrations, which shall include startup and shutdown conditions. The type, specifications, and location of these monitors shall be subject to District review and approval. The owner/operator shall submit a CEM Operation and Works Plans to the District and CPM for comment and approval. The owner/operator shall also install and maintain a telemetric data acquisition system at the District office. The owner/operator may use a predictive emission monitoring system (PEM) during the first three (3) years of operation in lieu of the ammonia CEM. If the PEM is chosen for ammonia, the owner/operator shall submit a plan for APCO and CPM approval prior to the first firing of the Gas Turbines Units. The APCO and CPM must approve the plan prior to installation. Operation and equipment installation for the PEM, shall occur according to the provisions of the approved PEM plan.

**Verification:** If the PEM option is chosen, the project owner/operator shall submit a PEM plan for District and CPM approval six (6) months prior to the first firing of the Gas Turbine Units. The CEM Operation and Works Plans shall be submitted for District and CPM comment and approval no later than 60 days prior to first firing of the Gas Turbine Units. The owner/operator shall submit a letter on District letterhead to the CPM indicating that a telemetric data acquisition system has been installed at the District office. The owner/operator shall submit a letter on District letterhead to the CPM indicating that the CEM (and potentially the PEM if chosen) has been installed and is operating properly.

**AQ-4** The owner/operator shall submit a Start up and Commissioning Plan to the APCO and CEC CPM for approval. This plan shall describe the procedures to be followed during the commissioning of the Gas Turbines, duct burners, the heat recovery steam generator (HRSG), and the steam turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the

tuning of the dry-low- NOx combustors, the installation and operation of the SCR systems, the installation and operation of the oxidation catalyst system and the installation, calibration, and testing of the CO, NH3 and NOx continuous emission monitors, and any activities requiring the firing of the Gas Turbines without abatement by the SCR and oxidation catalyst systems.

**Verification:** The owner/operator shall submit the Start up and Commissioning Plan to the APCO and CPM for approval at least 90 days prior to the first firing of the Gas Turbine Units.

**AQ-5** The, owner/operator shall notify the District and arrange for an inspection of the gas turbine units.

**Verification:** No later than seven (7) days prior to the first firing of the Gas Turbine Units, the owner/operator shall notify the District and arrange for an inspection of the equipment. The owner/operator shall also notify the CPM at the same time as the District, although an inspection is not required.

**AQ-6** The, owner/operator shall surrender the offsets identified in this evaluation or other offsets approved by the APCO and the CPM equal to the amount of permitted emissions prior to the first firing of the Gas Turbine Units.

**Verification:** No later than 30 days prior to the first firing of the gas turbine units, the owner/operator shall submit the necessary documentation that they have surrendered all offsets as identified in the District evaluation or other offsets as approved by the District and CPM.

**AQ-7** The, owner/operator shall submit a plan for performing ambient air monitoring, and shall obtain APCO and CPM approval for that monitoring. The plan shall provide for air monitoring at two separate locations in the surrounding area, to be performed by a third party approved by both the APCO and CPM. Continuous parameters measured at each location shall include NO, NO2, NOx, NH3, CO, and surface wind speed and direction; 24-hour particulate matter samples 10 microns or less in size (PM10) shall be taken on the standard 1 day in 6 schedule at each site. The monitoring locations will be selected, subject to APCO and CPM approval, with the intent to be best indicators of potential project air quality impacts and/or to be locations of highest community concern. The monitoring shall meet all requirements contained in the District's GUIDELINES FOR AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING, dated March 1993, including a forthcoming update to electronic data submission requirements or meet requirements determined by the APCO and CPM to be equivalent. Pre-combustion monitoring shall occur at each of these sites for twelve months prior to turbine startup, with the length of monitoring period and the starting date of monitoring subject to APCO and CPM approval. At each of these sites, ambient air monitoring for the same parameters noted above shall then be conducted

continually until one year following the start of commercial operation. The duration of this monitoring may be extended for one or both of the sites per APCO and CPM approval, for up to three additional years. This extension may occur at each site if requested by the APCO and CPM and justified by the monitoring data according to a protocol to be developed and agreed upon by the APCO, CPM and Duke. With APCO and CPM approval, the monitoring parameters included in this extended monitoring may be reduced to those which are determined to have key importance in evaluating the impact of plant emissions on the surrounding community. The owner/operator shall submit for approval, regular reports from these monitoring stations including monthly ambient air quality readings, maintenance and calibration reports to the District and CPM.

**Verification:** Twenty-four (24) months prior to the first firing of the Gas Turbine Units or 90 days following CEC approval of 00-AFC-12, whichever is later, the owner/operator shall submit a plan for performing ambient air monitoring, and shall obtain District and CPM approval for that monitoring. All ambient air quality reports shall be submitted by the owner/operator to the District and CPM for approval on a monthly basis. The owner/operator shall submit for approval maintenance and calibration reports as necessary to the District and CPM.

**AQ-8** If the turbine foundations are not completed within 30 months of the Final Determination of Compliance (FDOC) issuance, the project shall go through a new Best Available Control Technology (BACT) determination subject to APCO and CPM approval before the foundations are poured. This determination shall be made through a supplemental Authority to Construct application with the District and a Request to Amend the Conditions of Certification with the CEC. The project shall comply with the new APCO and CPM approved BACT determination and any conditions required of that determination.

**Verification:** No later than 10 days following the completion of the gas turbine foundations, the owner/operator shall submit a letter to the District and CPM indicating the exact date when the gas turbine foundations were completed.

**AQ-9** The, owner/operator shall obtain APCO approval of any offsite gas metering system that will provide fuel to the new gas turbine units. The metering system shall not release natural gas under normal operations.

**Verification:** The owner/operator shall submit to the CPM the written approval from the District of any offsite metering system that will provide fuel to the new gas turbine units no later than 10 days prior to the construction of that metering system.

**AQ-10** The, owner/operator shall take action to ensure that rust like particulate (RLP) is not emitted from any of the HRSGs. Such action shall include:

- a) Developing and submitting a RLP control and monitoring plan to the APCO at least 180 days prior to the first firing of any Gas Turbine Unit.

- b) Obtain APCO approval for the RLP plan at least 120 days prior to the first firing of any Gas Turbine Unit
- c) Performing maintenance, monitoring and record keeping according to the APCO approved RLP plan.

**Verification:** The owner/operator shall submit to the CPM the District approved RLP plan no later than 60 days prior to the first firing of any gas turbine unit.

#### Turbine Commissioning Conditions

**AQ-11** The, owner/operator shall minimize emissions of NOx and CO from the Gas Turbine Units to the maximum extent possible during the commissioning period according to the APCO and CPM approved Start up and Commissioning Plan.

**Verification:** The owner/operator shall submit for approval the Startup and Commissioning Plan to the District and CPM no later than 30 days prior to beginning Initial Commissioning activities. Emissions verification shall be determined through reporting requirements of Condition AQ-16.

**AQ-12** At the earliest feasible opportunity in accordance with the recommendation of the equipment manufacturer, the combustors of the Gas Turbines and duct burners of HRSGs shall be tuned to minimize NOx and CO emissions.

**Verification:** The owner/operator shall notify the District and CPM by letter of the exact date that the combustors for each gas turbine/duct burner set have been tuned, no later than 10 days following the completion of the tuning. Emissions verification shall be determined through reporting requirements of Condition AQ-16.

**AQ-13** At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturer's, the SCR and oxidation catalyst systems shall be installed, adjusted, and operated to minimize the emissions of nitrogen oxides, ammonia and carbon monoxide from the gas turbines.

**Verification:** The owner/operator shall notify the District and CPM by letter of the exact date that the SCR and oxidation catalyst were operational for each gas turbine/duct burner set, no later than 10 days following the date they were operational. Emissions verification shall be determined through reporting requirements of Condition AQ-16.

**AQ-14** The, total number of firing hours of each Gas Turbine and its duct burner without abatement of nitrogen oxide emissions by the SCR System shall not exceed 300 hours during the commissioning period. Such operation of the Gas Turbine without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR and oxidation catalyst systems in place. Upon

completion of these activities, the owner/operator shall provide written notice to the District and the unused balance of the 300 firing hours without abatement will expire.

**Verification:** See the verification for Condition of Certification **AQ-13**. The first quarterly emissions report as required under Condition AQ-24 shall include a daily log of hours of operation

**AQ-15** The total mass emissions of nitrogen oxides, carbon monoxide, volatile organic compounds, PM10, and sulfur dioxide that are emitted from each Gas Turbine during the commissioning period shall accrue towards the quarterly emission limits specified in Condition of Certification **AQ-29**.

**Verification:** See the verification for Condition of Certification **AQ-29**.

**AQ-16** During the commissioning period, the owner/operator shall demonstrate compliance with Conditions of Certification **AQ-13** and **-14** through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

- firing hours,
- fuel flow rates,
- stack gas nitrogen oxide emission concentrations,
- stack gas carbon monoxide emission concentrations and
- stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbine Units. The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO<sub>x</sub> and CO emission concentrations, summarized for each clock hour and each calendar day.

**Verification:** The project owner/operator shall include the information required in this condition in the first quarterly report required under the verification to Condition AQ-24. All records shall be retained on site for at least 5 years from the date of entry and made available to District and CEC personnel upon request.

**AQ-17** The, owner/operator shall conduct a District and CEC approved source test using external continuous emission monitors to determine compliance with Condition of Certification **AQ-27**. The source test shall determine NO<sub>x</sub>, CO, and VOC emissions during start-up and shutdown of the gas turbines. The VOC 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. Prior to 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 prior to the planned source testing date. Source test results shall be submitted to the District and the CEC CPM for approval. The following source test methods shall be used unless otherwise directed by the APCO: EPA Methods 201A/202 (PM10 and condensable particulate matter) for PM10; EPA Method 7E or 20 for NOx ; EPA Method 10 or 10B for CO; EPA Method 3, 3A, or 20 for O2; EPA Method 18 for VOC.

**Verification:** Not more than thirty days after 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 of Certification **AQ-27**. The owner/operator shall submit a source testing methodology to the District and CPM for approval not more than 20 working days prior to the intended source test date. 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.

**AQ-18** The, owner/operator shall conduct a District and CPM approved source test on each HRSG exhaust stack while the gas turbines and associated HRSG duct burner are operating at maximum allowable operating rate and at minimum load (simulating startup conditions) to demonstrate compliance with Condition of Certification **AQ-19** for formaldehyde, acrolein, benzene and polycyclic aromatic hydrocarbons (PAHs). If three consecutive biennial source tests demonstrate that the annual emission rates are 75% below the established significance levels contained in District Rule 219, then the owner/operator may discontinue future testing for that pollutant under this permit condition.

**Verification:** The owner/operator shall conduct the source test describe in this condition not more than 30 days after the end of the Commissioning Period and on a biennial basis thereafter. The owner/operator shall submit the results of these source tests not more than 60 days following the date of the source tests.

**AQ-19** For the entire facility, the cancer risk shall not exceed ten in a million and the health hazard index shall not exceed one as determined by the procedures contained in District Rule 219, Toxic New Source Review.

**Verification:** See the verification for Condition of Certification **AQ-20**.

**AQ-20** To demonstrate compliance with Condition of Certification **AQ-19**, the owner/operator shall calculate and record on an annual basis the maximum projected emissions of acrolein, formaldehyde, PAHs and benzene. Maximum projected annual emissions shall be calculated using the maximum heat input rate and the highest emission factor (pounds of pollutant per mmBtu of heat input) determined by a ny source test of the Gas Turbine Units.

**Verification:** The owner/operator shall submit these calculations and a summary of the results as part of each 4<sup>th</sup> quarter report to the CPM.

**AQ-21** The owner/operator shall perform a revised health risk assessment to update emissions of acrolein, benzene, PAHs and formaldehyde using the emission rates determined by the source test required under Condition of Certification **AQ-18** and the most current District approved procedures and unit risk factors in effect at the time of the analysis.

**Verification:** The owner/operator shall submit this risk analysis shall to the District and the CEC CPM within 60 days of the source test date.

**AQ-22** The owner/operator shall conduct a District-approved PM10 source test on each HRSG exhaust stack to demonstrate compliance with Condition of Certification **AQ-25**. The testing must be performed at three load levels: full gas turbine load with duct firing, full load without duct firing, and partial load without duct firing.

**Verification:** The owner/operator shall perform the source test as indicated in this condition not more than thirty days after the end of the Commissioning Period and once every 6 months thereafter. If any two consecutive source tests demonstrate that emission rates at a specified load level is less than 75% of the permitted limits, source testing for that load level shall only be required once in every 12 month period. All source test results shall be submitted for approval to the CPM no later than 60 days after the source test date.

Gas Turbine Unit Operating Conditions:

**AQ-23** The heat input rates shall not exceed the following:

Each gas turbine:	1,850.4 mmBtu/hr
Each duct burner:	426.2 mmBtu/hr
Each gas turbine and duct burner pair	2,141.2 mmBtu/hr and 49,062.4 mmBtu/day
Total all gas turbine And duct burners	66,826,240.0 mmBtu/year

**Verification:** The owner/operator shall submit summary of the fuel monitor recording demonstrating compliance with the limits established in the Condition as part of the Quarterly reports required in the verification of Condition AQ-24 to the CPM.

**AQ-24** The maximum daily combined emissions from the gas turbine units, including start-ups and shutdowns, shall not exceed the following limits:

<b><u>Pollutant</u></b>	<b><u>Lbs/Day</u></b>
Oxides of Nitrogen (NOx)	2,483.2
Carbon Monoxide (CO)	10,652.8
Particulate Matter <10 microns (PM10)	1,203.2
Volatile Organic Compounds (VOC)	644.3
Ammonia (NH3)	1,336.5
Sulfur Dioxide (SO2)	134.4

**Verification:** The owner/operator shall provide quarterly reports no later than 45 days after the end of each calendar quarter to the CPM that demonstrates compliance with the emissions limits of this condition. The owner/operator shall submit for approval to the CPM the form and content in the Quarterly reports, CEM (and PEM if available) data, fuel consumption data, operational load levels, startup/shutdown times and emission factors established by the most recent source tests sufficient to demonstrate compliance with the emission limits established in the Conditions of Certification.

**AQ-25** The pollutant mass emission rates in the exhaust discharged to the atmosphere from each Gas Turbine Unit shall not exceed the following limits:

<b>Pollutant</b>	<b>Lbs/Hour</b>	<b>Lbs/Day</b>
Oxides of Nitrogen (NOx)	15.5	354.3
Carbon Monoxide (CO)	9.4	215.8
Particulate Matter <10 microns (PM10)	13.3	300.8
Volatile Organic Compounds (VOC)	5.4	107.9
Ammonia (NH3)	14.6	334.1
Sulfur Dioxide (SO2)	1.5	33.6

These limits shall not apply during start-up, which is not to exceed four (4) hours. SCR and oxidation catalyst controls and good engineering practices shall be used to the fullest extent practical during start-up to minimize pollutant emissions. The CO emission limit shall be 18.9 lbs/hour for the first 12 months of operation and 9.4 lbs/hour thereafter. The NH3 limit shall be 29.2 lbs/hour for the first 12 months of operation (1st year), 21.9 lbs/hour for the second 12 months of operation (2nd year) and 14.6 lbs/hour thereafter.

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the emissions limits of this condition.

**AQ-26** The pollutant concentrations discharged to the atmosphere from each Gas Turbine unit shall not ultimately exceed the following limits, calculated at 15 percent O2, dry, averaged over the time period noted:

<b>POLLUTANT</b>	<b>CONCENTRATION (PPMVD)</b>	<b>AVERAGING TIME</b>
Oxides of Nitrogen (as NO2)	2.0	rolling one-hour
Carbon Monoxide (CO)	2.0	rolling three-hour
Ammonia (NH3)	5.0	rolling three-hour

These limits shall not apply during start-up, which is not to exceed four (4) hours, or shutdown, which is not to exceed one (1) hour. SCR catalytic controls and oxidation catalyst and good engineering practices shall be used to the fullest extent practical during start-up to minimize pollutant emissions. Start-up shall be defined as the period of time after fuel flow is initiated until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of this Condition, not to exceed four (4) hours. Shutdown shall be defined as the period of time from noncompliance with the emission concentration limits of this Condition until the termination of fuel flow to the Gas Turbine, not to exceed one (1) hour.

The CO emission limit shall be 4.0 ppmv for the first 12 months of operation and 2.0 ppmv thereafter. The NH3 limit shall be 10 ppmv for the first 12 months of operation (1st year), 7.5 ppmv for the second 12 months of operation (2nd year) and 5.0 ppmv thereafter.

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the emissions limits of this condition.

**AQ-27** Start-up pollutant emission rates discharged to atmosphere from each Gas Turbine during a start-up shall not exceed the following limits. These limits apply to any start-up period, which shall not exceed four (4) hours.

<b>POLLUTANT</b>	<b>LB/STARTUP</b>
Oxides of Nitrogen (as NO <sub>2</sub> )	320.0
Carbon Monoxide (CO)	2,480.0
Volatile Organic Compounds (as CH <sub>4</sub> )	64.0

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the emissions limits of this condition.

**AQ-28** Each Gas Turbine unit shall be limited to 400 hours of startup and shutdown time per year; no more than two turbines shall be in startup mode at any one time. Each gas turbine shall be limited to a combined start-up and shutdown time of 4 hours per rolling 24-hour period. A log of all startups and shutdowns shall be maintained onsite and retained for the most recent 5-year period. The log shall include date and time of occurrence, total time in startup or shutdown mode, total emissions of NO<sub>x</sub> and CO in tons for each event.

**Verification:** The owner/operator shall maintain this information on site for a minimum of five years and make it available to the District and CPM upon request. This information shall be summarized and submitted as part of the Quarterly reports to the CPM.

**AQ-29** Emission from all gas turbine unit sources shall not exceed the following limits:

POLLUTANT	TONS/QUARTER	TONS/YEAR
Oxides of Nitrogen (NOx)	76.83	292.30
Carbon Monoxide (CO)	167.32	636.54
Particulate Matter <10 microns (PM10)	53.41	203.20
Volatile Organic Compounds (VOC)	20.40	77.60
Sulfur Dioxide (SO2)	6.05	23.00

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the emissions limits of this condition. The annual emissions data (tons/year) shall be included in the 4<sup>th</sup> quarter summary.

**AQ-30** CEM Systems, including remote District access, shall be installed and operated on each of the Gas Turbine Units. These systems shall be designed to continuously record the measured gaseous concentrations, and shall calculate and continuously monitor and record the CO, O2, NH3 and NOx concentrations, corrected to fifteen (15) percent oxygen (O2) on a dry basis. The equipment installed for the continuous monitoring of CO shall be maintained and operated in accordance with 40 CFR Part 60, Appendix F. The equipment installed for the continuous monitoring of O2 and NOx shall be maintained and operated in accordance with 40 CFR Parts 72 and 75. For periods of missing CO data, CO hourly values shall be substituted from valid hourly average data from the previous thirty (30) unit operating days, excluding periods of startup and shutdown. The CO data shall be substituted based on equivalent incremental load ranges.

**Verification:** The owner/operator shall submit CO, NOx and ammonia data corrected to 15% O2, indicating substituted CO data as necessary as a part of the Quarterly reports to the CPM.

**AQ-31** The owner/operator shall conduct a Relative Accuracy Test Audit (RATA) on the CEMS in accordance with 40 CFR Part 60, Appendix B, Performance Specifications; a performance test shall also be performed, and the written test results of the performance tests shall be provided to the District and CPM for approval. A complete test protocol shall be submitted to the District and CPM prior to testing, and notification to the District and CPM prior to the actual date of testing shall be provided so that a District observer may be present. The performance tests shall include those parameters specified in the approved test protocol, and shall at a minimum include the following:

- a. Oxides of Nitrogen (as NO<sub>2</sub>): ppmv dry at 15% O<sub>2</sub> and lb/hr.
- b. Carbon Monoxide: ppmv dry at 15% O<sub>2</sub> and lb/hr.
- c. Ammonia (NH<sub>3</sub>): ppmv dry at 15% O<sub>2</sub> and lb/hr and the following process parameters:
- d. Natural gas consumption.
- e. Turbine load in megawatts.
- f. Stack gas flow rate (SDCFM) calculated according to procedures in EPA method 19, and % CO<sub>2</sub>.

**Verification:** The owner/operator shall conduct the RATA test within sixty (60) days after the end of the commissioning of the Gas Turbines. The owner/operator shall submit the RATA results within sixty (60) days after testing to the District and CPM for approval. The owner/operator shall submit the RATA test protocols for approval to the District and CPM no later than thirty (30) days prior to the source test date. The owner/operators are to notify the District and CPM of the actual test date at least ten (10) days prior to the test date. Changes to the test date made subsequent to the initial ten days notification may be communicated by telephone or other acceptable means no less than forty-eight (48) hours prior to the new test date.

#### General Conditions

**AQ-32** Each Gas Turbine and related HRSG shall be abated by a properly operated and properly maintained SCR system whenever fuel is combusted at those sources and the catalyst bed has reached minimum operating temperature. Each turbine unit shall be abated by a properly operated and maintained Oxidative Catalyst system.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-33** The owner/operator shall take monthly samples of the natural gas combusted. The samples shall be analyzed for sulfur content using District-approved laboratory methods. 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 determine the quarterly SO<sub>2</sub> emissions. The quarterly SO<sub>2</sub> emissions shall be determined by using the average sulfur content during the last three (3) measurements along with the amount of fuel combusted during the last three months. Quarterly SO<sub>2</sub> emissions shall be calculated and recorded within 30 days of the end of any month.

**Verification:** The owner/operator shall submit the results of the monthly sulfur content tests and the calculated quarterly SO<sub>2</sub> emissions with the Quarterly reports required under Condition AQ-24 to the CPM .

**AQ-34** The APCO and CPM shall be notified in writing before any changes are made to operating procedures, equipment, or materials used which have the potential to increase the emission of any air contaminant.

**Verification:** The owner/operator shall notify the District and CPM in writing at least 60 days prior to making any changes as indicated in this Condition.

**AQ-35** The gas turbine units and related ancillary equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the information presented in the application under which this permit was granted.

**Verification:** See the verification for Condition of Certification **AQ-24**.

**AQ-36** If the APCO determines that the operation of this equipment is causing a public nuisance, the owner/operator shall take immediate action and eliminate the nuisance.

**Verification:** The owner/operator shall include any such findings by the APCO in the Quarterly reports to the CPM.

**AQ-37** The owner/operator shall demonstrate compliance by using properly operated and maintained continuous emission monitors (CEMs) during all hours of operation including equipment Start-up and Shutdown periods, except for periods of CEM maintenance performed in accordance with District requirements, for all of the following parameters:

- a. Firing hours and fuel flow rates for the gas turbines and duct burners.
- b. Oxygen (O<sub>2</sub>) concentrations, Nitrogen Oxide (NO<sub>x</sub>) concentrations, and Carbon Monoxide (CO) concentrations.
- c. Ammonia injection and emission rates.

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 pollutant emission concentrations.

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

- d. Heat input rate.
- e. Corrected NO<sub>x</sub> concentrations, NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), corrected NH<sub>3</sub> concentrations, NH<sub>3</sub> mass emissions corrected CO concentrations, and CO mass emissions.

Records shall be maintained onsite for a period of five years after creation, unless otherwise allowed by the APCO.

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the information requirements of this condition.

**AQ-38** For each emission source, the owner/operator shall record the parameters specified in d. and e. of this Condition every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

- a. Total heat input rate for every clock hour.
- b. The NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), and corrected average NO<sub>x</sub> emission concentration for every clock hour.
- c. The CO mass emissions, and corrected average CO emission concentration for every rolling three-hour period.
- d. On an hourly basis, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
- e. For each calendar day, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
- f. For each calendar quarter, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
- g. For each calendar year, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
- h. Records shall be maintained onsite for a period of five years after creation, unless otherwise allowed by the APCO.

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the information requirements of this condition.

**AQ-39** The owner/operator shall calculate and record on a daily basis, the Volatile Organic Compound (VOC) mass emissions, Fine Particulate Matter (PM<sub>10</sub>) mass emissions, Sulfur Dioxide (SO<sub>2</sub>) mass emissions, and Ammonia (NH<sub>3</sub>) mass emissions from each source. The owner/operator shall use the actual heat input rates, actual start-up times, actual Shutdown times, and District-approved emission factors to calculate these emissions. Records shall be maintained onsite for a period of five years after creation, unless otherwise allowed by the APCO. The calculated emissions shall be presented as follows:

- a. For each calendar day, VOC, PM<sub>10</sub>, SO<sub>2</sub>, and NH<sub>3</sub> mass emissions shall be summarized for each source.
- b. On a daily basis, the cumulative total VOC, PM<sub>10</sub>, SO<sub>2</sub> and NH<sub>3</sub> mass emissions shall be summarized for each calendar quarter and for the calendar year.

**Verification:** The owner/operator shall provide data in the quarterly reports required in the verification for Condition of Certification **AQ-24** that demonstrates compliance with the information requirements of this condition.

**AQ-40** Instrumentation must be operated to measure the SCR catalyst inlet temperature and pressure differential across the SCR catalyst.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-41** The owner/operator shall submit to the Air Pollution Control District a written report each month that shall include:

- a. time intervals, date, and magnitude of excess emissions;
- b. nature and cause of the excess emission, and corrective actions taken;
- c. time and date of each period during which the continuous monitoring system was inoperative, except for zero and span checks, and the nature of system repairs and adjustments; and
- d. a negative statement when no excess emissions occurred.
- e. Records shall be maintained onsite for a period of five years after creation, unless otherwise allowed by the APCO.

**Verification:** A copy of this report shall be submitted as part of the Quarterly reports to the CPM.

**AQ-42** The owner/operator shall monitor and report SO<sub>2</sub> emissions in accordance with 40 CFR Parts 72 and 75.

**Verification:** See the verification for Condition of Certification **AQ-24**.

**AQ-43** The owner/operator shall hold "Acid Rain" Sulfur Dioxide Allowances in the compliance sub accounts not less than the total annual emissions of sulfur dioxide for the previous calendar year.

**Verification:** The owner/operator shall submit a copies of correspondence with the District demonstrating compliance in the 4<sup>th</sup> quarterly report to the CPM as to demonstrate compliance with this Condition.

**AQ-44** The equipment installed for the continuous monitoring of CO<sub>2</sub> or O<sub>2</sub> and NO<sub>x</sub> shall be maintained and operated in accordance with 40 CFR Parts 72 and 75.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-45** A written Quality Assurance program must be established in accordance with 40 CFR Part 75, Appendix B and 40 CFR Part 60, Appendix F which includes, but is not limited to: procedures for daily calibration testing, quarterly linearity and leak testing; record keeping and reporting implementation, and relative accuracy testing.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-46** Pursuant to Clean Air Act Amendments (CAAA) Title IV, Part 75, Section 75.50, permanent records shall be maintained onsite for a period of five years after creation. The records at a minimum shall include all items specified in Section 75.50.

**Verification:** The owner/operator shall make all such records available to the CPM upon request.

**AQ-47** Pursuant to CAAA, Title IV, Part 75, Section 75.64, quarterly reports shall be submitted to the District within 30 days following the end of the calendar quarter. The reports must be in electronic format and at a minimum must include all items listed in Section 75.64.

**Verification:** See the verification for Condition of Certification **AQ-24**.

**AQ-48** The owner/operator shall perform testing monthly (or less frequently if deemed appropriate by the Air Pollution Control Officer) to verify compliance with the Ammonia (NH<sub>3</sub>) slip limit. The owner/operator shall conduct this testing in accordance with the collection method specified in BAAQMD Source Test Procedure ST-1B and the analysis specified in EPA method 350.3.

**Verification:** The owner/operator shall submit the results of all monthly ammonia slip tests to the CPM as part of the Quarterly and Annual reports.

**AQ-49** Annual performance tests shall be conducted once in every twelve-month period in accordance with Air Pollution Control District test procedures.

**Verification:** The written results of the performance tests shall be provided to the District and the CPM within thirty (30) days after each test. A testing protocol shall be submitted to the District no later than thirty (30) days prior to the testing, and notification to the District at least ten (10) days prior to the actual date of testing shall be provided so that a District observer may be present. Changes to the test date made subsequent to the initial ten day notification

may be communicated by telephone or other acceptable means no less than forty-eight (48) hours prior to the new test date. If the testing cannot be completed during a twelve month period due to the equipment being non-operational or in limited operation at the end of the current twelve month period, the APCO may delay testing until the unit is operating at sufficient capacity.

**AQ-50** The owner/operator shall report all breakdowns which result in the inability to comply with any emission standard or requirement contained on this permit to the APCO as soon as reasonably possible, but in any case within 4 hours of its detection. The APCO may elect to take no enforcement action if the owner/operator demonstrates to the APCO's satisfaction that a breakdown condition exists.

As soon as the occurrence has been corrected, but no later than 10 days after the breakdown, a written report shall be supplied to the APCO. This report shall include at a minimum:

- a. a statement that the condition or failure has been corrected and the date of correction; and
- b. a description of the reasons for the occurrence; and
- c. a description of the corrective measures undertaken and/or to be undertaken to avoid such an occurrence in the future; and
- d. pictures of the failed equipment when applicable.

**Verification:** All breakdown reports are to be included in the Quarterly reports to the CPM.

**AQ-51** The owner/operator shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall be subject to District review and approval.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-52** No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three (3) minutes in any one (1) hour which is as dark or darker than Ringlemann 1 or equivalent 20% opacity.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-53** If any of the existing standby diesel engines are relocated to the new turbine plant, the owner/operator shall provide written notice to the APCO, and shall receive written approval from the APCO, prior to such relocation. Any notice of proposed relocation shall be accompanied by a health risk assessment prepared in accordance with

District Rule 219. If the APCO determines the health risk exceeds the toxic impact limits of Rule 219, the owner/operator shall install APCO approved oxidation particulate traps or APCO approved equivalent controls on any relocated standby diesel engine rated at 50 hp or greater prior and use ultra low sulfur fuel.

**Verification:** The owner/operator shall notify the CPM with 30 days if such action is taken pursuant to this Condition.

**AQ-54** any representative of the Air Pollution Control District or the California Energy Commission authorized by the Air Pollution Control Officer shall be permitted, pursuant to the authority contained in Section 41510 of the California Health and Safety Code:

- a. to enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this authorization;
- b. to have access to and copy any records required to be kept under the terms and conditions of this authorization;
- c. to inspect any equipment, operation, or process described or required in this authorization; and,
- d. to sample emissions from the source.

**Verification:** The owner/operator shall provide the District or CPM access to the power plant facility upon request.

**AQ-55** The turbines and duct burners shall be fired exclusively on natural gas.

**Verification:** See the verification for Condition of Certification **AQ-23**.

**AQ-56** The minimum stack height of any HRSG shall each be at least 145 feet above grade level at the stack base.

**Verification:** The owner/operator shall submit relevant "as-built" design diagrams showing the final true height of each of the HRSGs.

## REFERENCES

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- DUKE (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes Ia-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission on October 23, 2000.
- DUKE (Duke Energy Morro Bay LLC) 2000d. Letter to CEC/Badr from Sierra Research/Matthews RE Meteorological data from SLOAPCD used in preparing ambient air quality impact analysis, dated and submitted to California Energy Commission on November 1, 2000.
- DUKE (Duke Energy Morro Bay LLC) 2000e. Document from Sierra Research/Matthews to USEPA/Rios RE Application for a Prevention of Significant Deterioration Permit, dated and submitted to California Energy Commission on November 3, 2000.
- CAPE (Coastal Alliance on Plant Expansion) 2000c. Letter from CAPE/Winholtz to CEC/Lewis RE General comments on noise, dated and submitted to California Energy Commission on November 16, 2000.
- CCC (California Coastal Commission) 2000a. Letter from CCC/Bowen to CEC/Lewis RE Assessment of the Data Adequacy of the AFC, dated November 20, 2000. Submitted to the California Energy Commission on November 21, 2000.
- SLOAPCD (San Luis Obispo Air Pollution Control District) 2000a. Letter from SLOAPCD/Willey to CEC/Lewis RE Data Adequacy Review for Morro Bay Power Plant Project, dated November 17, 2000. Submitted on November 21, 2000.
- SLOAPCD (San Luis Obispo Air Pollution Control District) 2000b. Letter from SLOAPCD/Carr to Sierra Research/Rubenstein RE Requested Isopleth Diagrams that Illustrate the Spatial Distribution of Air Quality Impacts from Proposed Modernization Project, dated November 9, 2000. Submitted to the California Energy Commission on November 13, 2000.
- DUKE (Duke Energy Morro Bay LLC) 2000g. Transmittal from Sierra Research/Rubenstein to SLOAPCD/Willey RE APCD Application #3038, dated November 21, 2000. Submitted to the California Energy Commission on November 22, 2000.
- DUKE (Duke Energy Morro Bay LLC) 2000h. Letter from Sierra Research/Matthews to SLOAPCD/Willey RE Updated Calculations of Baseline Emissions for Units 1-4 at Morro Bay, dated November 28, 2000. Submitted to the California Energy Commission on November 30, 2000.
- SLOAPCD (San Luis Obispo Air Pollution Control District) 2000c. Transmittal from SLOAPCD/Allen to CEC/Lewis RE Project Site Meteorology Data, dated and submitted to the California Energy Commission on December 1, 2000.

SLOAPCD (San Luis Obispo Air Pollution Control District) 2000d. Letter from SLOAPCD/Willey to CEC/Lewis RE Notification of Application Completeness-Data Adequacy Review, dated November 28, 2000. Submitted to the California Energy Commission on December 11, 2000.

SLOCBOE (San Luis Obispo County Office of Education/Royer) 2001a. Letter to CEC/Lewis RE Support for Morro Bay Power Plant project, dated February 20, 2001. Submitted to the California Energy Commission on March 6, 2001.

MBNEP (Morro Bay National Estuary Program/Multari) 2001a. Letter to CEC/Lewis RE Additional Questions and Comments on Workshop, dated February 27, 2001. Submitted to the California Energy Commission on March 7, 2001.

DUKE (Duke Energy Morro Bay LLC) 2001a. Response to CEC 2/9/01 Data Requests (First set of responses to CEC data request Set 1), dated and submitted to California Energy Commission on March 9, 2001d.

DUKE (Duke Energy Morro Bay LLC) 2001b. Responses to CEC 2/9/01 Data Requests (Second set of responses to CEC data request Set 1), dated and submitted to California Energy Commission on April 11, 2001.

CAPE (Coastal Alliance on Plant Expansion/Groot) 2001b. Transmittal from CAPE/Groot to CEC/Lewis RE Data Requests of the Intervenor (to CEC staff), dated April 19, 2001. Submitted to the California Energy Commission on April 23, 2001.

CAPE (Coastal Alliance on Plant Expansion/Groot) 2001c. Transmittal from CAPE/Groot to CEC/Lewis RE Data Requests (Set 2) of the Intervenor (to Applicant), dated April 20, 2001. Submitted to the California Energy Commission on April 23, 2001.

**APPENDIX A**

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**SAN LUIS OBISPO COUNTY AIR POLLUTION  
CONTROL DISTRICT**

**FINAL DETERMINATION OF COMPLIANCE**

**MORRO BAY POWER PLANT PROJECT**

# HAZARDOUS MATERIALS MANAGEMENT

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

## INTRODUCTION

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The purpose of this staff analysis is to determine if the proposed Morro Bay Power Plant Project (MBPP Project, 00-AFC-12) 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. Staff's **Worker Safety and Fire Protection** analysis describes the requirements applicable to the protection of workers from such risks.

The only hazardous material stored at the Morro Bay Power Plant Project 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 Table 6.15-5 of the Application for Certification [Duke 2000a, 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 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.

The project will also use an aqueous mixture of hydrazine as a feedwater oxygen scavenger. This material may pose risks if not handled properly and was therefore the subject of further staff analysis.

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 on-site pipeline design is addressed in staff's **Facility Design** analysis.

The Morro Bay Power Plant Project will also require the transportation of aqueous ammonia to the facility.

## **LAWS, ORDINANCES, REGULATIONS, STANDARDS AND POLICIES**

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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 (Pub. L. 99-499, §301, 100 Stat. 1614 [1986]), also known as SARA Title III, contains the Emergency Planning and Community Right To Know Act (EPCRA) as codified in 42 U.S.C. §11001 et seq. This Act requires that certain information about any release to the air, soil, or water of an extremely hazardous material must be reported to state and local agencies.

The Clean Air Act (CAA) of 1990 (42 U.S.C. §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 CAA section on Risk Management Plans - codified in 42 U.S.C. §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 the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

Currently, due to the high volume of petroleum-containing hazardous materials already in place on this site, the applicant is required to have a Spill Prevention Control and Countermeasure Plan (SPCC) in place (Hazardous Waste Contingency Plan Title 40 C.F.R., Part 112.7).

### **STATE**

The California Accidental Release Prevention Program (Cal-ARP) - Health and Safety Code, section 25531 - 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 program supersedes the California Risk Management and Prevention Plan (RMPP).

Section 25503.5 of the California Health and Safety Code requires facilities which store or use hazardous materials to prepare and file a Business Plan with the local Certified Unified Program Authority (CUPA), in this case the San Luis Obispo County Health Department, Division of Environmental Health. This Business Plan is required to contain information on the business activity, the owner, a hazardous materials inventory, facility maps, an Emergency Response Contingency Plan, an Employee Training Plan, and other recordkeeping forms.

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

### **Gas Pipeline**

The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. The pipeline classes are defined as follows (Title 49, Code of Federal Regulations, Part 192):

- Class 1: Pipelines in locations with ten or fewer buildings intended for human occupancy.
- Class 2: Pipelines in locations with more than ten but fewer than 46 buildings intended for human occupancy. This class also includes drainage ditches of public roads and railroad crossings.
- Class 3: Pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12 month period (The days and weeks need not be consecutive).

The natural gas pipeline will be designed for Class 3 service and will meet California Public Utilities Commission General Order 112-D and 58-A standards as well as various PG&E standards. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192:

- Title 49, Code of Federal Regulations, Part 190 outlines the pipeline safety program procedures;
- Title 49, Code of Federal Regulations, Part 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports, requires operators of pipeline systems to notify the U.S. Department of

Transportation of any reportable incident by telephone and then submit a written report within 30 days;

- Title 49, Code of Federal Regulations, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. This part contains regulations governing pipeline construction, which must be, followed for Class 2 and Class 3 pipelines.

## **LOCAL AND REGIONAL**

The Uniform Fire Code (UFC 1997) contains provisions regarding the storage and handling of hazardous materials in Articles 4 and 79. The most recent version of the UFC was adopted in 1997. The City of Morro Bay adopted this version of the UFC into the municipal code in 1999.

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 City of Morro Bay Zoning Ordinance, Chapter 17.52, Section 17.52.100 is administered by the Morro Bay Fire Department and contains a requirement that hazardous materials may not be stored or used within 100 feet of residences.

## **SETTING**

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On October 23, 2000 Duke Energy Morro Bay LLC filed an Application for Certification (00-AFC-12) seeking approval from the California Energy Commission (Energy Commission) to construct and operate the proposed 1,200-megawatt (MW) Morro Bay Power Plant Project (MBPP Project). The "modernization" Project is proposed to be located at the existing 1,030 MW Morro Bay Power Plant site that is owned and operated by Duke Energy. This site is located within the City of Morro Bay, San Luis Obispo County, near Morro Bay Harbor, bordered on the west by Embarcadero Road and on the east by Highway 1. See Project Description for more details.

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 (section 6.2.2). 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 central California Coast microclimate. Therefore, staff agrees with the applicant that use of F stability (stagnated air, very little mixing), 1.5 meter/second wind speed, and an ambient temperature of 97° F in its modeling analysis of an accidental release of aqueous ammonia is an extremely conservative scenario and reflects worst case atmospheric conditions. Staff also believes that the Applicant's Alternative Scenario modeling input parameters involving accidental release from a tanker truck (see Table 6.15-6 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. The project site and immediate vicinity (within 1800 feet of the aqueous ammonia storage tanks) is mostly level terrain. The nearest elevated location (a hill on the north east corner of the site) is approximately 1800 feet from the facility to the west. However, because modeling results show impacts are insignificant at the fenceline, 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. Table 6.15-1 and Figure 6.15-2 (Duke 2000a) lists and shows the locations of both populated areas and sensitive receptors in the project vicinity. The fenceline closest to the aqueous ammonia storage tank area is 250 feet to the south of the tanks. The nearest public receptors are located in the harbor area west of the site and the nearest residence is to the east on Dunn St. ~1210 feet NW of the aqueous ammonia storage tanks. The nearest school is located 2600 feet to the north and the nearest day care center 4400 feet distant.

## ENVIRONMENTAL IMPACTS

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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 6.15) and in data responses. Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and the amounts proposed for use as listed in Table 6.15-5 of the AFC and determined the need and appropriateness of their use. If less toxic materials are available, staff suggested their use instead.
- 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, small quantities of solvents, amines (for controlling boiler feedwater pH), and chemicals for controlling feedwater oxygen will be present in small quantities. 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 proposed condition of certification HAZ-1). See Appendix B 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 proposed use of a small quantity of hydrogen gas (744 lbs.) poses a risk of explosion. However, the small quantity present and the results of previous modeling of the blast effects of a much larger (45,000 scf) hydrogen tank explosion for a similar power generating facility in California (Final Staff Assessment for the San Diego Gas and Electric Repowering Project, April 4, 1994) 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: hydrazine (35% aqueous mixture), sodium hypochlorite, petroleum fuels, natural gas, and aqueous ammonia.

### **Large Quantity Hazardous materials**

According to the applicant (Duke, 2000a), more than 5372 gallons of an aqueous mixture of sodium hypochlorite will be stored at the cooling water intake structure. Sodium hypochlorite has 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, the intake structure is located off-site at the end of the commercial area along Embarcadero and the delivery tanker area is not bermed. The chances for accidental spills during transfer from delivery vehicles to the storage tanks should be reduced as much as possible. Thus, measures to prevent transfer spills are extremely important and will be required as an additional section within the required Safety Management Plan for delivery of aqueous sodium hypochlorite (see Condition of Certification HAZ-3).

Large quantities of petroleum-containing hazardous materials will be used on this site. Diesel fuel (28,162 gallons) is of very low volatility and impacts of spills are expected to remain on-site. A small amount of gasoline (5741 gallons) will also be stored on-site. A Spill Prevention Control and Countermeasure Plan (SPCC) is required by Federal Regulations (see LORS above) and has already been prepared for the current petroleum-containing hazardous materials on-site (see AFC page 6.15-36). It will be modified to reflect new conditions.

### **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. . In particular, gas explosions can occur in the Heat Recovery Steam Generator 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 (HRSG) and during start-up.

The National Fire Protection Association (NFPA 85A) has est. controls for gas fired equipment, including 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 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**

Aqueous ammonia will be used in controlling the emission of oxides of nitrogen (NO<sub>x</sub>) 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. Two 30,000-gallon tanks will be used to store the 29.4 percent aqueous ammonia.

Based on the screening analysis discussed above, aqueous ammonia is one of the hazardous materials 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) poses far less risk.

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 150 ppm (recently changed from the 200 ppm value), 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 will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether, the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact.

The AFC (section 6.15.2.2.4) provided the results of modeling for a worst case and alternative case accidental release of aqueous ammonia. The worst-case release scenario postulated a spontaneous catastrophic failure of one of the two storage tanks resulting in the release of the entire 30,000 gallons of aqueous ammonia. In conducting this analysis, it was assumed that spilled material would be contained in the 60-foot by 30-foot containment area (~1800sq. ft.) below the storage vessel. Two layers of plastic balls will also be held within this containment structure, which will serve to limit the surface area of any spill aqueous ammonia. The tanker truck pad will also have a bermed area, which drains into this structure. The analysis assumed winds of 1.5 meters per second and atmospheric stability category F would exist at the time of the accidental release. An air temperature of 97° F was assumed. The US EPA approved DEGADIS 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 8,000 gallons of aqueous ammonia from the delivery tanker truck 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 DEGADIS air dispersion model. Atmospheric Stability Class D (instead of the more conservative F) was used, a lower ambient temperature was assumed (58° F), and a wind speed of 2.8 m/s was assumed.

The results indicated that in both instances, concentrations exceeding 75 PPM would be confined within the project site (916 feet from the storage tanks for the worst-case and 724 feet for the alternative scenario). Therefore, the release of anhydrous ammonia used for the project will not cause a significant impact.

### **Hydrazine**

An aqueous solution of 34% hydrazine is proposed for use as an oxygen scavenger for boiler feed water. Pure hydrazine is very toxic, very volatile, and is very hazardous to handle as it can ignite without an open flame or other ignition source. Many of these concerns are eliminated by use of an aqueous solution containing less than 35 percent hydrazine. However, if aqueous hydrazine is spilled resulting in a pool exposed to the atmosphere or if hydrazine is volatilized out of solution by a fire, the resultant fumes will remain very toxic.

In a response to staff's data requests, Duke replied that 347 pounds of aqueous hydrazine will be stored in a special storage building containing a double-walled storage tank. The building will be surrounded by a berm. The bermed area will not drain to a subsurface storage containment area nor will the area where the delivery vehicle parks be bermed. The Applicant did not conduct an Off-Site Consequence Analysis to evaluate the consequences of a spill into the bermed area.

Staff conducted its own modeling associated with the use of hydrazine at the proposed MBPP. Staff assumed loss of total contents into the bermed area and used the US EPA SCREEN3 air dispersion model. Staff used the National Research Council's Short Term Public Emergency Exposure Guidance Level (SPEGL) of 0.12 ppm as the Level of Concern. SPEGLs are defined as an acceptable ceiling concentration for a single unpredicted short-term exposure to the public. This modeling indicated significant impacts (greater than or equal to 0.12 ppm) for a considerable distance (up to 2300 feet which includes residential and commercial areas of Morro Bay) if aqueous hydrazine is spilled. (See Appendix C for the modeling input parameters and output results. Please note that the SCREEN3 model gives results in instantaneous ground level airborne concentrations. It does not predict the time it takes for the plume to reach specific distances nor the duration of the airborne concentration.) The Applicant, however, disagreed with staff's analysis pointing out that the bermed area is contained within a storage structure with the doors closed at all times (and will be at the new facility), that the entire contents of the aqueous hydrazine container could not be spilled, and that the container itself is made of high impact-resistant plastic. The size of the pool of spilled hydrazine solution and the rate of volatilization would therefore be less than the values staff used in its assessment. Nevertheless, staff believes that any spill of aqueous hydrazine is a serious matter and must be addressed by a trained and readily available "hazmat" team.

Staff believes that suitable alternatives exist to the use of aqueous hydrazine, one of which is carbohydrazide, a solid or in aqueous solution whereby no off-site impacts would exist should an accidental spill occur. Staff recommends that the applicant use this material as an oxygen scavenger.

However, should the Applicant continue to propose the use of aqueous hydrazine at the MBPP, the Applicant should be required to demonstrate to the Commission's satisfaction that aqueous hydrazine can be transported, stored, and used in a safe manner. Towards that, if the Applicant does wish to use this material, staff recommends that the following mitigation measures be implemented as part of the approval:

1. An aqueous hydrazine Safety Management Plan shall be prepared, including the details identified below as well as other safe work practices.
2. The delivery vehicle transfer area shall be bermed to contain the maximum amount of aqueous hydrazine stored in the vehicle tank.
3. The unloading and transfer to the hydrazine storage building shall be performed by the delivery vehicle driver and shall be supervised and monitored by at least one facility staff person who shall stand by with a pressurized water hose to dilute any spilled hydrazine.
4. In the event of a spill of hydrazine, the spill will be contained, diluted with water, and neutralized with sodium hypochlorite. Neutralized hydrazine shall be absorbed with materials such as clay, sand, or a commercial absorbent, and disposed of in an appropriate manner.
5. Neutralization chemical and absorbents shall be stored in close proximity to the unloading site.
6. The Applicant shall ensure that the delivery truck person is trained and equipped with personal protective equipment by the commercial supplier. The facility staff person shall be trained and equipped with personal protective equipment which shall consist of at the minimum butyl rubber gloves, boots, hard hat, apron or splash suit, and a face shield with safety glasses or goggles. Chemically impermeable suits and NIOSH approved full-face positive pressure supplied air respirators will also be available at the unloading site and at the facility control room.
7. Facility staff are to be trained in the safety procedures that are to be implemented during the unloading, transfer, and storage of aqueous hydrazine and these procedures will be posted at the hydrazine storage building and will be fully described in the Aqueous Hydrazine Safety Management Plan, the Business Plan, and the RMPP.
8. The hydrazine Safety Management Plan shall provide for equipment, personnel, and training to ensure that the Morro Bay Fire Department has the capability to respond to a release of aqueous hydrazine during transport, use, transfer, and storage.

## **Seismic Issues**

Hazardous materials spill could also occur during an earthquake, which 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, and neutralization systems. 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. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. Referring to the sections on GEOLOGIC HAZARDS and FACILITY DESIGN in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of the California Building Code for Seismic Zone 4 (AFC page 6.3-20), the most stringent code level. Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks, staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

## **Transportation of Hazardous Materials**

The transportation of hazardous materials to the facility is usually of great concern to the residents and workers in the surrounding community. Hazardous materials, including aqueous ammonia, sodium hypochlorite, and others will be transported to the facility via tanker truck. . While many types of hazardous materials will be transported to the site it is staff's belief that transport of aqueous ammonia poses the predominance of risk associated with such transport.

Aqueous ammonia would be delivered to the facility by tanker truck and thus it is possible that ammonia can be released during a transportation accident. The extent of impact in the event of such a release would depend on the location and on the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent on three factors:

1. the skill of the tanker truck driver,
2. the type of vehicle used for transport, and on
3. accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway, State Route 1, which is listed by the California Highway Patrol as a hazardous material transportation route. Staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California Highways to ensure safe handling in general transportation (see The Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, The US Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also address the issue of driver competence. (See AFC section 7.4.11 for additional information on regulations governing the transportation of hazardous materials.)

To address the issue of tank truck safety, aqueous ammonia will be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with design capacity of 8000 gallons. These vehicles will be designed to DOT Code MC-307. These are high integrity vehicles designed for hauling of caustic materials such as ammonia. Staff has therefore proposed a Condition of Certification (HAZ-5) to ensure that regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker, which meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on the following references to determine the approach to preparing a hazardous materials transportation accident risk analysis:

Rhyne, W.R. 1994. Hazardous Materials Transportation Risk Analysis. Quantitative Approaches for Truck and Train.

Chapter 2: Transportation Quantitative Risk Analysis

Chapter 3: Databases

Davies, P.A. and Lees, F.P. 1992. "The Assessment of Major Hazards: The Road Transport Environment for Conveyance of Hazardous Materials in Great Britain." Journal of Hazardous Materials, 32: 41-79.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1990. "Truck Accident Rate Model for Hazardous Materials Routing." Transportation Research Record. 1264: 12-23.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1993. "Procedure for Developing Truck Accident and Release Rates for Hazmat Routing." Journal of Transportation Engineering. 119(2): 189-199.

Vilchez, J.A., Sevilla, S., Montiel, H. and J. Casal. 1995. "Historical Analysis of Accidents in Chemical Plants and in the Transportation of Hazardous Materials." J. Loss Prev. Process Ind. 8(2): 87-96

Pet-Armacost, J.J., Sepulveda, J. and M. Sakude. 1999. "Monte Carlo Sensitivity Analysis of Unknown Parameters in Hazardous Materials Transportation Risk Assessment." Risk Analysis. 19(6): 1173-1184.

National Response Center  
Chemical Incident Reports Center, U.S. Chemical Safety Board  
National Transportation Safety Board

Staff used this data and that from the Davies and Lee (1992) article which references the 1990 Harwood study to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The maximum usage of aqueous ammonia each year of operation of the proposed Morro Bay Power Plant will require about 104 tanker truck deliveries of aqueous ammonia per year (maximum of two trucks per week). Each truck delivery will travel less than one-half mile between State Route 1 and the facility per delivery (a specific transportation route will be required by Condition of Certification Haz-6). The result is 52 miles of delivery truck travel in the project area per year. Previous assessments by staff have found that the risk over this distance is negligible.

Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) was approximately 0.1 in one million.

Staff therefore believes the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility are insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public. The transportation of similar volumes of hazardous materials on the nation's highways is not unique nor an infrequent occurrence. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is far less than those associated with many activities that the public readily accepts.

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility (with the exception of the possible use of aqueous hydrazine). Based on this, staff concludes that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation. If the Applicant wishes to use aqueous hydrazine, it should demonstrate that the risk of a transportation accident involving aqueous hydrazine is insignificant.

Staff also finds that restricting the route of transportation would be important in keeping the risks of accidents to negligible levels. Accordingly, staff proposes a Condition of Certification (HAZ-6) that requires the applicant to identify the preferred hazardous materials transportation route and obtain approval from the CPM before hazardous materials are delivered to the facility.

## **CUMULATIVE IMPACTS**

Staff reviewed the potential for the operation of the MBPP combined with existing light industrial facilities to result in cumulative impacts on the population within the area. Projects

that could potentially contribute to cumulative impacts are those located or which will be located in the same geographic area of influence defined as within a 1-mile radius of the proposed power plant. (These projects are discussed in AFC section 6.1.4 and figure 6.1-1, and Table 6.1-1.) None of the proposed projects within a one-mile radius of the MBPP will use hazardous materials. Because there already exists a power generation facility on this site, the risks and hazards surrounding the use of hazardous materials has already been addressed for the existing facility and for the surrounding industries. Staff finds that the replacement of the power generating facilities at 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.

## **APPLICANT'S PROPOSED MITIGATION**

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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 curbs, 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 1,800 square foot containment area which will surround the two 30,000 gallon aqueous ammonia storage tanks;
- a sloped containment pad for the aqueous ammonia tanker truck delivery area that will drain into the same subsurface covered sump placed beneath the storage tanks; and
- process protective systems including automatic shut-off 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.

The facility will also prepare a Hazardous Materials Business Plan and a Risk Management Plan (RMP) and modify the existing spill Prevention Control and Countermeasures (SPCC) Plan.

## **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**

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The worst-case accidental release scenario evaluated by Duke Energy in the AFC assumed that accidental spills of aqueous ammonia would occur from the storage vessel into the basin below the storage vessel or from a tanker truck into the same catchment system. Staff believes that the most likely event resulting in a spill would be during transfer from the delivery tanker to the storage tank. Staff also believes that if the applicant continues to propose the use of aqueous hydrazine, the potential for a spill during transfer from the delivery vehicle to the storage container is possible. Staff therefore proposes a condition (HAZ-3) requiring development of a safety management plan for the delivery of aqueous ammonia and HAZ-7 for the delivery of aqueous hydrazine if the Applicant is able to

demonstrate to the Commission's satisfaction that this material can be used and transported safely. The developments of these two Safety Management Plan addressing delivery of ammonia and hydrazine 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**

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The requirements for the 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, San Luis Obispo 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).

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS**

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### **AGENCY COMMENTS**

CDFG-18 *The California Department of Fish and Game requests that LORS section refer to Fish and Game Code.*

This is not a hazardous materials issue but rather a water issue. Please refer to that section of the FSA for the response.

CDFG-19 *The California Department of Fish and Game is concerned that the Hazardous Material Management section fails to address potential effects of transporting hazardous materials on habitats and species along the route.*

This is not a hazardous materials issue but rather a water or biology issue. Please refer to those sections of the FSA for the response.

CMB-4 *The City of Morro Bay requests an explanation why an Ammonia on Demand system is not proposed for the project.*

Staff has conducted an analysis of the use of aqueous ammonia at the proposed power plant and many other proposed power plants throughout the state. Staff has found that the risks of using, storing and transporting aqueous ammonia are insignificant. Indeed, staff has failed to find a single accident or spill of aqueous ammonia either at a CEC-certified power plant or during the transportation to a CEC-certified power plant. Furthermore, staff has not found an environmental justice issue associated with the use of aqueous ammonia at this proposed facility. Staff has also reviewed the use of dry urea pellets as an alternative source of

ammonia for SCR. Staff has found that it is a viable alternative, however, it has not been used extensively in this country nor on a scale of this magnitude. However, if the Commissioners are somehow dissatisfied with the use of aqueous ammonia, this alternative is available for consideration.

*CMB-44 The City of Morro Bay is concerned that hydrazine poses significant risks, and the MBFD requests a study for the replacement of Aqueous Ammonia with a Urea Pellet system.*

Staff also prefers the use of alternatives to aqueous hydrazine and has proposed a substitute material. However, staff believes that the Applicant should be required to demonstrate to the Commission's satisfaction that aqueous hydrazine can be used and transported safely. If the applicant can do so, staff recommends an additional COC, Haz-7, which requires the development and implementation of a hydrazine Safety Management Plan.

## **CONCLUSIONS AND RECOMMENDATIONS**

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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, San Luis Obispo 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, San Luis Obispo County and staff. In addition, staff's proposed conditions of certification also require San Luis Obispo County's acceptance of the RMP and staff's approval of the RMP prior to delivery of any hazardous materials to the facility. In addition, if the Applicant is able to demonstrate to the Commission's satisfaction that aqueous hydrazine can be used and transported safely, an Aqueous Hydrazine Safety Management Plan will be required to ensure the safe handling, transportation, use and appropriate spill response.

## PROPOSED CONDITIONS OF CERTIFICATION

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**HAZ-1** The project owner shall not use any hazardous material at the MBPP not listed in Appendix C, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by 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 San Luis Obispo 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 San Luis Obispo County and the CPM in the final document. A copy of the final plans, including all comments, shall be provided to San Luis Obispo County and the CPM once approved by EPA.

**Verification:** At least 60 days prior to the delivery of aqueous ammonia to the proposed storage facility, the project owner shall provide the final plans listed above and accepted by San Luis Obispo County to the CPM for approval.

**HAZ-3** The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and aqueous sodium hypochlorite. 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 these chemicals with incompatible hazardous materials.

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

**HAZ-5** The project owner shall direct all vendors delivering aqueous ammonia to the site to use only transport vehicles, which meet or exceed the specifications of DOT Code MC-307.

**Verification:** At least 60 days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

**HAZ-6** The project owner shall direct all vendors delivering any hazardous material to the site to use only the route(s) approved by the CPM.

**Verification:** At least 60 days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation to the CPM for review and approval.

**HAZ-7** An aqueous hydrazine Safety Management Plan shall be prepared and include the following:

1. The unloading and transfer to the hydrazine storage building shall be performed by facility staff and shall be supervised and monitored by at least one facility staff person who shall stand by with a pressurized water hose to dilute any spilled hydrazine should a leak occur.
2. In the event of a spill of hydrazine, the spill will be contained, diluted with water, and neutralized with sodium hypochlorite. Neutralized hydrazine shall be absorbed with materials such as clay, sand, or a commercial absorbent, and disposed of in an appropriate manner.
3. Neutralization chemical and absorbents shall be stored in close proximity to the unloading site.
4. The Applicant shall ensure that the delivery truck person is trained and equipped with personal protective equipment by the commercial supplier. The facility staff person shall be trained and equipped with personal protective equipment which shall consist of at the minimum butyl rubber gloves, boots, hard hat, apron or splash suit, and a face shield with safety glasses or goggles. Chemically impermeable suits and NIOSH approved full-face positive pressure supplied air respirators will also be available at the unloading site and at the facility control room.
5. Facility staff are to be trained in the safety procedures that are to be implemented during the unloading, transfer, and storage of aqueous hydrazine and these procedures will be posted at the hydrazine storage building and will be fully described in the Aqueous Hydrazine Safety Management Plan, the Business Plan, and the RMPP.
6. The hydrazine Safety Management Plan shall provide for equipment, personnel, and training to ensure that the Morro bay Fire department has the capability to respond to a release of aqueous hydrazine during transport, use, transfer, and storage.

**Verification:** At least 60 days prior to receipt of aqueous hydrazine on site, the project owner shall submit copies of the required Safety Management Plan to the CPM for review and approval.

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## APPENDIX A

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### 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 to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's CEQA analysis. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices 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 <sup>2</sup>	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 <sup>1</sup>	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 <sup>2</sup>	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL <sup>3</sup>	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 <sup>4</sup>	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 <sup>2</sup>	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2 <sup>5</sup>	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

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### 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**

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[Attach AFC Table 6.15-5]

## APPENDIX C

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[Attach staff's modeling results of an aqueous hydrazine spill]

# NOISE AND VIBRATION

Testimony of Jim Buntin

## INTRODUCTION

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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 cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant operation or construction practices, such as pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Morro Bay Power Plant Project (00-AFC-12), and to recommend procedures to ensure that the resulting noise and vibration levels would comply with applicable laws, ordinances, regulations, and standards (LORS), and would not create significant adverse impacts.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### 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.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration which have been applied by other jurisdictions. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 VdB, which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

# STATE

California Government Code Section 65302(f) encourages each local government entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **NOISE: Table 1**.

**NOISE: 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	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Residential - Multi-Family	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Transient Lodging – Motel, Hotel	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Schools, Libraries, Churches, Hospitals, Nursing Homes	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Auditorium, Concert Hall, Amphitheaters	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Sports Arena, Outdoor Spectator Sports	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Playgrounds, Neighborhood Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Office Buildings, Business Commercial and Professional	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Industrial, Manufacturing, Utilities, Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable
	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable
	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable
Clearly Unacceptable	New construction or development generally should not be undertaken.							

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

The State of California, Office of Noise Control, prepared a Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. The Model also contains a definition of “pure tone” in terms of one-third octave band sound pressure levels that can be used to determine whether a noise source contains significant pure tone components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by 5 dBA.

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....

The Energy Commission has interpreted the CEQA criteria such that noise produced by the permitted power-producing facility that causes an increase of more than 5 dBA in the background noise level ( $L_{90}$ ) at a noise sensitive receiver during the quietest hours of the day is usually considered a significant effect.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- 1. The construction activity is temporary,
- 2. Use of heavy equipment and noisy activities is limited to daytime hours, and
- 3. All feasible noise abatement measures are implemented for noise-producing equipment.

### **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

### **Morro Bay General Plan Noise Element**

The City of Morro Bay has adopted specific noise performance standards for stationary sources in the Noise Element of the General Plan (City of Morro Bay 1987). The noise levels considered acceptable for residential land uses are described by **NOISE: Table 2**.

**Noise: Table 2 - Morro Bay Noise Element Standards**

Noise Level Descriptor	Daytime Standard, dBA (7 a.m. to 10 p.m.)	Nighttime Standard, dBA (10 p.m. to 7 a.m.)
Hourly $L_{eq}$	50	45
Maximum Level	70	65
Maximum Impulsive Level	65	60

The above noise standards are applied at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures (rather than at the property line).

## SETTING

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### **PROJECT BACKGROUND**

The Morro Bay Power Plant (MBPP) Project involves the construction and operation of a 1,200-megawatt (MW) power plant, which is proposed to be located at the existing 1,030 MW Morro Bay Power Plant site that is owned and operated by Duke Energy.

The new units will replace currently operating generation Units 1 and 2 (326 megawatts [MW], 1950's technology) and Units 3 and 4 (676 MW, 1960's technology) with two state-of-the-art 600 MW combined cycle units. Each new unit will be capable of producing 600 MW, so that upon completion, the Plant will be capable of producing a total of 1,200 MW. Each new unit will consist of two gas-fired turbines and one steam turbine driven by the heat produced by the other two turbines. Each new unit will have two 145-foot tall stacks compared with the existing plant's three 450-foot tall stacks.

The MBPP will continue to interconnect with the electrical grid at the existing PG&E switchyard located on the plant site.

The Project will include demolition of the on site fuel oil tank farm, all existing power plant equipment (boiler – steam turbine complex), and removal of three 450 feet tall exhaust stacks. Stage one: demolition of the tank farm, will take three months, and will be complete in 2002. Stage two: demolition of the three 450 foot stacks, will begin after commercial operation of the new units, and will take about 21 months. Stage three: dismantling of the existing units, will take about 47 months.

The equipment that has the greatest potential to generate significant noise levels includes the gas and steam turbines, steam generator, pumps, motors, main transformers, and an instrument air compressor. During construction of the project, pile driving and demolition have the potential to produce significant ground-borne vibration levels.

## **EXISTING LAND USE**

### **Power Plant Site**

This site is located within the City of Morro Bay, San Luis Obispo County, near Morro Bay Harbor, bordered on the west by Embarcadero Road and on the east by Highway 1. The Project would be located within the existing MBPP property, in part where the current tank farm is located. Land uses in the project vicinity include recreational, residential, commercial, school and business uses.

Noise from the existing plant dominates the background acoustical environment in the near vicinity. The closest noise sensitive receptors are homes located at the west end of Surf Street, which is immediately south of the plant. Noise from the existing plant is also dominant at the commercial area west of the plant entrance. In other areas of Morro Bay, plant noise is often inaudible, especially during periods of heavy traffic, which includes most daytime hours. For example, traffic on State Highway 1 dominates the daytime noise environment east and north of the plant site. On the hillside east of the plant, the plant noise is audible when highway traffic noise is reduced, such as at night.

The noise levels produced by the existing plant vary depending upon the level of power production. In general, plant noise is higher during daytime hours, when electrical demand is highest. The dominant plant noise sources appear to be the fans, generators and transformers.

The project will involve installing new electrical generation equipment north to the area currently occupied by the tank farm. This will move the acoustical center of the project a significant distance to the north, so that the greatest potential noise effects will occur north of the currently-affected residential areas. Therefore, for this analysis, the Morro Dunes RV Park was considered to be the nearest sensitive receptor to the acoustical center of the project.

### **Linear Facilities**

The MBPP will continue to interconnect with the electrical grid at the existing PG&E Morro Bay switchyard located on the plant site. Therefore, no off-site linear facility construction is required for this project. (Duke 2000a, AFC § 6.12.2.2)

The MBPP will tie into natural gas and potable water supply pipelines that are located within the property boundary of the MBPP site. Therefore, no off-site pipeline construction is required for this project.

## EXISTING NOISE LEVELS

In order to predict the likely noise effects of the project on adjacent sensitive receptors, Duke Energy (Duke or applicant) commissioned ambient noise surveys of the area. The surveys were conducted, at various hourly time intervals in January and June of 1999, and were supplemented in July 2000 and July 2001. The noise surveys were conducted using Bruel & Kjaer and Larson Davis sound level meters meeting the requirements of the American National Standards Institute (ANSI) for Type 1 sound level measurement systems. The measurements were performed at heights of approximately five feet above ground level to simulate the average height of the human ear (Duke 2000a, AFC § 6.12.1.3.2).

The applicant's noise survey monitored existing noise levels at the following fourteen off-site monitoring locations, which are shown by **NOISE: Figure 1**:

- 1 Scott Avenue – residential area southeast of project site
- 2 Morro Bay High School – north of project site, near caretakers' residences
- 3 Morro Bay Elementary School – south of project site
- 4 Radcliff Street at Berwick Drive – residential area east of Highway 1
- 5 Morro Dunes RV Park – north of project site
- 6 First Church of Christ Scientist - south of project site
- 7 Morro Bay Library - south of project site
- 8 Piney Way at Olive Drive – residential area south of project site
- 9 MBPP Entrance
- 10 Embarcadero Retail Area – west of project site
- 11 Public Park at Coleman and Embarcadero - west of project site
- 12 Public Beach Shoreline - west of project site
- 13 Morro Rock, East Side - west of project site
- 14 Morro Rock, West Side - west of project site

**NOISE: Table 3** summarizes the ambient noise measurement results (Duke 2000a, AFC § 6.12.1.3.4).

**Insert NOISE: Figure 1 here.....**

**Noise: Table 3: Summary of Measured Noise Levels**

Measurement Sites	Measured Noise Levels, dBA		
	Nighttime		CNEL
	L <sub>eq</sub>	L <sub>90</sub>	
1	43	41	53
2	45	42	60
3	45	42	56
4	43	42	59
5	42	40	50-55*
6	46	43	55-60*
7	38 to 48	37 to 46	50-55*
8	37	36	45-50*
9	61	60	70-75*
10	67	63	70-75*
11	57	54	60-65*
12	62	55	65-70*
13	48	46	55-60*
14	53	49	60-65*

\* - Energy Commission staff estimate

The applicant has conducted an ambient noise measurement over a 25-hour period at the Morro Dunes RV Park (Site 5) to provide additional information concerning ambient noise levels at the most-affected residential receptor. These data indicated that the ambient background noise level (L<sub>90</sub>) during nighttime hours was in the range of 37 to 46 dBA, and was dominated by frogs in the adjacent creek. Noise from the operation of Units 3 and 4, and from the distant surf, was described by the applicant as being “intermittently and dimly heard” at nighttime.

The applicant also conducted frequency analyses of the noise measured at Locations 1 through 8, during day and late night hours. These data provide the basis for a comparison of the frequency content of the existing and the proposed plant, primarily to determine the presence of pure tones. The existing plant produced noticeable pure tones in the lower frequency bands, most likely due to the Unit 3 and Unit 4 forced-draft fans and transformers (Duke 2000a, AFC § 6.12.1.3.4).

In general, the noise environment in the immediate vicinity of the existing plant can be described as relatively noisy, containing pure tones that can be particularly annoying. The noise environment in the immediate vicinity of the existing plant is dominated by noise from the existing plant, primarily produced by fans, generators and transformers. At more distant receivers, traffic and other noise sources dominate the existing noise environment.

## **IMPACTS**

Noise impacts associated with the project can be created by short-term construction activities, by demolition, and by normal long-term operation of the power plant.

## PROJECT SPECIFIC IMPACTS — CONSTRUCTION

### Community Effects

#### General Construction Noise

Construction noise is usually considered a temporary phenomenon. In this case, the construction period for the MBPP includes three phases: demolition of the tank farm (a 3-month effort), construction of the new power plant and demolition of the existing 450-foot tall stacks (21 months), and dismantling of the existing power plant generation units (32 months). Construction and demolition 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. The City of Morro Bay Noise Element does not specifically regulate the permissible hours of construction, and does not have any specific noise limits regarding the hours during which construction is allowed.

The applicant has prepared a comprehensive analysis of construction noise impacts, listing predicted noise levels due to specific types of equipment and of generalized construction activities. The construction noise analysis results are summarized for the most-affected receptor locations during the busiest periods of construction (about 7 months) in **NOISE: Table 4**.

**NOISE: Table 4 - Construction Noise Level Predictions**

Receptor No.	Description	Daytime Ambient Noise Level, $L_{eq}$ , dBA	Highest Construction Noise Level, $L_{eq}$ , dBA	Cumulative Noise Level, $L_{eq}$ , dBA	Change in Noise Level, $L_{eq}$ , dBA re: Ambient
1	Scott Avenue	50	54	55.5	+5.5
2	Morro Bay HS	60	50	60.4	+0.4
5	Morro Dunes RV Park	60	64	65.5	+5.5
10	Embarcadero	67	63	68.5	+1.5
11	Public Park	56	60	61.5	+5.5
12	Public Beach	62	52	62.4	+0.4
13	Morro Rock, East Side	52	53	55.5	+3.5

The predicted construction sound levels would result in cumulative noise levels up to 5.5 dBA higher than under the ambient conditions at three locations, the Scott Avenue residential area, the Morro Dunes RV Park, and the Public Park. These increases would be perceptible, and potentially significant. Because the increase in noise levels is of a temporary nature, and will be restricted to daytime hours by Condition of Certification **NOISE-8**, the noise effect of construction is considered to be insignificant.

The noise levels shown in **NOISE: Table 4** assumed the use of a “quieter” pile driving technique to install piles supporting the main equipment and building foundations. The applicant proposes to use auger cast piles, which are installed using a drilling technique, rather than using impact pile driving. The expected noise reduction from using this technique is 5 to 15 dBA (Duke 2000a, AFC § 6.12.2.1).

The applicant also analyzed the potential noise effects of haul trucks used during construction. The predicted noise levels due to truck traffic are shown by **NOISE: Table 5**. The predicted cumulative truck traffic noise levels would be considered insignificant.

**NOISE: Table 5 – Truck Traffic Noise Level Predictions**

Receptor No.	Description	Daytime Ambient Noise Level, $L_{eq}$ , dBA	Highest Truck Noise Level, $L_{eq}$ , dBA	Cumulative Noise Level, $L_{eq}$ , dBA	Change in Noise Level, $L_{eq}$ , dBA re: Ambient
1	Scott Avenue	50	36	50.2	+0.2
2	Morro Bay HS	60	39	60	0
5	Morro Dunes RV Park	60	57	61.5	+1.5
10	Embarcadero	67	50	67.1	+0.1
11	Public Park	56	50	57.0	+1.0
12	Public Beach	62	34	62	0
13	Morro Rock, East Side	52	28	52	0

The predicted truck traffic noise levels assumed maintenance of proper speeds (25 mph), and limiting the use of truck engine brakes using administrative controls.

As noted above, the demolition of the tank farm, the existing stacks and the existing generation units will also be potentially significant sources of noise. The applicant has also prepared an analysis of noise associated with these aspects of the site activities. No explosives will be used for these demolition projects. Specifically, the removal of the fuel tanks and their foundations would probably involve saw or torch cutting of the tank shells, and pavement breaking of the foundations. Further, the stacks will be cut into several sections, and lifted off by a large crane. The remaining buildings are expected to be demolished with standard knock-down techniques and pavement breaking equipment (Duke 2000a, AFC § 6.12.2.1). The predicted tank demolition noise levels are shown by **NOISE: Table 6**.

**NOISE: Table 6 – Tank Demolition Noise Level Predictions**

Receptor No.	Description	Daytime Ambient Noise Level, $L_{eq}$ , dBA	Highest Demolition Noise Level, $L_{eq}$ , dBA	Cumulative Noise Level, $L_{eq}$ , dBA	Change in Noise Level, $L_{eq}$ , dBA re: Ambient
1	Scott Avenue	50	49	52.5	+2.5
2	Morro Bay HS	60	45	60.1	+0.1
5	Morro Dunes RV Park	60	59	62.5	+2.5
10	Embarcadero	67	58	67.5	+0.5
11	Public Park	56	55	58.5	+2.5
12	Public Beach	62	47	62.1	+0.1
13	Morro Rock, East Side	52	48	53.5	+1.5

The analysis shows that the demolition of the tank is predicted to produce noise levels consistently below ambient noise levels at the nearest receptors. The cumulative noise levels would increase ambient noise levels by up to 2.5 dB. This activity would continue for about 3 months. Noise produced by the tank demolition is therefore expected to be insignificant.

The predicted power building and stack demolition noise levels are shown by **NOISE: Table 7**.

**NOISE: Table 7 – Power Building/Stack Demolition Noise Level Predictions**

Receptor No.	Description	Daytime Ambient Noise Level, $L_{eq}$ , dBA	Highest Removal Noise Level, $L_{eq}$ , dBA	Cumulative Noise Level, $L_{eq}$ , dBA	Change in Noise Level, $L_{eq}$ , dBA re" Ambient
1	Scott Avenue	50	54	55.5	+5.5
2	Morro Bay HS	60	31	60	0
5	Morro Dunes RV Park	60	38	60	0
10	Embarcadero	67	72	73.2	+6.2
11	Public Park	56	64	64.6	+8.6
12	Public Beach	62	48	62.2	+0.2
13	Morro Rock, East Side	52	58	59.0	+7.0

The stack removal and power building removal will occur over a 32-month period. However, the periods of actual heavy equipment use would be some fraction of that time period. Potentially significant noise levels could be experienced at the Scott Avenue residential area, the Public Park, the Embarcadero, and the east side of Morro Rock. It is not clear that the 32-month duration of the stack removal and power building demolition should be considered

“temporary.” Thus, even though the demolition will be restricted to daytime hours by Condition of Certification **NOISE-8**, the noise effects of power building and stack demolition could be significant.

Energy Commission staff believes that it is important to ensure that noise due to this phase of construction is controlled to minimize increases in ambient noise levels at noise sensitive receptors. Therefore, staff has recommended Condition of Certification **NOISE-9**, which specifically addresses noise due to stack removal and power building removal. Appropriate noise mitigation measures for this project phase could include temporary noise barriers, enclosure of stationary equipment, location of noisy equipment in distant portions of the site, and ensuring that powered equipment is fitted with silencers and enclosures incorporating the best available noise reduction technology.

### **Construction Staging Area Noise**

The applicant is proposing to utilize three areas at Camp San Luis Obispo for construction staging areas. These sites are located at the former base motor pool complex, the former Caltrans yard, and an intermediate area. Noise produced in the staging areas will primarily be the result of truck traffic and laydown of construction materials. The applicant projects an average of 10 to 20 trucks per 24-hour day, with a maximum of 30 trucks in any one day. The staging area will be used for about 24 months.

The proposed construction staging areas are within areas designated for existing and future non-noise sensitive uses. In addition, two of the sites have been used for motor vehicle-related activities in the past. The sites are located adjacent to State Highway 1, which is a significant source of traffic noise in the staging area and adjacent areas. Given the nature of the surrounding land uses, and the character of the proposed activities, there is no apparent potential for significant noise impacts due to use of the construction staging area.

Based upon the potential noise impacts of construction and demolition noise, the Energy Commission staff has recommended the inclusion of four Conditions of Certification (**NOISE-1**, **NOISE-2**, **NOISE-8**, and **NOISE-9**) to monitor and mitigate potential construction and demolition noise impacts.

Because noise impacts associated with construction/demolition activity and related traffic are reduced by the proposed Conditions of Certification, and are of limited duration, potential construction and demolition noise impacts to receptors in the MBPP project area are considered to be less than significant.

### **Pile Driving Vibration**

Conventional pile driving produces potentially significant ground-borne vibration. The proposed use of auger-cast pile driving is not expected to produce a significant amount of vibration at the nearest receptors. It is not practical to prepare a preliminary study until the pile driving engineering plan has been prepared. For these reasons, the applicant has not provided a specific analysis of potential pile driving vibration effects. However, the potential for public annoyance or property damage due to pile driving vibration remains of concern.

Therefore, Energy Commission staff has recommended **NOISE-10** as a Condition of Certification, requiring specific vibration analysis and mitigation measures at the nearest receptors during pile driving activities.

### **Steam Blows**

Typically, the steam blows during construction and start-up create the loudest noise encountered during the construction phase. 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.

According to the applicant, un-silenced steam blow noise levels could be as high as 70 dBA to 74 dBA at the nearest receiver (Scott Avenue). With appropriate vent silencers, the noise levels could be reduced by 20 to 30 dBA, or to a level ranging from 40 to 44 dBA at the nearest residence (Duke 2000a, AFC § 6.12-5). The resulting noise levels would be in the range of ambient noise levels at the quietest time of night.

The applicant has proposed to mitigate the noise generated from construction steam blows by use of noise control steam system vents. Energy Commission staff proposes that any high pressure steam blows be muffled with an appropriate silencer to achieve the maximum noise level standard of the City of Morro Bay, and that they be performed only during daytime hours to minimize annoyance to residents (see proposed Condition of Certification **NOISE-4** below).

Energy Commission staff further proposes a notification process to make neighbors aware of scheduled steam blows (see proposed Condition of Certification **NOISE-5** below).

Implementation of the proposed Conditions of Certification **NOISE-4** and **NOISE-5** is expected to reduce noise from steam blows to a level of insignificance.

### **Linear Facilities**

No new off-site linear facilities are proposed as part of this project.

## **Worker Effects**

Duke 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 (Duke 2000a, AFC § 6.12.2.2). To ensure that construction workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-3**.

## **PROJECT SPECIFIC IMPACTS — OPERATION**

### **Community Effects**

The applicant has incorporated noise reduction measures into the design of the project to ensure that there will not be a substantial increase in noise levels at the nearest potentially affected receptor, which is the Morro Dunes RV Park. In addition, the applicant intends to achieve compliance with the noise performance standards of the Morro Bay Noise Element, which, because of the existing MBPP noise environment, is potentially more restrictive than the Energy Commission requirement to prevent a significant increase in background noise levels.

### **Power Plant Operation**

During its operating life, the MBPP represents essentially a steady, continuous noise source day and night. Occasional brief 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 facility include the steam turbine generator, gas turbine generators, heat recovery steam generators, transformers, 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. The resulting hourly average noise levels are typically dominated by the steady-state noise sources.

Discussions are currently underway between the City of Morro Bay, the applicant, and the Energy Commission concerning alternative cooling methods for this project. If the current once-through seawater cooling system is replaced by cooling towers or fans, new noise sources would be introduced, with potential noise impacts depending upon their configuration and location. A separate analysis of noise associated with different cooling options has been prepared for this project.

Duke performed extensive acoustical calculations to determine the facility noise emissions, and to develop noise mitigation measures. The calculations were based on specific manufacturer noise data for the major equipment planned for the facility (Duke 2000a, AFC § 6.12.2.2). The modeling assumed that the new units would be operated at maximum load over a 24-hour period. This is quite conservative, as actual power generation requirements vary with the time of day and electrical demands. The modeling was performed as an

iterative process to refine noise mitigation measures and requirements for equipment noise emission factors. Specific noise mitigation measures evaluated included:

- Selecting an effective plant layout
- Low-noise main transformers
- Baffles on the HRSG exhaust ducts
- Shroud enclosure at transition between GTG exhaust and HRSG inlet
- Noise reducing design of HRSG casing walls
- Low noise system steam vents, tanks and piping on the HRSG penthouse
- Low-noise boiler feedwater pump trains
- Enclosing noisy equipment within turbine buildings
- Enhanced acoustical properties for GTG and STG turbine building elements
- Retaining existing berms as noise barriers
- Adding a 20-foot high wall at the northernmost boundary of the site, with absorptive characteristics on the side facing the plant

The 20-foot high wall (noise barrier) at the northernmost boundary of the plant site is intended to achieve compliance with the Morro Bay Noise Element standards for residential land uses at the Morro Dunes RV Park. Energy Commission staff observes that the Morro Dunes RV Park is a temporary (transient) lodging use, and, according to the City of Morro Bay, is not necessarily considered to be a noise sensitive land use. The land on which the RV park is situated is owned by the applicant. Therefore the City of Morro Bay is not insistent upon achieving the residential noise standard at the RV park, and would not require the noise barrier. The applicant will provide additional information to the City concerning the relative costs of the barrier as compared to using setbacks or other buffers, but the applicant has indicated a commitment to achieving compatible noise exposures at the RV park. At this time, the noise barrier is proposed as the means of achieving that objective.

In response to the comments offered by the City of Morro Bay, Energy Commission staff notes that a relatively large setback is required to reduce noise to the same degree as a barrier. To match the noise reduction provided by a barrier sufficient to block line of sight between source and receiver, a setback of about twice the distance from source to receiver is required. For example, if the dominant source is about 500 feet from the receiver, a total setback of about 890 feet would be required to achieve a noise level reduction of 5 dBA; to achieve a reduction of an additional 5 dBA would require a total setback of about 1,580 feet. In comparison, noise reduction of 5 dBA can be achieved using a barrier height sufficient to block line of sight between source and receiver; an additional reduction of 5 dBA could be achieved with an increase of barrier height, to a maximum of about 15 dBA. Therefore, a noise barrier would be more practical in reducing noise north of the project site than the use of setbacks.

**NOISE: Table 8** compares the predicted project noise levels to the background noise levels ( $L_{90}$ ) that were measured at times when the existing power generation units at the MBPP were shut down or on standby.

**NOISE: Table 8 – Summary of Predicted Noise Levels**

Measurement Sites	Nighttime L <sub>90</sub> , dBA			CNEL, dB*
	Ambient	Project	Cumulative	
1	41	41	44	50
2	42	36	43	49
3	42	35	43	49
4	42	37	43	49
5	40	43	45	51
6	43	38	44	50
7	40	33	41	47
8	36	31	37	43

\* - Energy Commission staff estimates

**NOISE: Table 9** lists the predicted project noise levels in terms of the equivalent noise level (L<sub>eq</sub>), which is the metric used in the Morro Bay Noise Element. In this table, the ambient background noise level (L<sub>90</sub>) was measured at times when the existing units at the MBPP were shut down or on standby, to represent future conditions after the existing units are dismantled.

**NOISE: Table 9 – Summary of Predicted Noise Levels**

Measurement Sites	Nighttime Sound Level, dBA			Noise Standard, L <sub>eq</sub> , dBA
	Ambient L <sub>90</sub>	Project L <sub>eq</sub>	Cumulative L <sub>eq</sub>	
1	41	41	44	45
2	42	36	43	45
3	42	35	43	45
4	42	37	43	45
5	40	43	45	45
6	43	38	44	45
7	40	33	40	45
8	36	31	37	41

As a result of these analyses, Energy Commission staff believes that no significant noise impacts are likely to occur due to the operation of the project, as mitigated. The proposed Condition of Certification **NOISE-6** would ensure that the background noise level (L<sub>90</sub>) at the most-affected residential receptor would not increase by more than 5 dBA, and that noise due to the plant operations would not exceed the standards of the Morro Bay Noise Element.

### Tonal and Intermittent Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant has stated that no strong tonal noises will be generated during the operation of the project.

Energy Commission staff requested an estimate of the tonal content of noise produced by the new plant, as compared to the existing plant. A worst-case analysis at a distance of 520 feet from the acoustic center of the new plant (which would be within the applicant's property, but is comparable to the worst-case noise exposure adjacent to the existing plant), showed that noise from the new facility would have a similar spectrum shape, though the overall noise level would be reduced by about 6 dBA. That is, the new plant would sound similar to the existing plant, except that the proposed Conditions of Certification would eliminate any pure tones.

The applicant has also stated that noise control steam system vents will be installed on the HRSG penthouse to mitigate the intermittent noise from pressure relief valves. The applicant estimated that the noise levels associated with the steam system vents would be in the range of 40 dBA to 44 dBA at the receptors at Scott Avenue (Measurement Site 1), and would be less than 42 dBA to 45 dBA at the Morro Dunes RV Park (Site 5). Emergency pressure safety valve (PSV) discharges would not be silenced. These safety devices are typically not silenced, and produce noise only under emergency conditions. Because these noise sources are expected to be in compliance with the LORS, their noise effects are considered to be insignificant.

To ensure that no strong tonal noises are present and that intermittent noises are mitigated, Energy Commission staff has proposed a Condition of Certification (**NOISE-6**, below), which requires the applicant to mitigate pure tones and 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 PG&E's high voltage transmission system (Duke 2000a, AFC § 6.12.2.2). Noise from the transmission lines will include a corona discharge hum, which is expected to be audible within 100 feet of the power lines. However, the nearest residences are located more than 100 feet from the transmission lines. As a result, no noise 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 (Duke 2000a, AFC § 6.12.2.2). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. The applicant would implement a comprehensive hearing conservation program. To ensure that construction workers are, in fact, adequately protected, Energy Commission 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 project alone.

Pursuant to CEQA, a cumulative impacts analysis can be performed by either 1) summarizing growth projections in an adopted general plan or in a prior certified environmental document, or 2) compiling 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 planned projects that could contribute to cumulative noise impacts in the project study area identified in the AFC (Duke 2000a). There are industrial noise sources north of the project site that could contribute to the cumulative noise levels at receptors in that direction. In addition, traffic noise levels are significant in the Highway 1 corridor. The effects of noise produced by those sources have been accounted for by the ambient noise level measurements, and the resulting noise levels are described in the noise level predictions listed above.

## **FACILITY CLOSURE**

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In the future, upon closure of the MBPP, all operational noise from the entire MBPP site would cease, and no further adverse noise impacts from operation of the MBPP 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 MBPP, 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 modified.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS**

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### **CALIFORNIA COASTAL COMMISSION**

Comment CCC-3: *The Commission requested identification of potential construction noise impacts to public access/recreation at Morro Strand State Beach, Morro Rock and Coleman Park.*

The staff analysis includes a section on the effects of construction and demolition noise at the Embarcadero, Coleman Park, Morro Strand Beach, and Morro Rock.

### **CITY OF MORRO BAY**

Comment CMB-74: *The City noted that the applicant had suggested a restriction of steam blows to the hours of 8:00 a.m. to 5:00 p.m., and suggested those hours would be better than the hours cited in the PSA.*

Condition of Certification NOISE-4 has been modified to adopt the City's recommendation.

Comment CMB-75: *The City suggested it would be helpful if the CEC would define and establish who would be responsible for determining "legitimate" noise complaints.*

The CPM will make the necessary determinations, with input from CEC technical staff. The use of the term "legitimate" allows the CPM to determine if the noise of concern is in fact due to the owner's activities.

## **CITIZEN COMMENTS: PSA WORKSHOPS**

Unlisted Comment: *A citizen expressed concern about potential noise effects in the vicinity of Del Mar Elementary School.*

Energy Commission staff has recommended that short-term noise measurements in the vicinity of the Del Mar Elementary School be required as part of proposed Condition of Certification **NOISE-6**.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Energy Commission staff concludes that the MBPP will be built and operated to comply with all applicable noise laws, ordinances, regulations, and standards. Energy Commission staff further concludes that if the MBPP facility were designed as described above, and further mitigated as described below in the proposed Conditions of Certification, it is not expected to produce significant adverse noise impacts.

To ensure compliance with all applicable noise LORS, Energy Commission staff recommends adoption of the following proposed Conditions of Certification.

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**NOISE-1** At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one mile of the site, 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 ground disturbance, 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 City of Morro Bay Planning 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 ground disturbance, 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 ground disturbance, 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 70 dBA, measured at the Scott Avenue monitoring site, or at any other residential receptor. The project owner shall conduct steam blows only on

weekdays 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 period of execution, to the CPM, who shall review the proposal with the objective of ensuring that the resulting noise levels do not exceed the average nighttime ambient  $L_{90}$  plus 5 dBA. If the low-pressure process is approved by the CPM, the project owner shall implement it in accordance with the requirements of the CPM.

**Verification:** At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM and the City of Morro Bay 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 the City of Morro Bay and all residents within one-half mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

**Verification:** Within five days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

**NOISE-6** The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause resultant noise levels to exceed the ambient background noise level ( $L_{90}$ ) at residential receivers by more than 5 dBA, and that the noise due to plant operations will comply with the noise standards of the Morro Bay Noise Element.

No new pure tone components may be 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.

Protocol:

- A. Prior to initiating construction, the project owner shall conduct short-term ambient noise measurements during day, evening, and nighttime hours at one location in the vicinity of the Del Mar Elementary School.
- B. Within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct short-term survey noise measurements at monitoring sites 1, 2, 4, and 6, and at the above-described location in the vicinity of the Del Mar Elementary School. The short-term noise measurements shall be conducted during both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods. In addition, the applicant shall conduct a 25-hour community noise survey at Morro Dunes RV Park. The survey during power plant operations shall also include measurement of one-third octave band sound pressure levels at each of the above locations to ensure that no new pure-tone noise components have been introduced.
- C. If the results from the two noise surveys (pre-construction vs. operations) indicate that the background noise level ( $L_{90}$ ) at the most affected receptor has increased by more than 5 dBA for any given hour during the 25-hour period, or that the noise standards of the Morro Bay Noise Element have been exceeded, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.
- D. If the results from the two noise surveys (pre-construction vs. operations) indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

**Verification:** Within 15 days after completing the pre-construction survey, the project owner shall submit a summary report of the survey to the City of Morro Bay Planning Department, and to the CPM. Within 15 days after completing the post-construction survey, the project owner shall submit a summary report of the survey to the City of Morro Bay Planning Department, and to the CPM. Included in the post-construction survey 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 15 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 of the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (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** Noisy construction or demolition work shall be restricted to the times of day delineated below:

Weekdays	8 a.m. to 5 p.m.
Weekends and Holidays	9 a.m. to 5 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

**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.

**NOISE-9** The project design and implementation shall include noise mitigation measures adequate to ensure that power building and stack demolition will not cause resultant noise levels to exceed the ambient background noise level ( $L_{90}$ ) at residential receivers by more than 5 dBA.

Protocol:

A. Upon request by the CPM, the project owner shall conduct one-hour noise measurements during power building and stack demolition at monitoring sites 1, 2, 4 and 6.

B. If the results from the noise survey indicate that noise due to the power building and stack demolition has caused the background noise level ( $L_{90}$ ) at the most affected receptor to increase by more than 5 dBA for any given hour during the measurement period, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

**Verification:** Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the City of Morro Bay Planning 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 15 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-10** Vibration due to pile driving shall be limited to a peak particle velocity of 0.2 in/sec at the nearest sensitive structure.

Protocol:

- A. Upon commencement of pile driving, the project owner will conduct continuous vibration monitoring at the nearest residential receptor, and will continue the monitoring until the pile nearest that residence is installed.
- B. If vibration measurements indicate at any time that the pile driving vibration at any sensitive receptor has exceeded a peak particle velocity of 0.2 in/sec, the operator shall notify the CPM immediately, and shall cease pile driving until a mitigation plan is developed and implemented.

Verification: Within 30 days after completing the vibration measurements, the project owner shall submit a summary report of the measurements to the local jurisdiction, and to the CPM. Included in the report will be a description of any additional mitigation measures which were implemented to achieve compliance with the above listed vibration limits, as well as the vibration measurement data demonstrating compliance.

**EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM**

Morro Bay Power Plant Project  
(00-AFC-12)

**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:

\_\_\_\_\_ dBA Date:

Initial noise levels at complainant's property: \_\_\_\_\_

Final noise levels at 3 feet from noise source: \_\_\_\_\_ dBA Date:

\_\_\_\_\_ dBA Date:

Final noise levels at complainant's property: \_\_\_\_\_

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

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- City of Morro Bay. 1987. Noise Element of the City of Morro Bay General Plan, 1987.
- DUKE (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes 1a-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission on October 23, 2000.
- DUKE (Duke Energy Morro Bay LLC/Trump) 2001a. Transmittal from DUKE/Trump to CEC/Lewis RE Responses to CEC's February 9, 2001 Data Requests, dated and received at the California Energy Commission on March 9, 2001.
- DUKE (Duke Energy Morro Bay LLC/Trump) 2001b. Transmittal from DUKE/Trump to Robert E. Hendrix, City Manager, City of Morro Bay, dated August 9, 2001.
- Federal Transit Administration. 1995. *Transit Noise and Vibration Impact Assessment*. DOT-T-95-16. Harris, Miller, Miller and Hanson, Inc. Burlington, Massachusetts.
- Morro Bay Power Plant Project. 2000. Application for Certification, Morro Bay Power Plant (00-AFC-12), submitted to the California Energy Commission October 23, 2000.
- State of California. 1990. General Plan Guidelines, Office of Planning and Research, June 1990.
- State of California. 1977. Model Community Noise Control Ordinance, Office of Noise Control, April 1977.

## **NOISE: APPENDIX A**

### **FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE**

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **NOISE: Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (Leq), or by average day and night A-weighted sound levels with a nighttime weighting 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 values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects (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 sound levels, in dBA.

**NOISE: Table A1**  
**Definition of Some Technical Terms Related to Noise**

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L <sub>10</sub> , L <sub>50</sub> , & L <sub>90</sub>	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L <sub>90</sub> is generally taken as the background noise level.
Equivalent Noise Level, L <sub>eq</sub>	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L <sub>dn</sub> or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: California Department of Health Services 1976, 1977.

<b>NOISE: Table A2 Typical Environmental and Industry Sound Levels</b>			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: 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:

<b>NOISE: Table A3 Addition of Decibel Values</b>	
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  $\pm 1$  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

# PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D.

## INTRODUCTION

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Operating the modernized Morro Bay Power Plant (MBPP) would expose the general public and workers to combustion by-products as well as the toxic chemicals associated with the various aspects of electricity generation. Such exposures would be considered significant if they occur at levels that can produce specific health symptoms in humans and are the focus of federal and state requirements for specific technological controls. The issue of possible worker impacts is addressed in the **Worker Safety and Fire Protection** section while the health significance of exposure to project-related electric and magnetic fields (EMF) is addressed in the **Transmission Line Safety and Nuisance** section.

The air pollutants of specific concern for the proposed and similar gas-fired projects are categorized as criteria pollutants and non-criteria pollutants (also known as air toxics, toxic air contaminants, or TACs) according to differences in the strategies for their control. The criteria pollutants differ from the non-criteria pollutants in that the EPA has established specific ambient air quality standards to protect against significant health impacts in humans. The impacts of the criteria pollutants of specific concern for this project are discussed in the attachment A along with the rationale for each applicable standard. When a project is proposed for an area, which violates the air quality standards, the health impacts associated with emission of the pollutants in question are discussed in this **Public Health** section. Such project-related criteria pollutants are regulated statewide by ensuring compliance with the applicable technological and administrative control requirements. The state's Air Pollution Management Districts (or Air Districts) are responsible for ensuring such compliance at the local level. Details of the applicable compliance procedures are specified in each Air District's rules and regulations.

The Air District for this project is the San Luis Obispo County Air Pollution Control District (SLOCAPCD) whose applicable regulations are addressed in the **Air Quality** section. The requirements in these regulations are formulated to ensure continued compliance with all air quality standards or continued progress towards compliance according to an EPA-approved schedule. Each compliance attainment goal is achieved by applying the best available control technology (BACT) to each source while fully offsetting any project-related emission increments through corresponding emission reductions at other sources within the Air District. Staff usually considers the effectiveness of the Air District's emission control and offset requirements in assessing the need for additional mitigation.

Each Air District's program for criteria pollutant control usually differs from its program for air toxics control in terms of impact assessment methods and compliance procedures. The differences in applicable compliance assessment procedures are best addressed separately in the **Air Quality** section for criteria pollutants and the **Public Health** section for the non-criteria pollutants. The air toxics of specific concern in this analysis are emitted in much smaller amounts from common sources than the criteria pollutants and have no air quality standards. Most are emitted together as volatile organic compounds (VOCs) or toxic metals.

Their respective ambient levels usually differ according to the type of fuel associated with their generation. The constituents of most concern for the proposed and similar projects are well characterized with respect to emission rates and health effects, which are considered the same way for all sources in the state.

The purpose of this public health analysis is to assess the proposed project's air toxics for compliance with applicable emission LORS, which differ from those addressed for the criteria pollutants in the **Air Quality** section. If compliance were established, staff would recommend certification; if not, staff would recommend against certification.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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### **FEDERAL**

#### **The Clean Air Act of 1970 section 112 (42 U.S. Code, section 7401 ET seq.)**

This section of the act required establishment of ambient air quality standards to protect the public from the effects of air pollutants. These standards have been established by the United States Environmental Protection Agency (EPA) for the major criteria pollutants: nitrogen oxides (NO<sub>x</sub>), ozone, sulfur dioxide, carbon monoxide, sulfates, lead, and particulate matter with a diameter of 10 micron or less (PM<sub>10</sub>).

#### **Clean air act of 1970 section 112 (42 U.S. Code section 7412)**

This section requires new sources which emit more than 10 tons per year of any specified hazardous air pollutant (HAPs) or more than 25 tons per year of any combination of HAPs to apply the Maximum Achievable Control Technology (MACT).

### **STATE**

#### **California Health and Safety Code section 39606**

This section of the code requires the California Air Resources Board (CARB) to establish California's ambient air quality standards to reflect the California-specific conditions influencing its air quality. Such standards have been established by the ARB for ozone, carbon monoxide, sulfur dioxide, PM<sub>10</sub>, lead, hydrogen sulfide, vinyl chloride and nitrogen dioxide. The California standards are listed together with the corresponding federal standards in the **Air Quality** section.

#### **California Health and Safety Code section 41700**

This section of the code 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 business or property.

## **The California Health and Safety Code section 39650 et seq.**

This section of the code mandates that the California Environmental Protection Agency (Cal-EPA) establish safe exposure limits for toxic, non-criteria air pollutants and identify the best available methods for controlling their emission. These laws also require that the new source review rules of each air quality management district (AQMD or Air District) include regulations establishing procedures to control the emission of these pollutants. The toxic emissions from natural gas combustion are listed in CARB's California Toxic Emissions Factors (CATEF) database for natural gas-fired combustion turbines to allow for uniform assessment of combustion sources. Cal-EPA has developed specific cancer potency estimates for assessing any cancer risk they may pose at specific exposure levels. To protect against the non-cancer effects of the toxic air pollutants, Cal-EPA established specific no-effects levels (known as reference exposure levels or RELs) for assessing the likelihood of effects at specific exposure levels. Such health effects may be considered significant when exposure exceeds these reference levels. The Energy Commission staff (staff) uses these Cal-EPA potency estimates and reference exposure values in its health risk analyses.

## **California Health and Safety Code section 44300 et seq.**

This section of the code requires facilities, which emit large quantities of criteria pollutants and any amount of non-criteria pollutants, to provide the local air district an inventory of toxic emissions. Operators of such facilities may also be required to prepare a quantitative health risk assessment to address the potential health risks involved. CARB ensures statewide implementation of these requirements through the state's Air Districts.

## **LOCAL**

Local implementation of the provisions of the Health and Safety Code section 44300 in the project area is ensured by the Air District (SLOCAPCD), which established Rule 219 in this regard. The applicant has complied with the related Air District requirements by submitting a Health Risk Assessment as part of their permit application.

## **SETTING**

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As discussed in the information from the applicant, (Duke 2000a pages 6.9-10 and 6.9-11), MBPP is within a 107-acre industrial complex in the city of Morro Bay in San Luis Obispo County. The immediate surroundings are zoned for light industry, commercial establishment, residential housing and recreational uses. The residential areas are to the northeast, east, and southeast with the nearest located adjacent to the site boundary along Scott Street and on neighboring streets approximately 900 feet from the edge of the building housing existing generation units 1-4. The surrounding commercial establishments include motels, shops, and tourism and commercial fishing-related facilities.

The applicant has provided a listing of locations with sensitive receptors within a two-mile radius together with their respective distances from the site (Duke 2000a, pages 6.16-2 and 6.16-3). Sensitive individuals include children, pregnant women, the elderly, and the chronically ill who are more sensitive than the general population to the biological effects of environmental pollutants in general. They may be found in relatively small numbers in

individual residences, or in relatively large numbers in specific establishments or institutions such as schools, daycare centers, retirement homes, hospitals, or recreation centers. Exposure limits on environmental pollutants are established with safety factors considered adequate to protect against significant impacts in such sensitive individuals.

Since this modernization project is proposed for a site with past and on-going industrial activities, Pacific Gas and Electric, or PG&E (the former owner) conducted specific Site Assessment Surveys (PG&E 1997a, b, c, and d) to assess the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions indicating a release or threat of release from present or past activities. PG&E remains responsible for the cleanup of any such contamination.

As more fully discussed in the **Waste Management** section, PG&E's Site Assessment Surveys identified remedial issues for nine specific locations with specific structures to be removed as part of the proposed modernization. These issues relate to the failure to extend these surveys to the areas underneath these demolition-bound structures. Staff considers such pre-remediation surveys necessary for the plan for removing any contaminants as encountered during site grading, excavation, or project erection.

## **EXISTING AIR QUALITY**

As noted by the applicant (Duke 200a, pages 6.2-6 through 6.2-13) and more fully discussed in the **Air Quality** section, the SLOCAPCD is in violation of the federal and state standards for ozone and the state's short-term (24-hour) standard for PM<sub>10</sub>, pointing to the need for continued stringency in the control of contributions from new sources. In spite of these basin-wide violations, air quality monitoring in the project vicinity has shown ozone violation to be rare. Violation of the state's short-term PM<sub>10</sub> standard is due to emissions from wind-blown fugitive dust, emissions from combustion sources, and organic sulfate and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides and nitrogen oxides (NO<sub>x</sub>). Such ozone and PM<sub>10</sub> violations trigger a requirement for the mitigation measures specified in specific Air District rules. The implementing Conditions of Certification are specified for this project in the **Air Quality** section.

As noted in Attachment A, the health effects of ozone derive from its effects as an oxidant in the respiratory system. The EPA revised the prior air quality standards in 1997 to account for impacts that were found to occur at exposure levels previously considered incapable of significant impacts. The revised standards were intended for enhanced protection against impacts within the general public and sensitive individuals, and will begin to be applied after the normal administrative and judicial reviews. Since there are no reliable methods for assessing the potential ozone contribution from specific sources, regulation against new additions is aimed against the emission of its precursor pollutants, NO<sub>x</sub> and VOCs. The applicable requirements are also specified in the **Air Quality** section for this project.

While the PM<sub>10</sub> standards were established against effects from human exposure, a large number of studies (whose results were published after the last standards were set in 1987) have shown that serious health impacts could result at levels not previously considered capable of significant impacts. As noted in Appendix A, these health impacts include

premature death, aggravation of respiratory and cardiovascular diseases, changes in lung function and tissue structure, and impacts on the body's disease defense mechanisms. The manifestation of these impacts is considered particularly likely in sensitive individuals. Of further concern to regulators has been the finding that PM<sub>2.5</sub> might be a more reliable surrogate for the health impacts of environmental particulates than PM<sub>10</sub>. Because of this, the EPA revised the PM<sub>10</sub> standards in 1997 to accommodate the need for protection against the impacts of PM<sub>2.5</sub> exposure. Many area residents with specific knowledge of these new findings have pointed to the relatively large body of related publications in expressing their concerns about further additions from project operations.

Since the new PM<sub>2.5</sub> standard is yet to be implemented as noted in Appendix A, the particulate impact assessment in the **Air Quality** section was made using the existing standard for PM<sub>10</sub>. Since the project-related mitigation is aimed at the combustion sources of PM<sub>10</sub> and PM<sub>2.5</sub>, staff considers such PM<sub>10</sub>-driven mitigation to be adequate against the impacts of the companion PM 2.5.

The potential health effects of air toxics from the proposed and similar projects are assessed separately by staff according to their potential to induce cancer or effects other than cancer. Staff would not recommend certification if any of these effects were determined to be significant as discussed below.

## **METHOD OF ASSESSING THE POTENTIAL IMPACTS OF THE TOXIC AIR POLLUTANTS**

Any toxic air pollution-related health risks from operating the modernized MBPP and similar sources would mainly be associated with emissions from their natural gas-fired turbines and supporting equipment consisting of diesel-fueled fire pumps and emergency generator, and a gasoline storage and dispensing facility. All the supporting equipment is already being used for the existing facility with Air District-mandated emission controls and will continue to be used after modernization (Duke 2000a, page 6.2-69).

The procedure for addressing the cancer and non-cancer risk of toxic pollutants from these project-related sources is known as a health risk assessment, which consists of the steps listed below:

- A hazard identification step in which each pollutant of concern is identified along with possible health effects;
- A dose-response assessment step in which the relation between the magnitude of exposure and the probability of effects is established;
- An exposure assessment step in which the possible extent of pollutant exposures from a project is established for all possible pathways by dispersion modeling; and
- A risk characterization step in which the nature and the magnitude of the possible human health risk is assessed.

## **Health Effects Assessed**

The air toxics-related impacts of concern in this analysis are those that can result shortly after exposure or following long-term (or chronic) exposure. Those from short-term exposure are known as acute effects and generally result from exposure at relatively high levels. Some examples of pollution-induced non-cancer health effects from acute or chronic exposure include headaches, dizziness, coughing, nausea, asthma, skin rash, and irritation of any part of the body such as the eyes, throat and skin.

For this and similar gas-fired facilities, high-level toxic exposures (at levels capable of acute effects) could occur only during major accidents, not during routine operations when emissions are much lower (although staff still addresses the potential for significant acute impacts). Compliance with Air District-mandated emission control technologies is reflected by the incremental cancer and non-cancer risk estimates calculated. Since these incremental risk estimates are calculated the same way for such sources, they can be used, despite underlying scientific uncertainties, to compare similar projects for compliance with the best emission control technologies as currently identified for statewide use by the ARB.

### **Estimating the Risk of Non-Cancer Effects**

The method used by regulatory agencies to numerically assess the likelihood of acute or chronic impacts of air toxics or toxic soil contaminants is the hazard index method. In this approach, a hazard index is calculated as a numerical representation of the likelihood of significant health impacts at the exposure levels expected for the source being considered. This index is calculated by dividing the exposure estimate by the applicable reference exposure level (REL). These RELs are established by first identifying the lowest exposure levels capable of causing health effects and then applying specific safety factors to these levels to ensure protection against such effects in even the most sensitive individuals. Each REL is established from the health effects information available when the standard was set. (As more becomes known through further studies, the RELs are revised for continued health protection). After calculating the hazard indices for the individual pollutants, these indices are added together for all those that affect the same part of the body or target organ, to obtain a total hazard index for the source. Total hazard indices of 1.0 or less are regarded as indicating a potential lack of significant health impacts while an index of more than 1.0 may indicate a significant potential for the non-cancer acute or chronic effects being considered.

### **Estimating the Risk of Cancer**

Since cancer is currently considered inducible from every exposure to a carcinogen, the risk of cancer manifestation is more sensitive than the risk of non-cancer effects for assessing the environmental acceptability of a source of both carcinogens and non-carcinogens. This accounts for the prominence of theoretical cancer risk estimates in staff's environmental risk assessment process.

For any project, the risk of operations-related cancer is obtained by multiplying the exposure estimate by the potency factors for the individual carcinogens to be emitted. These potency factors are numerical values established to represent the cancer-causing potential of one carcinogen as compared to the others. After calculating these individual risk values, they are

added together to obtain the total incremental cancer risk from operations. Given the conservatism in the this risk calculation process, these numerical estimates are best regarded as only representing the upper bounds on the cancer risk at issue. They should not be presented as the real risk, which will likely be lower and could indeed be zero. Since the same calculation process is used in all cases, these risk numbers are best used for (a) setting mitigation priorities, (b) choosing between competing control technologies, and (c) assessing the effectiveness of control measures. The significance of any specific estimates as indicators of a real cancer hazard is assessed according to specific evaluative criteria.

## **STAFF'S SIGNIFICANCE CRITERIA**

Various state and federal agencies specify different cancer risk levels as trigger or significance levels for specific action in cases of emissions from specific sources. For example, many Air Districts have selected a risk of 10 in a million as a trigger level for public notification under Air Toxics "Hot Spots" (AB 2588) and the Proposition 65 programs. Rule 219 of the Air District requires the use of the best available control technology for air toxics (T-BACT) if the risk is more than 1 in a million and project denial if the risk more than 10 in a million.

Each cancer risk assessment may be conducted in two phases to first obtain a rough estimate of the cancer risk possible and then establish the need for specific action. In the first phase (which is the screening-level analysis), calculations are made using conservative, simplifying assumptions that tend to overestimate rather than underestimate the risk. If the estimates from this screening-level analysis were below 10 in a million, staff would consider the suggested cancer risk as insignificant and not warranting further analysis for specific mitigation. If the estimate is above 10 in a million level, a more refined analysis (using more site-specific information) might be necessary to assess the need for specific mitigation. In such a refined analysis, staff would recommend specific mitigation only when the risk estimate is 10 in a million or more. This limit-based regulatory approach is intended to prevent each identified source from significantly contributing to any increases in the already high (1 in 4, 25 %, or 250,000 in a million) background cancer risk of the average individual. The reasons for this high background cancer remain largely unknown. What has become clearer to scientists, however, is that environmental pollution is responsible for only a small fraction of this risk. As noted in the publication by the South Coast Air Quality Management District (2000, page 2), this fraction represents only about two percent of cancer cases.

For non-carcinogenic pollutants, staff considers significant health impacts to be unlikely when the total hazard index is 1.0 or less. If more than 1.0, staff would regard the related emissions as potentially significant from an environmental health perspective. It would not automatically call for specific mitigation whose recommendation would depend on the index value involved.

# IMPACTS

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## PROJECT SPECIFIC IMPACTS

The health impacts of the toxic air contaminants of primary concern in this analysis can be assessed separately as construction-phase impacts and operational-phase impacts.

### Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (Duke 2001, page 6.2-62, and Appendix 6.2) are those from human exposure to (a) the wind-blown dust from site grading, excavation and building demolitions, (b) emissions from demolition and construction-related equipment, and (c) contaminants in the soil and water. The dust-related impacts may derive from exposure to the dust itself as PM10, or exposure to the toxic contaminants adsorbed on to such dust.

As more fully discussed in the **Waste Management** section, PG&E (from whom the applicant purchased MBPP in 1998) remains responsible for the cleanup of any site contamination associated with past PG&E's operation of MBPP. This responsibility applies to the entire site including the areas around the demolition-bound structures (the generating units, related building, the fuel oil storage tanks, and exhaust stacks), which were not included in the Site Assessment Surveys commissioned by PG&E to formulate a plan for possible contaminant cleanup (PG&E 1997a, b, c, and d). The contaminants of specific concern in this regard are, arsenic, asbestos, beryllium, benzo (a) pyrene, nickel, chlordane and petroleum hydrocarbons. These contaminants were found at relatively low water and soil levels in the surveyed areas, reflecting the effectiveness of past remedial actions and existing contaminant prevention program at the site. Staff recommends that the applicant conduct surveys around these structures not previously surveyed, before beginning demolitions or material removal. Results from such a survey would allow for the mitigation plan necessary to protect against the human health and ecological impacts of concern to staff. The implementing condition of certification is **Waste-3** in the **Waste Management** section.

The demolition-related impacts of concern would result from exposure to (1) the diesel exhaust from the equipment to be used, (b) the toxic constituents of the demolition-bound, 450-foot exhaust stack and other structures, and (3) the toxic contaminants that may be encountered around the location of these structures. Results from staff's recommended pre-demolition survey would be used for safe removal of any contaminants encountered during site preparation. This would leave the hazardous constituents of demolition-bound structures and the equipment-related diesel emissions as the remaining hazards of potential significance to exposed humans. The applicant (Duke 2000a, page 6.2-7 and Appendix 6.2) has identified the specific equipment to be used in the construction phase along with expected emission rates for the relatively short (21-month) period involved. The potential impacts of the criteria pollutants from such emissions are addressed in the **Air Quality** section (a) in terms of compliance with the applicable air quality standards and (b) Air District requirements for specific mitigation.

In keeping with present ARB guidelines on risk assessments for diesel-fueled engines, the applicant used diesel exhaust particulate matter as a surrogate for all the toxic pollutants associated with diesel emission, which the ARB has identified as posing specific carcinogenic and non-carcinogenic risks to humans. Although diesel exhaust can produce both acute and chronic effects in exposed humans, there is inadequate data for Cal/EPA to use in establishing a specific REL against acute effects, leaving cancer and chronic non-cancer impacts as the only quantifiable health risk from such exposures. Given the general lack of chronic impacts from the relatively short construction periods (which would be 20 months for this project), only a potential cancer risk is appropriate for any related risk assessment.

Staff conservatively calculated this diesel-related construction risk as 4.8 in a million, which is below the 10 in a million level staff regards as necessitating further mitigation beyond the Air District's requirements specified in the Air Quality section. One of the most effective of such measures is the use of specific post-exhaust pollution traps to reduce the emission of construction-related diesel PM10 as a criteria pollutant. These control measures were established by the state for diesel-fueled construction equipment as a discrete source category. Since such controls are also effective for the control of the air toxics effects of primary concern in this analysis, staff considers their use as additional protection against the minimal cancer and non-cancer risks associated with such emissions in the relatively short construction period involved.

The applicant's calculations (Duke 2001, Appendix 6.2) show that the diesel emissions from demolition-related equipment would be much lower than from construction activities, meaning that any related cancer risk would be lower and therefore potentially insignificant. This would leave the toxic hazards from the demolition-bound structure as the hazard of potential significance. The toxic hazards in question include asbestos, waste oil, petroleum hydrocarbons, mercury, and lead, all of which are capable of specific cancer or non-cancer health effects. The applicant (Duke 2000a, pages 2-79 through 2-81, and 6.14-18 and 6.14-19) recognizes this potential risk and intends, in the specific case of the exhaust stacks, to prevent air releases by (a) carefully cutting up these stacks instead of blowing them up with dynamite, and (b) implementing specific dust suppression measures in the structure destruction and removal process, as required under Air District rules. This demolition management plan is more fully presented in the **Air Quality** section as specifically consisting of the following main steps:

- Erection of specific on-site enclosures to avoid releasing asbestos and other hazardous materials into the air;
- Material sorting to salvage specific building and other salvageable materials without human exposure to any toxic components;
- Sampling collection and analyses to establish the hazardous nature of generated wastes and applicable disposal methods; and
- Implementation of specific dust suppression measures to minimize exposure to dust or any dust-bound toxic contaminants.

Staff considers this proposed mitigation plan (as recommended for implementation in the **Air Quality** section in connection with the criteria pollutant components) as adequate for handling these contaminants without significant impacts on construction workers or area residents.

### **Operational Impacts**

As more fully discussed in the **Air Quality** section, this project is proposed to utilize T-BACT, which, for the toxic air pollutants of primary concern in this analysis, involves the use of clean-burning natural gas, and an oxidation catalyst. As noted in a report by the South Coast AQMD (2000, page 6), one characteristic that distinguishes these toxic air pollutants from the criteria pollutants (some of which are subject to further reactions in the course of dispersion) is that their impacts tend to be highest in close proximity to their sources and quickly drop off with distance from such sources. This means that the proposed project's air toxics levels would be highest around it and decrease rapidly as one moves into the surrounding area, away from the points of maximum impacts

The applicant assessed the cancer and non-cancer health risk of power generation at the proposed project using these ambient-level estimates. The assessment was made according to procedures specified in the 1993 California Air Pollution Control Officer's Association (CAPCOA) guidelines (Duke 2000a, pages 6.2-45, 6.2-46, and 6.2-67 through 6.2-69) with the results provided to staff along with documentation of the assumptions used (Duke 2000a pages 6.2-9, 6.2-10, 6.2-68, 6.16-19 through 6.16-25, and Appendix 6.2). Such documentation was provided with respect to the following:

- Pollutants considered;
- Emission levels assumed for the pollutants involved;
- Dispersion modeling used to estimate potential exposure levels;
- Exposure pathways considered;
- The cancer risk estimation process;
- Hazard index calculation; and
- Characterization of project-related risk estimates.

Staff has found these assumptions to be acceptable and has validated the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the maximum hazard index for each non-carcinogenic pollutant, or maximum cancer risks for estimated levels of the carcinogenic pollutants. These analyses were conducted to estimate the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

The following toxic pollutants from gas combustion were considered with respect to cancer and non-cancer effects: acetaldehyde, acrolein, ammonia, benzene, 1,3 butadiene, chrysene, diesel exhaust, ethylbenzene, formaldehyde, gasoline vapor, naphthalene, polycyclic aromatic hydrocarbons (PAHs), propylene oxide, toluene, and xylenes. Although

the modeling results indicate that maximum impacts from the project's gas-fired turbines and diesel-fueled emergency generator would occur at different locations, the applicant added their associated cancer risks together as a conservative way of presenting the maximum risk estimate possible in the project area. Such addition would be appropriate only when such impacts occur at the same location. Using this procedure, the applicant calculated a total risk of 0.17 in a million for the new project turbines. The risk from the 1-hour weekly testing of the existing diesel-fueled emergency generator (that will still be used) was calculated as 1.34 in a million, leading to a total risk estimate of 1.51 in a million for all facility sources (turbines and supporting equipment) in the post-modernization period. This post-modernization risk estimate is significantly below the 10 in a million significance level staff regards as necessary for mitigation above the ARB-specified T-BACT for such projects. It is also below the Air District's significance criterion of 10 in a million in this regard.

For the non-carcinogenic toxic pollutants, the maximum chronic hazard index of 0.041 was calculated for the maximally exposed individual and is significantly below staff's significance criterion of 1.0, meaning that the project's toxic emissions would be at levels staff considers insignificant with respect to the chronic health impacts of concern. A maximum acute hazard index of 0.355 was calculated, also suggesting a potential lack of significant modernization-related impacts of an acute nature. The values for all sensitive receptor locations are much lower.

As more fully discussed in the **Air Quality** section, the offsets, and emission control requirements for the proposed project operation would be adequate to prevent any significant additions to the ambient levels of the criteria pollutants of concern for the project. Such compliance would be true for the criteria pollution pollutants for which there are no air quality violations as well as area's problem criteria pollutant (ozone and PM10) for which there are existing violations.

## **CUMULATIVE IMPACTS**

When toxic pollutants of specific concern in this analysis are emitted from multiple sources within a given area, the cumulative, or additive, impacts of such emissions could, in theory, lead to significant health impacts within the population, even when such pollutants are emitted at insignificant levels from the individual sources involved. Analyses of such emissions have shown, however, that the peak impacts of such toxic pollutants are normally localized within relatively short distances from the source. Toxic pollutant levels beyond the point of maximum impact quickly fall within background levels.

Staff has established from a list of proposed area projects (Duke 2000a, pages 6.1-4 through 6.1-13) that no new major sources of toxic pollutants are proposed near enough for the impact overlap necessary for significant impacts of a cumulative nature. The potential for such cumulative impacts is addressed in the **Air Quality** section with respect to the criteria pollutants. The potential for new violations or significant additions to existing violations was considered in establishing the extent of the emission offsets recommended as a specific condition of certification.

## FACILITY CLOSURE

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As noted in the introduction section, the toxic pollutants of primary concern in this analysis are those from routine operation of the proposed modernization project. During temporary or permanent closure, the main concern would be over non-routine releases of hazardous materials or wastes on site. Such releases are discussed respectively in the **Hazardous Materials Handling** and **Waste Management** sections. Since project operations would be stopped during forced temporary closures, any hazardous releases would not be in significant amounts. During permanent closures, the only emissions of potential significance would derive from demolition or dismantling activities and the equipment used. Such emissions would be subject to controls required in specific conditions adopted by the Energy Commission after a closure plan is received from the project owner.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

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**Comment: BCPS-1.** *We have grave concerns about the health effects of the new plant on all residents of the County and Morro Bay, particularly infants and children with particular sensitivity to the impacts of environmental pollutants.*

**Staff's Response:** As noted in this analysis, the exposure standards for the pollutants of specific concern for the project and similar projects were established to ensure protection against all segments of the population including sensitive individuals such as children, the elderly and those with pre-existing diseases. The continuing challenge is to appropriately adjust these exposure standards to reflect new findings on the health effects at issue.

**Comment: BCPS-2:** *The proposed plant's lower stack height, lower exhaust velocity, and lower exhaust temperatures will assure that more pollutants, not fewer, will remain in Morro Bay and deteriorate the air quality.*

**Staff's Response:** Since these noted factors and parameters determine the amount of project-related pollutants to be encountered in the area, they were considered in the modeling procedures used to establish (a) potential exposure levels and (b) the level of offsets necessary to counteract the potential effects of plant operations. Staff finds the combination of BACT use and requirements for offsetting emission reductions as adequate to prevent the project's operations from increasing the levels of the air pollution of concern for the proposed and similar projects.

**Comment BCPS-3:** *We believe that comparing the proposed project with the existing project (the no-project alternative) is very relevant to the air quality health impact analysis.*

**Staff's Response:** We agree, and note that such an analysis is included in staff's assessment for the criteria pollutants for which there are specific air quality standards. This was specifically done by modeling existing (background) levels together with project-related levels to assess the potential for air quality violations during operations. From this approach, it was possible to establish how the project's emissions would influence the existing air quality in the project area. The approach for carcinogens is different in being primarily aimed

at preventing any significant additions to the already high (1 in 4) cancer risk of the average individual. This measure of significance is the point at issue for the project's carcinogens. We established the project's potential cancer risk as potentially insignificant.

**Comment: CDFG-1:** *Commenter recommends that the Air Quality section be revised to include an analysis of the affected air quality on terrestrial and aquatic species.*

**Staff's Response:** Such an analysis is not necessary since existing air quality standards are established as necessary to protect against human health and ecological effects such as effects on aquatic and terrestrial species. Furthermore, humans are assumed to be more sensitive than all other species in setting specific limits on air pollutants, meaning that air emissions without significant impacts on humans would be unlikely to significantly affect the other species on land or in water.

## CONCLUSIONS AND RECOMMENDATIONS

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Staff does not consider the calculated cancer risk from operating the project with the toxic emission control measures proposed to be significant. Therefore, no cancer risk-based mitigation is proposed. The estimates for acute and chronic non-cancer risks also suggest a lack of significant non-cancer impacts. Implementing the requirements of the recommended **Air Quality** and **Waste Management** Conditions of Certification would serve to protect against exposure to the air or soil pollutants from the proposed demolition or construction activities.

Since operation of the modernized MBPP would allow for more efficient power generation without significant health impacts, staff recommends approval with respect to the toxic pollutants of primary concern in this analysis. The conditions for ensuring compliance with all applicable air quality standards are specified in the **Air Quality** section while the conditions for preventing any significant construction and demolition-related impacts from soil and water contamination are specified in the **Waste Management** section. No specific **Public Health** conditions of certification are recommended.

## REFERENCES

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California Air Resources Board (ARB) 1996. California Toxic Emissions Factors (CATEF) Database for Natural Gas-Fired Combustion Turbine Cogeneration.

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

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## **ATTACHMENT A–HEALTH EFFECTS OF CRITERIA POLLUTANTS AND RATIONALE FOR EXISTING AIR QUALITY STANDARDS.**

### **OZONE (O<sub>3</sub>)**

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 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, which is yet to be implemented.

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<sub>3</sub> 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 is 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<sub>3</sub> entering the airways and can cause O<sub>3</sub> 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 (PM10). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. As noted in the **Air Quality** section, air-borne particles may be emitted directly to the atmosphere or result secondarily from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM10 may be made up of specific elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil. Its size, chemical composition, and concentration can vary considerably from area to area and from season to season within the same area.

PM10 can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects, which may result from their physical presence in the respiratory system or the biological interaction of the chemicals adsorbed on to them. Depending on the source, such biological interactions may manifest themselves as cancer or non-cancer effects. The fine-mode fraction consists of particles with a diameter of 2.5 micrometers or less (PM2.5), while the coarse-

mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter (PM<sub>10-2.5</sub>).

According to the available information, the ambient concentrations of particulate pollution have declined since the early 1970s, reflecting the effectiveness of past mitigation approaches. Despite these improvements, a series of studies have shown these pollutants as capable of significant health impacts at levels significantly lower than existing standards considered adequately protective at the time they were set. Premature death is the most serious outcome in this regard as mediated through specific and non-specific cardio-pulmonary effects whose underlying biological mechanisms are inadequately understood. Other non death-related impacts include asthma and other respiratory effects. Children and the elderly are particularly sensitive to such impacts.

One of the most significant aspects of the present particle-related health concern is the identification of PM<sub>2.5</sub> as a better surrogate than PM<sub>10</sub> for those particulate fractions associated with the health effects of current concern. It was because of this that the EPA is currently working to establish separate PM<sub>10</sub> standards. The operational limits will be specified at the end of the pre-requisite administrative and legal reviews.

PM<sub>2.5</sub> is derived directly from combustion by-products, which have volatilized and condensed to form primary PM<sub>2.5</sub> or secondarily from the interaction of specific precursors as discussed in the **Air Quality** section. 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.

Crushing, grinding, and abrasion of surfaces form coarse-mode PM<sub>10-2.5</sub>), 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<sub>10</sub> includes many different types of particles with widely divergent chemical characteristics, the potential for some health effects depends upon the constituent make-up of PM<sub>10</sub> to which the individual 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 this 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<sub>2.5</sub> standards to the existing annual and 24-hour PM<sub>10</sub> 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 and bronchitis. Taken together, the new standards should enhance protection against the wide range of established PM-related health effects, which include premature mortality, cardiopulmonary diseases, and sub-cellular alterations in respiratory tissue, structure and function. Such effects are of particular concern in children and sensitive individuals.

California has 24-hour and annual standards for PM<sub>10</sub> only, which are based on studies describing 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.

The California 24-hour PM<sub>10</sub> 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 margin of safety to account for the possibility of effects occurring at lower levels (CARB 1982, p. 84). The state 24-hour PM<sub>10</sub> standard was set to be more stringent than the national 24 hour PM<sub>10</sub> standard. At the time of CARB's adoption of the state standard, the U.S. EPA had not set federal 24-hour PM<sub>2.5</sub> 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 showing that long-term exposure to PM<sub>10</sub> causes decreased breathing capability and increased respiratory illness in susceptible populations such as children (CARB 1991, p. 25). The annual standard is also set to protect against 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<sub>2</sub>)**

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<sub>2</sub>)**

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO<sub>2</sub> 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.).

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# **SOCIOECONOMIC RESOURCES**

Testimony of Michael Fajans and Amanda Stennick

## **INTRODUCTION**

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The technical area of Socioeconomics includes several related areas of interest and concern. A typical socioeconomic impact analysis evaluates the effects of potential short-term and long-term project-related population changes on local housing, schools, medical and protective services, as well as the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population. The socioeconomic analysis also includes demographic information which is used in several technical areas for an Environmental Justice analysis. Socioeconomic analysis discusses the potential direct and cumulative impacts of the proposed Morro Bay Power Plant Project (MBPP) on local communities, community resources, and public services.

## **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**

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### **FEDERAL**

Executive Order 12898, "Federal Actions to address Environmental Justice (EJ) in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on agencies to achieve environmental justice as part of this mission. The order requires the US Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

Civil Rights Act of 1964, Public Law 88-352, 78 Stat.241 (Codified as amended in scattered sections of 42 U.S.C.) Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national programs in all programs or activities receiving federal financial assistance.

### **STATE**

#### **California Government Code, Sections 65996-65997**

As amended by SB 50 (Stats. 1998, ch. 407, sec.23), these sections state that public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

#### **14 California Code of Regulations, Section 15131**

- Economic or social effects of a project shall not be treated as significant effects on the environment.
- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.

- Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce and or avoid the significant effects on the environment.

## SETTING

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### PROJECT LOCATION

The proposed project is at the site of the existing Morro Bay Power Plant in the City of Morro Bay, California. The project site is in the western side of town, between Highway 1 and the Morro Bay shoreline. For a more complete description of the location, please refer to the **PROJECT DESCRIPTION** section of this document and the facility location section of the Application for Certification (Duke 2000a). The study area for socioeconomics includes areas within a one-way commuting distance of about two hours. This area includes San Luis Obispo County, Monterey County, northwestern Santa Barbara County, including the City of Santa Maria, and western Kern County, including the City of Bakersfield.

### DEMOGRAPHIC CHARACTERISTICS

According to preliminary Census 2000 results, San Luis Obispo County had a population of 246,681, an increase of 13.6 percent from the approximately 218,000 population from the 1990 Census. Only 58 percent of the county population lives in the seven incorporated cities, with many people living in the county jurisdiction.

The comparable numbers for the City of Morro Bay were 10,350 in 2000, approximately six percent above the 9,802 people counted in the 1990 Census. In addition to Morro Bay, the unincorporated communities of Baywood, Los Osos, and Cayucos are also located within a six-mile radius of the project site. As shown in **SOCIOECONOMICS TABLE 1**, their combined population was 27,000 in 1990, with Baywood-Los Osos responsible for just over half the population. These communities together accounted for about 12 percent of the San Luis Obispo County population in 1990.

Santa Barbara County has a population of approximately 410,000 people, of whom about 120,000 live in the northern Santa Barbara County cities of Guadalupe, Lompoc, and Santa Maria.

**SOCIOECONOMICS TABLE 1** shows 1990 demographic characteristics for the communities in proximity to the Morro Bay Power Plant, and also indicates County averages or totals. Compared to San Luis Obispo County averages, the population of the nearby communities had fewer minority residents (88-95 percent non-Hispanic White) and a lower proportion of Hispanic residents, 3.5-8 percent, compared to a County population of 12.4 percent. The proportion of the population living in poverty status ranged from 7.2 percent in Baywood-Los Osos to 10 percent in Morro Bay, slightly below the 1990 County average of 12.1 percent. Although the median household income in Morro Bay, at \$26,000, was below the County average, this was probably accounted for by the substantial elderly population in Morro Bay. Almost 27 percent of the residents were 65 years old or more, which is double the elderly

population percentage of the County. 2000 Census data on income and age is not yet available.

**SOCIOECONOMICS TABLE 1**  
**Demographic Profile of Nearby Communities: 1990 & 2000**

Race/ethnicity	1990				2000	
	Morro Bay	Baywood -Los Osos	Cayucos	San Luis Obispo County	Morro Bay	San Luis Obispo County
Total population	9,802	14,377	2,822	217,162	10,350	246,681
White (excluding Hispanic)	92.9%	88.0%	95.2%	81.6%	83.4%	76.1%
Black	.8%	.4%	.6%	2.3%	.6%	1.9%
American Indian	1.6%	.8%	.3%	.9%	.8%	.6%
Asian	1.9%	3.9%	.4%	2.8%	1.7%	2.6%
Other/2 or more(2000)	2.8%	.1%	0%	.1%	2.0%	2.4%
Hispanic origin (1)	8.0%	7.0%	3.5%	12.4%	11.4%	16.3%
Median Household Income (1989)	\$26,049	\$35,392	\$31,481	\$31,164	N.A.	N.A.
% Poverty status	10.0%	7.2%	7.5%	12.1%	N.A.	N.A.
Source: Dept. of Finance Demographic Unit. 1990 & 2000 Census						
(1) Hispanic total (1990) includes several race categories, so totals do not add up to 100%						

## EMPLOYMENT AND ECONOMIC CHARACTERISTICS

The existing San Luis Obispo County labor force includes approximately 115,000 people; the current unemployment rate is three percent, so there are about 111,000 jobs in the County (about 15,000 are in the Baywood-Los Osos, Cayucos, or Morro Bay area).

Leading industrial categories in San Luis Obispo County are services, with 24,000 jobs in January 2001, construction trade with 23,600, and government with 22,400 jobs. There were 5,400 workers employed in construction in the County (EDD), a substantial reduction from the 8,800-construction industry employment reported by the 1990 Census. **SOCIOECONOMICS TABLE 2** shows the distribution of employment by industrial sector for San Luis Obispo County. There has not been a significant increase in countywide employment in recent years.

**SOCIOECONOMICS TABLE 2.**  
**Employment by Industry: January 2001**

Sector	San Luis Obispo County
Agriculture/mining	4,200
Construction	5,400
Manufacturing	7,500
Transportation/Public Utilities	4,900
Construction Trade	23,600
Finance/Insurance Real Estate	4,900
Services	23,900
Government	22,400
<b>Total</b>	<b>96,800</b>
Sources: California EDD, March 2001. Note: employment by place of work, excludes self-employed.	

The existing MBPP employs approximately 75 people (Duke 2000a). Because the proposed project will replace some existing units, there will be no need to hire additional operational employees. Businesses immediately adjacent to the project site include a Pacific Gas and Electric substation, restaurants along the Embarcadero, and the City Corporation Yard and a RV storage facility.

### **Housing**

The following discussion reflects concerns from the City of Morro Bay that construction workers may impact housing, including seasonal rentals.

As of January 2000, Morro Bay had 6,113 housing units, including 3,950 single family detached units, 1,366 attached units, and 797 mobile homes. Of the total, 4,807 were occupied, yielding a 21 percent vacancy rate. However, most of the vacant units are second homes or recreational property that are not available for rent. According to those familiar with the Morro Bay housing market, there are few vacant housing units available on the market.

The San Luis Obispo countywide housing supply is approximately 101,000 units, of which 65 percent are detached units and 11 percent are mobile homes. The overall vacancy rate was 11 percent countywide, but it is difficult to know how many of the vacant units are second homes (DOF). The five percent vacancy rate in San Luis Obispo may be a more accurate measure of true housing vacancy.

In addition to the standard housing stock, Morro Bay, as a seasonal recreational destination, also has a supply of motels, short-term recreational vehicle (RV) parks and campgrounds. There are currently 768 motel rooms available in Morro Bay, 2,200 additional units in San Luis Obispo, and a total of approximately 8,600 in the County. Demand peaks during the summer and weekends, with more availability in winter and weekdays. For the Morro Bay motels, annual occupancy averaged 67.5 percent during 2000, with occupancy rates of more

than 90 percent for July and August (Duke 2001a). On average, 250 motel units are available. From November through March, more than 300 rooms were available on average. Only from June through September is average availability less than 200 rooms, with a low of 74 rooms vacant during July and 68 in August.

Other potential temporary housing resources include temporary RV parks and campgrounds. There are approximately 400 temporary RV spaces in Morro Bay, and 260 camping spaces, the latter primarily in Morro Bay State Park and Morro Strand State Beach. These locations fill up during July and August, but generally have a few hundred available spaces during off-peak periods. A small number of habitation permits are also granted for "liveaboards" on vessels in Morro Bay harbor. However, these are severely limited and subject to a long waiting list.

### **Schools**

The San Luis Coastal Unified School District provides K-12 education for San Luis Obispo, Morro Bay, and the nearby unincorporated area. The closest school to the project site is Morro Bay High School, approximately 2,000 feet north at 235 Atascadero Road, just west of Highway 1. Morro Elementary School, at 1130 Napa Avenue, is located about 3,000 to 4,000 feet southeast of the power plant site. While the high school enrollment is at capacity, there is excess capacity available at the elementary school level.

### **Utilities, emergency, and other services**

Natural gas is provided to the project site via PG&E's Pipeline 306 from the Kettleman Compressor Station (AFC, page 2-30), and PG&E provides electricity to the site and community. The Southern California Gas Company provides natural gas to residents in the City of Morro Bay. The primary local telephone provider is Pacific Bell.

The City of Morro Bay provides water and sewer service within the city limits. However, the present MBPP provides its own potable water supply via on-site wells. Cooling water for the generation turbines is taken from Morro Bay and returned to the ocean.

Police protection is provided by the Morro Bay Police Department, with 20 sworn officers plus a support staff. Other public protection is provided by the San Luis Obispo County Sheriff's Department, which provides service to the unincorporated area and the City of Morro Bay via a mutual aid agreement with the City. The California Highway Patrol has jurisdiction over traffic matters in the unincorporated county as well as on state highways.

The closest hospitals are in San Luis Obispo, approximately 12 miles from the MBPP site. Sierra Vista Regional Medical Center, French Hospital, and San Luis Obispo General Hospital together provide all needed functions, including 24-hour emergency rooms.

For information on fire protection please refer to the Worker Safety and Fire Protection section of this Final Staff Assessment.

### **Fiscal and Financial**

The existing Morro Bay Power Plant is a major financial factor for the City of Morro Bay, providing jobs for residents, and is a major fiscal factor, paying both property taxes and

natural gas franchise fees which are major revenue sources for the City. The current plant pays approximately \$1.1 million annually in property taxes, of which the majority (61 percent) goes to schools and colleges, 23 percent goes to the County general fund and approximately 12 percent, or \$131,000 goes to the City of Morro Bay. This would represent about eight percent of the City's property tax revenue, based on the estimated property tax revenue for FY 2000-2001 (Morro Bay Finance Dept.). Since Duke Energy purchased the plant and buys natural gas, the company also pays natural gas franchise fees of \$450,000 to 650,000 annually to the City.

The City of Morro Bay has expressed concerns that the presence of the plant reduces tourism in Morro Bay. Transient occupancy taxes have risen in recent years at a rate comparable to those of other San Luis Obispo County communities, which implies that the plant has not adversely affected tourism (Duke 2000a). Since the plant pre-dates significant tourism in the area, it is speculative to estimate what the community would be like without it.

## **IMPACTS**

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### **PROJECT-SPECIFIC IMPACTS**

Staff reviewed the Duke Energy Morro Bay Power Plant Project Application for Certification, dated October 2000, as well as the responses to data adequacy requests dated March 7 and April 9, 2001. Additionally, staff requested and reviewed a demographic research analysis from the marketing firm Claritas, Inc. The analysis was specific to the projected year 2000 demographic profile of the area within a six-mile radius of the MBPP site. The applicant used appropriate public databases in the analysis contained in the AFC. Staff's analysis is based on verification of the information in the AFC and independent research.

#### **Employment**

Given the need to remove the onsite tank farm prior to constructing the new plant, and the demolition of the existing large stacks and removal of existing units 1 through 4 after the new plant is completed and operating, the construction period will occur over an approximately six year period. The peak construction labor requirement is estimated at 831 workers on two shifts, which is expected to occur during the 13<sup>th</sup> month of construction. The number of workers is expected to exceed 600 workers for six months and exceed 200 workers for a 12 month period, months 6 through 17 of the process (Duke 2000a). **SOCIOECONOMICS TABLE 3** shows the distribution of workers by craft over the construction effort.

The six-month peak construction employment of more than 600 workers represents a significant proportion of all construction jobs in San Luis Obispo County (11%) but because the one-way commute distance for construction workers is two hours, the labor pool extends to portions of Santa Barbara and Kern Counties. Thus, little difficulty is expected in finding a construction labor force within commute distance for the proposed project, and few workers would be expected to relocate to Morro Bay or San Luis Obispo as a result of the project.

**SOCIOECONOMICS TABLE 3.**  
**Number of Construction Workers by Month: Morro Bay Power Plant Project (Construction)**

Craft	Month of Construction																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	Number of Workers																						
Boilermaker	0	0	0	0	0	0	0	0	0	3	42	48	48	47	55	63	55	26	16	8	2	0	0
Carpenter	4	4	4	0	23	35	46	47	53	69	62	53	59	58	66	72	47	18	7	4	2	0	0
Clerk/administration	3	3	8	9	29	14	10	7	9	9	11	8	8	8	9	10	9	4	4	2	2	3	3
Electrician	4	2	4	0	12	6	23	65	79	94	111	149	184	176	158	139	43	22	15	8	7	6	4
Engineering Management	6	6	15	11	35	35	28	36	46	42	57	68	73	62	62	55	40	22	11	9	10	8	9
Equipment Operator/Teamster	6	6	20	12	24	78	59	37	81	129	114	102	115	112	112	70	43	14	6	3	1	0	0
Iron Worker	4	8	4	0	16	25	46	53	60	58	114	126	120	109	76	9	8	0	0	0	0	0	0
Laborer	4	4	7	7	30	40	46	43	72	103	85	79	94	92	108	123	86	30	13	7	7	2	2
Millwright	0	0	0	0	0	5	11	10	11	9	34	63	85	84	94	81	44	20	5	3	2	0	0
Pipe Fitter	4	2	2	0	0	5	23	18	38	54	59	46	45	45	37	25	10	5	0	1	1	1	1
Total Workers Onsite	35	35	64	39	169	242	291	317	450	571	688	741	831	793	778	647	385	161	77	44	34	19	19

Craft	Month of Construction																						
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	Number of Workers																						
Boilermaker	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
Carpenter	0	0	0	0	4	6	6	8	8	8	6	7	5	5	5	2	2	2	2	2	0	0	0
Clerk/administration	2	3	3	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4	4	3	3	3	3
Electrician	0	0	0	0	2	2	2	4	4	4	4	4	3	3	3	2	2	2	3	4	4	4	4
Engineering Management	5	6	6	7	7	7	7	8	9	9	14	13	12	12	12	9	7	7	7	8	6	6	6
Equipment Operator/Teamster	0	0	0	0	1	4	4	8	12	16	14	16	16	16	16	16	14	14	16	20	22	27	27
Iron Worker	0	0	0	2	2	3	3	3	4	4	4	6	6	6	6	2	2	2	4	6	10	10	10
Laborer	2	4	5	5	6	8	12	14	14	14	10	12	12	12	12	11	10	10	10	11	12	12	12
Millwright	0	0	2	2	2	2	2	4	4	4	4	4	2	2	2	0	0	0	0	0	0	0	0
Pipe Fitter	0	0	2	2	2	2	2	4	5	5	7	7	6	6	6	4	4	4	4	6	6	8	8
Total Workers Onsite	9	13	18	22	30	38	42	59	66	70	70	76	68	68	68	52	47	47	52	64	66	73	73

**SOCIOECONOMICS TABLE 3 (continued)**  
**Number of Construction Workers by Month: Morro Bay Power Plant Project (Demolition)**

Craft	Month of Construction																							
	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
	Number of Workers																							
Boilermaker	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carpenter	0	4	4	4	3	4	4	2	4	4	4	2	4	2	2	2	2	2	2	2	2	2	2	2
Clerk/administration	3	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Electrician	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Engineering Management	5	4	4	3	3	5	5	5	5	5	5	5	4	3	3	3	3	3	3	3	3	3	4	4
Equipment Operator/Teamster	23	23	23	18	13	18	20	9	11	20	13	9	4	2	2	2	2	2	2	2	2	2	2	2
Iron Worker	8	8	6	3	3	6	6	3	6	6	6	3	3	0	0	0	0	0	0	0	0	0	0	0
Laborer	8	12	8	6	6	6	6	4	6	6	8	4	4	2	2	2	2	2	2	2	2	2	4	4
Millwright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipe Fitter	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total Workers Onsite	55	62	48	35	29	40	42	24	33	42	37	24	20	9	9	9	9	9	9	9	9	9	13	13

Source: Applicant response to data requests 88 and 89.

Note: No construction months 24 and 25.

**SOCIOECONOMICS TABLE 4** provides an analysis of labor force availability. There are three trades identified where the project demand will exceed the local supply of workers: boilermakers, ironworkers, and millwrights. For boilermakers, the peak demand will require 63 workers during month 16, 23 more than are available in the area. The greatest local worker shortage will occur for ironworkers, where a maximum need of 126 workers compares to a supply of 40 available residing with the three county commute area. Finally, there are 60 millwrights in the labor force, and the plant construction will require 94 during the 15<sup>th</sup> month of construction. For all these trades, there will be an 11-month period when from 6 to 113 workers may seek temporary weeknight housing. For only five of these months will there be more than 50 workers needing temporary housing.

The demolition of the existing plant, including the stacks, may require up to four years, including the salvaging of usable components, but would require an average of 38 workers over the period, with a peak of 80 workers during the demolition phase (Duke 2000a). Because of the available labor pool within a two-hour commute distance of the project, this level of employment would not have a significant impact on available local labor.

The permanent employment associated with the proposed project (approximately 75 workers) would be about the same as the current labor force – transferred from working on present Units 1 through 4. This will not have a significant impact on the Morro Bay labor force.

**SOCIOECONOMICS TABLE 4.  
Maximum Construction Labor Needs and Local Works by Craft**

Craft	Maximum number of workers needed By craft	Total workers in San Luis Obispo & Santa Barbara Counties by craft	Worker demand exceeds local supply	
			Maximum needed in excess of local supply	Months of construction
Boilermaker	63	40	23	11-17
Carpenter	72	1,000	--	--
Clerk/administration	29	500+	--	--
Electrician	184	500	--	--
Engineering management	73	400	--	--
Equipment Operator/ teamster	129	1,200	--	--
Iron Worker	126	40	86	7-15
Laborer	123	500	--	--
Millwright	94	60	34	12-16
Pipe Fitter	59	225	--	--

Source: Applicant based on surveys of local trades unions.

## **Housing**

As stated previously, construction of the proposed project is not expected to result in a significant number of workers moving to the area for construction or permanent jobs. Morro

Bay has some housing turnover although a low actual vacancy rate. However, mobile home, RV parks, and motels also provide temporary living opportunities. As stated in the setting section, there is good availability of temporary RV space and motels for nine months of the year, with the availability more limited during summer. However, this limitation is offset by the 16,000-student Cal Poly San Luis Obispo campus, which creates a substantial rental availability in San Luis Obispo during summer.

As stated above, during a limited time, there is the potential for construction workers in particular trades to temporarily relocate to Morro Bay. However, their presence is likely to be primarily on weeknights, when demand for transient housing is lower than on weekends. Thus, the presence of temporary housing demand generated by a limited number of construction workers is expected to be a positive rather than negative influence on the Morro Bay and/or San Luis Obispo transient housing stock.

### **Schools**

Few temporary workers are expected to move to and/or bring families to Morro Bay during the construction period. Thus, there is not expected to be any impact on the need for school facilities. One-time school impact fees would not be generated by the project since no additional square footage will be added (AFC, page 5.10-9).

### **Utilities, Emergency And Other Services**

Pacific Gas and Electricity currently provides natural gas to the MBPP via a pipeline from Kettleman. Since the proposed project will replace an existing power plant, the existing natural gas line will be shifted to the new plant with no impact. Cooling water for the proposed facility will be taken from Morro Bay and returned to the Pacific Ocean at Estero Bay through existing pipes, again replacing the existing plant. Total cooling water supply will be reduced approximately 30 percent (Duke 2000a). Water for process use and potable water for plant personnel will be provided by the onsite wells that supply the current plant. Consumption rates will be higher during construction than on-going operations, as it is presently during maintenance periods. An adequate supply is available. Sanitary sewer flow to the Morro Bay sanitary sewage system and treatment plant will be slightly reduced over current levels. Portable toilets will be used during the construction period to minimize temporary impacts to the City's sewage treatment system.

In terms of public safety, the security fence around the MBPP will remain in place and security guards will control access during the construction as well as operational phase. The applicant has agreed to assist the City in providing additional police and fire department staffing and equipment during the construction period in order to address staffing shortfalls. The "Fire Safety and Police Services Program" addresses the following concerns:

- Emergency response [fire], if required.
- Plan check responsibilities once construction plans are available.
- "Command and Control" and overall management responsibilities.
- Inspection and training requirements.
- Police emergency services, if required.
- Construction traffic management. (Duke 2000a).

Please refer to the **Worker Safety and Fire Protection** section for a discussion of potential impacts on Fire services.

For the Police Department, Duke will support a Traffic Officer and provide overtime support during the construction period. Functions will include: traffic management at key intersections, particularly during shift change and major deliveries; coordination with onsite security; liaison between the Police Department and the applicant (Duke 2000a). The estimated approximate cost is \$285,000, with payment to be initiated with the removal of the tanks and beginning of construction.

### **Public Finance And Fiscal**

Construction of the proposed project will generate one-time sales tax receipts, but since the majority of supplies and equipment will be purchased outside of the City of Morro Bay, limited local sales tax will be generated by the project. According to applicant estimates, about \$10 million worth of material and equipment would be purchased locally, including concrete, steel, and miscellaneous equipment. Construction payroll is estimated to be about \$67 million (Duke 2000a). On-going local expenditures for maintenance and materials are projected at \$260,000 annually, a continuation of existing expenditures. On-going operational payroll is projected at approximately \$8.6 million.(CEC 2001c). Thus, the project will result in both one-time and ongoing economic benefits to local businesses.

The existing MBPP generated approximately \$131,000 in annual property tax to the City of Morro Bay and a total of \$1.1 million to all agencies in 1999, based on an assessed value of \$110 million. The net increase in assessed value of the Morro Bay Power Plant is estimated to be \$409 million (AFC, page 6-10-43), the total value minus the value of Units 1 through 4 that will be removed. Based on the expectation that approximately \$519 million of improvements will represent assessable value, the City of Morro Bay will receive \$626,700 in additional property tax revenue, the County General Fund \$1.019 million, and the School District will receive \$1.662 million in additional annual revenues. (**SOCIOECONOMICS TABLE 5**).

**SOCIOECONOMICS TABLE 5.**  
**Estimated Incremental Property Tax for Morro Bay Power Plant Project**

Taxing Jurisdictions	Approximate Share of Tax Increment	Approximate Incremental Revenue
City of Morro Bay	11.94%	\$526,700
San Luis Obispo County General Fund	23.10%	\$1,019,000
Air Pollution Control District	.064%	\$2,800
City/County Library	1.73%	\$76,400
San Luis Flood Control District	.245%	\$10,800
Nacimiento Water Service	.266%	\$11,700
Cayucos-Morro Bay Cemetery	.918%	\$40,500
San Luis Coastal Unified School District	37.69%	\$1,662,400
San Luis Obispo Community College	6.71%	\$295,700
County School Service	3.97%	\$175,200
ERAF (schools)	13.36%	\$589,100
Total to County	100.00%	\$4,388,400
State Water Debt	.40%	\$17,600
<b>TOTALS</b>	<b>100.40%</b>	<b>\$4,428,500</b>
Source: Estimates based on applicants projections of property value and San Luis County Auditor-Controller allocation factors.		

Franchise fees to Morro Bay for natural gas are projected at \$850,000 annually. Duke Energy has agreed to support a minimum annual funding to the City of Morro Bay of \$2 million from property taxes, franchise fees, and other city fees. The company will provide the City with additional funding to guarantee the \$2 million annual fee should the combined totals not reach this level (Duke 2000a).

## **ENVIRONMENTAL JUSTICE SCREENING ANALYSIS**

The purpose of the environmental justice screening analysis is to determine whether there exists a low-income and/or minority population within the potential affected area of the proposed site.

Minority populations, as defined by USEPA's April 1998 National Environmental Policy Act Compliance Analysis are identified where either:

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

Staff has determined the potential affected area as a six-mile radius of the proposed site. The six-mile radius is consistent with the radius used for staff's cumulative air quality analysis.

**SOCIOECONOMICS TABLES 6 and 7** contain 1990 census data and 2000 population estimates for minority populations within a 6-mile radius of the project, the City of Morro Bay, and for the State of California, respectively. **SOCIOECONOMICS FIGURES 1 and 2** illustrate the 1990 and 2000 demographics of the six-mile study area, respectively. Based on the screening process for environmental justice, the data in **SOCIOECONOMICS TABLES 6 and 7** show the minority population for the six-mile radius to be between 7.4 percent and 17.1 percent. The minority population within the City of Morro Bay (which is included in the six-mile radius) is between 11.5 percent and 16.6 percent. Based on the screening analysis, a minority population greater than 50 percent is not present.

The guidelines also state that a minority population may be identified when 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. Therefore, a demographic comparison to the next larger geographic area or political jurisdiction should also be presented when determining whether impacts fall disproportionately on minority and low income populations. For this comparison, staff used the City of Morro Bay as the appropriate unit of geographic analysis because it is the political jurisdiction where the project would be constructed. Comparing the six-mile radius (2000 data) which has a total minority population of 17.1 percent to the City of Morro Bay which has a total minority population of 16.6 percent indicates that the minority population in the affected area is not meaningfully greater than the minority population percentage in the larger geographic area or political jurisdiction. Therefore, based on the 50 percent threshold and the meaningfully greater analysis, the project does not have a minority population within the six-mile radius, and therefore no further environmental justice analysis is warranted.

**SOCIOECONOMICS TABLE 6: Minority Populations 1990**

	Total Population <sup>1</sup>	Minority Population <sup>2</sup>	Percent Minority
Six-mile radius	33,748	2,494	7.4%
City of Morro Bay	9,802	1,133	11.5%
State of California	29,760,021	12,730,895	42.8%
Source: 1990 US Census data.			
2. Minority includes non-white and white-Hispanic populations.			

**SOCIOECONOMICS TABLE 7: Minority Populations 2000**

	Total Population <sup>1</sup>	Minority Population <sup>2</sup>	Percent Minority
Six-mile radius	36,336	6,230	17.1%
City of Morro Bay	10,350	1,716	16.6%
State of California	33,560,448	17,100,904	51%
Dept. of Finance Demographic Research Unit			
Minority includes non-white and white-Hispanic populations.			

## **Low-Income Populations**

**SOCIOECONOMICS TABLE 8** contains 1990 census data for low-income populations within a 6-mile radius of the project, and the City of Morro Bay. 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. Because the guidelines do not give a threshold to determine the existence of a low-income population, Energy Commission staff uses the fifty-percent threshold used for minority populations. The data in **SOCIOECONOMICS TABLE 8** indicates that there is not a 50 percent or greater population of low-income people within the project area.

**SOCIOECONOMICS TABLE 8: Low-Income Populations**

	Population Below Poverty Level <sup>1</sup>	Percent Below Poverty Level
6 Mile Radius	2,959	8.8%
City of Morro Bay	976	11.4%
Source: 1990 US Census.		

## **Staff Findings**

According to the EPA Guidelines, a minority or low-income population exists if the population of the affected area is greater than fifty percent of the affected area's general population or the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. Based on the results of the screening analysis, no such populations were found. Therefore, staff finds that there are no socioeconomic environmental justice issues.

## **PROPERTY VALUES**

Neighbors of projects similar to the proposed project have expressed property value concerns. To address such concerns on previous projects, staff has assessed the potential property value impacts associated with natural gas-fired power plants. In general, staff has determined that there is no information or study that demonstrates an adverse or negative impact on surrounding property values directly attributable to a natural gas-fired power plant per se. Negative impacts, however, can be generated if there are significant adverse impacts such as visual, noise, traffic, or air quality. Based upon this finding and the fact that the proposed project is a replacement of an existing power plant and not a change in land use, staff has concluded that the proposed project is unlikely to adversely impact property values in the vicinity. There may be a small negative impact during the construction of the new plant, as the existing large plant will still be in operation while construction cranes and other equipment are utilized in constructing the adjacent replacement plant. Homes in the neighborhood that look down at the plant will temporarily have a "more industrial" view, but upon completion this will improve and the view will be enhanced compared to the present. Please refer to Appendix A for a general discussion on property values.

## **CUMULATIVE IMPACTS**

San Luis Obispo County is an area that has a relatively constant level of development of public and private projects, including highway projects, new commercial development, and new residential development. There are on-going projects in San Luis Obispo County that would occur concurrently with the Morro Bay Power Plant Project should it be approved. The only potential impact from a cumulative socioeconomic point of view would be a possible shortage of workers in some trades, and the influx of a new population which may have an impact on housing and schools.

Table 6.1-1 in the AFC lists the known offsite development projects in the project area. Of these projects, expansion of the San Luis Obispo Airport will be completed in 2001. Cleanup of Avila Beach and completion of the Cuesta Grade Highway 101 project may overlap with the MBPP in some construction trades, such as equipment operators and laborers, but there is no labor force shortage in these skills. Most of the projects listed in Table 6.1-1 are residential and commercial development projects which would not require the same construction trades as those needed for power plant construction.

Thus, there are no industrial projects in the area that would draw upon trades that might be in short supply. Given the size of the labor force in the county and adjacent counties, staff believes that there are an adequate number of workers in the area.

## **FACILITY CLOSURE**

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### **UNEXPECTED PERMANENT CLOSURE**

Should the plant be permanently closed, the beneficial socioeconomic impacts such as worker payroll, project expenditures, local economic stimulus, and property tax revenues would no longer occur. The planned lifetime of the proposed power plant is 25 to 40 years; however, given unforeseen circumstances the plant may be retired prematurely for a variety of reasons.

### **UNEXPECTED TEMPORARY CLOSURE**

Should the plant be temporarily shutdown or closed, there would not be any significant socioeconomic impacts. The applicant would conduct a review to determine if there had been any environmental damage or release of hazardous materials. If not, the plant could be mothballed. Before the plant begins commercial operation, the applicant will develop a contingency plan to deal with premature or unexpected closures. This would include communication with the Energy Commission, the City of Morro Bay, and local agencies regarding schedule of facility closure and compliance with LORS.

### **PLANNED CLOSURE**

In the event that the decision is made to permanently close the facility, the applicant will develop a plan for decommissioning that will be submitted to the Energy Commission and other appropriate agencies. The plan will include compliance with all applicable LORS. Should the plant be permanently closed, the beneficial socioeconomic impacts such as

worker payroll, project expenditures, and property and other tax revenues would no longer occur. This would have a significant adverse impact on the tax revenues of the City of Morro Bay.

## **RESPONSE TO PUBLIC COMMENTS**

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CMB – 43 The City is concerned that the storage of rubble onsite will have significant adverse socioeconomic impact. Based on the analysis of property values discussed above and the general discussion in appendix A, staff believes that the storage of rubble will not have a significant adverse impact on property values.

CDFG – 26 California Department of Fish and Game commented that staff did not perform an analysis of the impacts of the project on the commercial fishing industry. Staff is unaware of any information that the fishing industry would be significantly impacted. Please see the **Biology** of this FSA for more detail.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Staff believes that the Morro Bay Power Plant Project would not cause a significant adverse direct or cumulative impact on housing, employment, schools, public services or utilities. The Project would have a temporary benefit to the City of Morro Bay and adjacent areas in terms of an increase in local jobs and commercial activity during the construction of the facility. The construction payroll and project expenditures would also have a positive effect on the local and county economy. The estimated benefits from the project include an increase in the project site property taxes and increases in the affected area's sales taxes, employment, and sales of services, manufactured goods, and equipment. The estimated annual operating budget of the plant will be \$2 to \$4 million, some of which will be spent locally. Overall, staff believes that the project will have a positive socioeconomic impact on the Morro Bay area.

The project, as proposed, would be consistent with all applicable Federal and State LORS. The proposed conditions of certification ensure the compliance with LORS, and that anticipated local benefits occur to the extent feasible.

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

## **PROPOSED CONDITIONS OF CERTIFICATION**

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- SOCIO-1** The project owner and its contractors and subcontractors shall recruit employees and procure materials and supplies within the Central California area (San Luis Obispo, Kern, and Santa Barbara Counties) first 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 for outside the local area.

**Verification** At least thirty (30) days prior to site mobilization or start of demolition, 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.

**SOCIO-2.** The project developer shall contribute \$285,000 to the City of Morro Bay to mitigate demands on the Morro Bay Police Department that will occur during the construction and demolition of the new and existing Morro Bay Power Plant.

**Verification:** In each Annual Compliance Report, the project owner shall submit to the CPM verification of payment to the City of Morro Bay per the agreement detailed in Appendix 6.10-5 of the AFC.

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## APPENDIX A – PROPERTY VALUES

At the June 2001 workshop, several members of the community stated their concerns that the Morro Bay Power Project (MBPP) would contribute to a diminishment of property values. This Appendix addresses the concerns of the Morro Bay homeowners.

The statements of the Morro Bay homeowners do not identify a specific physical attribute of the MBPP (such as stack height) that could cause homeowners to suffer an economic loss because they cannot sell their homes at full market value. Rather, they make generalized statements about the industrial nature of the project contributing to diminished property values. Staff's Visual Resources section of the FSA has determined that with mitigation, there will be no significant impacts associated with construction of the project. According to staff, visual resources will improve after construction because of design features incorporated into the project, including removal of the on-site tank farm and demolition of existing power building and stacks for Units 1 through 4. Staff's Air Quality section of the FSA has determined that with emission reduction credits and inter-pollution trading, there will be no significant air quality impacts associated with construction and operation of the project. Overall, staff's analysis found no significant adverse impacts associated with construction or operation of the project in any of the technical areas. Also, it is important to recognize that the MBPP project is a modernization of an existing PG&E power plant, originally constructed in the 1950s.

In general, the claims of diminished property value through decreased marketability are based on the reported concern about hazards to human health and safety and increased noise and visual impacts associated with living in proximity to locally unwanted land uses such as power plants, freeways, high voltage transmission lines, landfills, hazardous waste sites, etc. The issue of property value impacts associated with facility siting has been given much attention over the past 20 years, and as a result, has been the subject of extensive study.

Staff researched the literature on proximity impacts analysis and cites the Kinnard-Dickey paper, A Primer on Proximity Impact Research: Residential Property Values Near High-Voltage Transmission Lines as a comprehensive study on this topic. Previous studies cited in the Kinnard-Dickey paper show that three procedures are used to measure any difference between sales prices, marketing periods and/or sales volume of proximate properties and those of competitive properties in control areas: These Approaches are:

- 1) Paired Sales Analysis - finding sales of properties within the impact area and comparing them with sales of similar, competitive properties in the control area. Any price differentials are noted, and any pattern of such differences is identified;
- 2) Survey Research/Opinion - this method is used as either a supplement or substitute for analysis of market sales transaction data. Potential purchasers either will or will not buy; they either will or will not pay the same or similar prices for proximate properties. It is important to note that Survey Research/Opinion merely reflects responses to hypothetical situations by interviewees who are not necessarily prospective buyers, especially in the impact area under study; and

- 3) Market Impact Studies Using Multiple Regression Analysis (MRA) in the Hedonic Pricing Model Format - gathering data files on as many market sales transactions as possible within the impact area and within one or more similar control areas over a specified time period, usually a few years prior to an awareness of the proposed project. The extended time period is used to identify and measure any price/value impact that might occur within the impact area after an awareness of the project occurs. This type of "before and after" analysis supplements the comparison of levels and trends and prices, marketing time, and sales volume within the impact area and those in the control area. The post-announcement sales information also provides a basis for testing the likely duration of any value impact that might be identified.

The Multiple Regression Analysis MRA approach to market proximity impact analysis is preferred in the current professional and academic literature because the model reflects what buyers and sellers actually do as opposed to what potential buyers say they might do under specified hypothetical circumstances. Further, the use of large sets of sales data indicate that the results are more representative of the market than those of the paired sales studies.

Studies cited in the Kinnard-Dickey paper shows that three possible effects to the market value of residential properties have been claimed: 1) Diminished Price - which is identified by comparing unit prices that are proximate to power lines to unit prices of similar and competitive properties more distant from power lines; 2) Increased Marketing Time - even when proximate properties sell at or near the same prices as more distant control properties, claimants argue that proximate properties take longer to sell. Such increased marketing time can represent a loss to the seller by deferring receipt, availability, and use of sale proceeds; and 3) Decreased Sales Volume - which is a more subtle indicator of diminished property value if potential buyers decide not to buy in the impact area. A measurable decrease in sales volume in the impact area compared with sales volume in the control area where otherwise similar properties purportedly still are selling can represent evidence of decreased market value from proximity to the high voltage transmission lines (or claimed hazard).

The findings of the Kinnard-Dickey paper indicate the following:

- Distinguish between fear of health hazards by current and potential residents and the market behavior of buyers and sellers in the same area. It is misleading to confuse opinion responses of hypothetical buyers based on fear with actual past and likely behavior of buyers in market areas identified as proximate to the claimed hazard.
- Studies of market behavior of purchasers who are near sources of claimed hazards show that the more informed a potential buyer is, the less likely that buyer is to be deterred from purchasing near the claimed hazard. Knowledge of occurrence probabilities, awareness of findings of reproducible scientific studies, and understanding of the causal nexus lead to a greater willingness of the potential buyer to live near the claimed hazard, and has been found to minimize price effects on proximate residential properties.
- MRA studies indicate that any observed negative price, marketing time, and sales volume effects tend to be statistically nonsignificant; results could easily have occurred randomly

or by chance, and do not necessarily represent a consistent, systematic market response to locations proximate to the claimed hazard.

- In some MRA studies negative price effects in the range of five to nine percent were identified up to 200 feet distant from the edge of the high voltage transmission line right-of-way. These studies found that effective screening of views can diminish or eliminate the negative price effect. In addition, any observed negative value impacts decrease, and most likely disappear over time (four to ten years).
- While fear of health hazards is admissible in courts as an explanation of why diminution in property values has occurred, it is not a measure of the diminution in market value due to the lack of corroborating market sales data. Even if buyer attitudes have been influenced with the emerging support of fear concerns in both court cases and market-wide survey research studies, such studies focus directly on the attitudes and opinions of potential buyers, while market proximity impact studies reflect, identify, and measure the influence of those attitudes and opinions through actual market behavior.

In addition to a literature search on proximity analysis impacts, staff reviewed the **Analysis of Property Value Impacts of the Crockett Cogeneration Project**. The Crockett analysis cites several studies that examine the impacts on property values of very large industrial facilities. Such facilities include nuclear power plants, industrial waste incinerators, and landfills. As stated in the Crockett analysis, one or more of three methods were used to study impacts of property values: hedonic pricing, contingent valuation, or regression analysis of market sales data. Hedonic pricing techniques analyze how the attributes of a good affect its price, and have been used in several of the studies to estimate the losses in sale price of homes due to possible exposure to technological or natural risks. The findings of previous studies in the Crockett analysis yield an equivocal conclusion.

“Under some conditions facilities result in negative economic impacts and under other conditions they do not. Thus, even for very large facilities that are extreme in terms of their potential health, safety, and aesthetic impacts, there is no clear association with diminished economic impacts. Indeed, economic impacts are not clearly and reliably observed even for nuclear power generation facilities near residential properties” (Analysis of Property Value Impacts of the Crockett Cogeneration Project, Appendix X, Crockett Cogeneration Project, 1992).

Further, the Crockett analysis states that “there are many factors involved in purchasing a new home: affordability; age; size; schools; location; and so on, and it has simply not been demonstrated that a view obstruction would be a major factor in a property value decline” (Analysis of Property Value Impacts of the Crockett Cogeneration Project, Appendix X, Crockett Cogeneration Project, 1992).

The Kinnard-Dickey paper and the Crockett analysis cite several examples of proximity impact analyses, methodologies used to measure impacts, and types of possible proximity impacts on residential property values. Further, both studies conclude that differing, and sometimes conflicting findings have emerged from market studies. Despite the fact that

many technical and conceptual issues remain untested and unresolved, the Kinnard-Dickey paper supports the use of the MRA in the Hedonic Pricing Model format, when a large data set of appropriately screened property sales are used.

While it is possible that property owners near the MBPP site may have the perception that their homes will diminish in value because of the project, the actual loss of property value and potential effects can only be tested through data from home sales. Staff disagrees that the MBPP project will diminish property values because of the long-term existence of the Morro Bay power plant, and the Visual Resources assessment which states that the viewshed will improve once construction is completed.

Further, staff believes that it is infeasible to conduct a proximity impact analysis at this time because the MRA method, as supported by the Kinnard-Dickey paper, requires that data be collected on as many market sales transactions as possible within the impact area and within one or more similar control areas over a few years prior to an awareness of the proposed project to accurately reflect what buyers and sellers actually do as opposed to what potential buyers say they might do under specified hypothetical circumstances.

Based on the findings of the Kinnard-Dickey paper and the Crockett analysis, staff believes that the potential for the project to diminish property values would be difficult, if not impossible to prove. Because the MBPP project is situated within a long-established industrial area, staff believes that it is not likely that the MBPP project would diminish

# TRAFFIC AND TRANSPORTATION

Steven J. Brown, P.E.

## INTRODUCTION

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The Traffic and Transportation section of the Final Staff Assessment (FSA) addresses the extent to which the Morro Bay Power Plant (MBPP) project may impact the transportation system within the vicinity of its proposed location. The MBPP consist of the construction of two new combined cycle generating units. The project will also include demolition of the onsite fuel tank farm, demolition of the existing power plant building, removal of the three exhaust stacks for Units 1 through 4, refurbishment of the sea water intake structure, and installation of a bridge across Morro Creek.

This section analyzes the potential traffic and transportation impacts for the area roadways that will be associated with decommissioning and removal of onsite fuel oil tank and existing power generating equipment, construction of new combined cycle generating units, and operation of the Morro Bay Power Plant.

This analysis includes an evaluation of the influx of large numbers of construction workers, and how, over the course of the construction phase, they can increase roadway congestion and impact traffic flow around the project site and offsite laydown areas. The review considers: 1) the roads and routing which are proposed to be used; 2) potential traffic-related problems associated with those routes; 3) the anticipated number of trips associated with the workforce, transportation of large pieces of equipment; 4) the frequency of trips and probable routes associated with the delivery of hazardous material and increase in traffic hazards; and 5) how project-related traffic can increase roadway congestion.

On-going (post construction) operations and maintenance traffic, including deliveries of hazardous materials will represent a negligible increase over current conditions. In all cases, the transportation of hazardous materials will need to comply with federal and state laws.

Staff has analyzed the information provided by the AFC, the City of Morro Bay, and other sources to determine the potential for the Morro Bay Power Plant Project 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

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### 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 address the transportation of hazardous materials. Provisions within the California Vehicle Code are:

- 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.
- Sections 25160 et seq. addresses 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. In addition, the possession of certificates permitting the operation of vehicles transporting hazardous materials is required.

California Streets and Highways Code, Sections 117 and 660-72, and California Vehicle Code, Sections 35780 et seq., require permits for the transportation of oversized loads on county roads.

California Street and Highways Code, Sections 660, 670, 1450, 1460 et seq., 1470, and 1480, regulate 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 Morro Bay Power Plant Project is located in Morro Bay, California. The City of Morro Bay has guidelines and policies pertinent to development within the City set forth in the Morro Bay General Plan Circulation Element and the City of Morro Bay Coastal Land Use Plan, included as part of the California Coastal Act of 1976. The City of Morro Bay General Plan Circulation Element and Coastal Land Use Plan contain the guiding policies used in the transportation analysis for this project.

The City of Morro Bay has local ordinances regarding vehicle weight and size limits in its Municipal Code. The ordinances that limit the size and weight of vehicle traffic on certain roadway segments are included below.

- 10.28.230 Vehicle Weight Limit - No person shall operate or drive a motor vehicle with a gross vehicle weight in excess of five tons on any portion of Ironwood Avenue between California State Highway No. 41 and Avalon Street. Vehicles with bona fide points of destination on this street segment and vehicles subject to Sections 1031 and 1036, inclusive, of the Public Utilities Code are exempt from compliance with this section. (Ord. 345, 1989)
- 10.28.130 Certain vehicles prohibited in central traffic district -
  - A. No person shall operate any of the following vehicles in the central traffic district between the hours of seven a.m. and six p.m. of any day:
    1. Any freight vehicle more than eight and one-half feet in width, with load, or any freight vehicle so loaded that any part of its load extends more than twenty feet to the front or rear of said vehicle;
    2. Any vehicle carrying building material that has not been loaded, or is not to be unloaded, for some point within the central traffic district;
  - B. Provided that the city engineer may by written permit charged in the Master Fee Schedule authorize the operation of any such vehicle for the purpose of making necessary emergency deliveries to or from points within the central traffic district. (Ord. 225 § 43, 1982; Ord 9 § 1 (part), 1964: prior code § 8512)
- 10.04.030 Central traffic district - Central traffic district includes all streets or portions of streets within the area bounded by the following streets: Bounded on the south by Pacific Street, on the north by Beach Street, Main Street and Quintana Road, on the west by the Embarcadero and Front Street and on the east by Kern Avenue, Morro Bay Boulevard and Quintana Road. Central traffic district means "business district" as defined in the Vehicle Code of the state. (Ord. 447 § 2A, 1995: amended during 3/88 supplement; Ord. 9 § 1 (part), 1964: prior code § 8102)

## SETTING

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### REGIONAL DESCRIPTION

The Morro Bay Power Plant (MBPP) Project is located in the City of Morro Bay in San Luis Obispo County, California. The project site is located between State Route 1 and the Pacific Ocean on the north end of the Embarcadero commercial district. The proposed project is located within the existing Morro Bay Power Plant site. Access to the site is proposed from Embarcadero Drive via a new roadway extension north to Atascadero Road. A secondary project access is proposed at the existing rear gate entrance on Main Street. **Traffic and Transportation Figure 1** shows the major roads, potential access roads, and highways in the project area.

#### Area Roadways

The major roadways in the vicinity of the project site are State Route 1, State Route 101, State Route 41 (Atascadero Road), Main Street, and Embarcadero Road. These roadways are described below.

State Route 1 passes through the City of Morro Bay and is the key north/south route serving the coastal area. State Route 1 is a scenic route through central California with a portion of State Route 1 north of the project site extending up through the Cayucos area recently designated by the State of California as a key scenic route.

State Route 101, which is located about 15 miles east of Morro Bay, offers an alternative north/south route through the County and is a more direct north/south regional passageway, linking the San Francisco Bay Area to the north with the cities of San Luis Obispo, Santa Barbara, and Los Angeles to the south. State Route 1 and State Route 101 join together as a combined route in the Santa Barbara area and the San Luis Obispo area.

State Route 41, also known as Atascadero Road within the Morro Bay city limits, extends east from State Route 1 at the Cuesta Hillside residences to State Route 101 in the City of Atascadero. Atascadero Road extends west of State Route 1 past Morro Bay High School to the beach where it ends.

Main Street is a primary local collector that extends north/south from the northern city limits to Morro Bay State Park. Main Street parallels State Route 1 adjacent to the project site and serves the central business district of Morro Bay.

Embarcadero Road extends from Morro Rock along the waterfront to the boat launch at Tidelands Park. The Embarcadero area serves as a major tourist attraction and commercial district. The existing site access is on Embarcadero Road south of Coleman Park.

**Figure 1: Regional Transportation Setting**

Quintana Road serves as a frontage road for State Route 1 from South Bay Boulevard to Main Street near the project back entrance. Quintana Road primarily serves commercial land uses adjacent to State Route 1.

### **Railways**

Freight rail service is not provided to the project area, as rail lines do not exist in the City of Morro Bay. Passenger rail service exists in San Luis Obispo along the Union Pacific/Southern Pacific Coast Line track. Freight rail service is also provided on the same track system.

### **Truck Traffic**

The roadways adjacent to the site carry a small percentage of heavy vehicles (approximately 4% according to Appendix 6.11-1, sub appendix G1 of the AFC). The City of Morro Bay has vehicle weight limits for some local roadways. These roadways were identified in the Laws, Ordinates, Regulations and Standards Section and are not associated with any of the project truck routes proposed. Therefore, any project traffic impact will not be significant from the weight limit perspective. Thus, California Vehicle Code limits apply to all other roadways (including state routes). These limits are 20,000 pounds per axle and 10,500 per wheel or wheels on one end of the axle.

## **INTERSECTION OPERATING CONDITIONS**

Intersections are usually the critical elements of the roadway system in assuring adequate travel capacity, minimizing delays, maximizing safety, and minimizing environmental impacts.

The operating conditions of a roadway system, including intersections, 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 (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. The thresholds for LOS A to F are based upon the length of delay per vehicle and vary by signalized or unsignalized intersection control. There are numerous methodologies used to determine intersection LOS. For the MBPP project, the applicant used intersection operations analysis methodologies contained in the *Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1994 except for State Route 1. Roadway LOS on State Route 1 was analyzed using methodologies contained in *Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1997.

The City of Morro Bay General Plan Circulation Element specifies a minimum standard of LOS C at intersections. Table 6.11-2 of the AFC summarizes intersection LOS at the 15 study intersections. Each study intersection was found to operate at an overall acceptable LOS (LOS C or better) under existing conditions (see **TRAFFIC AND TRANSPORTATION Table 1**). The intersection of Main Street at State Route 1, Northbound Ramps has an overall intersection LOS of A. However, vehicles heading westbound under worst movement conditions experience a LOS of D. The LOS of the impacted intersections reported by the applicant in Table 1 was verified by independent calculations.

**TRAFFIC AND TRANSPORTATION Table 1  
Level of Service - Existing Conditions**

North/South Street	East/West Street	Intersection Control	AM Peak Hour on Adjacent Street (7:00-8:00)		PM Peak Hour on Adjacent Street (4:00-5:00)	
			Delay (sec)	LOS	Delay (sec)	LOS
Main St.	Atascadero Rd.	All-Way Stop	13.2	B	13.9	B
Hwy 1 NB Ramps	Atascadero Rd.	Unsignalized	2.7	A	1.4	A
Hwy 1 SB Ramps	Atascadero Rd.	Unsignalized	1.4	A	2.8	A
MBHS East	Atascadero Rd.	Unsignalized	0.9	A	1.3	A
MBHS West	Atascadero Rd.	Unsignalized	1.5	A	1.1	A
Main St.	Hwy 1 NB Ramps	Unsignalized	0.7	A	1.6	A
Main St.	Hwy 1 SB Ramps	Unsignalized	1.6	A	1.5	A
Main St.	Quintana Rd.	Signalized	7.6	A	8.5	B
Main St.	Beach St.	All-Way Stop	9.3	A	6.0	A
Main St.	Harbor St.	All-Way Stop	9.2	A	3.5	A
Main St.	Pacific St.	Unsignalized	1.1	A	2.3	A
Embarcadero Rd.	Beach St.	All-Way Stop	7.9	A	2.2	A
Embarcadero Rd.	Harbor St.	Unsignalized	0.8	A	1.0	A
Embarcadero Rd.	Pacific St.	Unsignalized	1.3	A	1.8	A
Embarcadero Rd.	Main Duke Entr.	Unsignalized	0.2	A	0.8	A

Source: DUKE 2000a. Volume 1-B. Table 6.11-2 pages 6.11-20 through 6.11-22

## IMPACTS

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### PROJECT SPECIFIC IMPACTS

#### Construction Phase

Construction activity at the Morro Bay Power Plant will be carried out in three Stages, (see **TRAFFIC AND TRANSPORTATION Table 2**). Stage I will be the decommissioning and removal of existing on-site fuel oil tanks. This stage will last approximately three months. The work associated with this decommissioning phase will require less than 40 workers per day on the site. Stage II will be for the construction of two 600 MW combined cycle generating units. Stage II construction will take approximately 21 months with an expected maximum workforce of 950 (700 on the day shift and 250 on the night shift). Stage III of the project will be for the decommissioning and removal of the existing power generating equipment from the site. This stage is estimated to take approximately 34 months with a peak workforce of 100 per day.

In analyzing the potential effects of the Morro Bay Power Plant Project, it was found that the primary impact of the project would occur during Stage II. After construction, the ongoing operation of a facility will be similar to current operating conditions and will not create a significant increase in traffic. During construction, the number of trips generated by the site will be significantly higher due to construction workers and construction-related deliveries. The construction phases, in particular Construction Stage II, would require the largest amount of construction employees. This phase was analyzed to represent the highest amount of trip generation (i.e., worst-case conditions).

**TRAFFIC AND TRANSPORTATION Table 2**  
**Stages For Project Construction**

<b>Duration</b>	<b>Stage I 3 Months</b>	<b>Stage II 21 Months</b>	<b>Stage III 34 Months</b>
Workforce			
Peak	35	700 Day Shift/250 Night Shift	100
Average	35	300 Day Shift/100 Night Shift	40

Source: Duke 2000a. Volume 1-B Table 6.11-1. page 6.11-1.

To provide a worst-case estimate of the impacts of the site during construction, impacts on the LOS for local intersections were analyzed using the current traffic counts along with estimated traffic generated by the project during the peak month of Stage II construction.

Recreational facilities adjacent to the project site include Coleman Park, the Morro Rock, Atascadero State Beach, and bicycle facilities adjacent to State Route 1. A discussion of project-related traffic impacts to these amenities is included later in this section.

### **Commute Traffic and Parking**

During the peak construction stage (Stage II), a maximum of 950 workers are expected to access the site daily. Of the 950 employees, 700 employees are expected during the day shift (i.e., beginning no later than 7:00 a.m. and ending before 4:00 p.m. or after 5:00 p.m.) and 250 employees are expected during the night shift (i.e., beginning no earlier than 7:00 p.m. and ending no later than 6:00 a.m.). The measured ambient a.m. peak hour of traffic within the study area is between 7:00 a.m. and 8:00 a.m. and the ambient p.m. peak hour is between 4:00 p.m. and 5:00 p.m. The applicant has stated it will schedule the workforce shifts to avoid these peak hour traffic times. This will result in construction traffic being off of the area roadways during the City of Morro Bay peak traffic hours. Therefore, the project's peak traffic periods will not coincide with the ambient traffic peak periods. (see **TRAFFIC AND TRANSPORTATION Table 3**).

To evaluate the impact the project could have on local traffic, the expected highest traffic volume for the project was used. This would occur during Stage II when a maximum workforce of 700 is expected on the day shift. This maximum workforce was used to determine vehicle trips to and from the MBPP site. Based on similar plant construction activities, this analysis used a daily trip generation rate of 2.2 trips per employee. Twenty five percent of construction workers are expected to carpool based on observations from the applicant for the construction of their Moss Landing Power Plant. Approximately 80 percent of the daily one-way trips will arrive or leave during the project peak hours. Ten percent of the on-site workers at expected to travel off-site during the day for personal business. In addition to construction traffic, visitors, catering, staff generated trucks, and deliveries such as United Postal Service will create additional traffic. It is estimated that 5% of day shift construction levels will equal these non-construction generated trips. These trip estimates are included in the traffic analysis to reflect the maximum traffic generated by the project's workforce. This reflects the worst-case traffic conditions. This worst case traffic volume was used along with the construction truck traffic to analyze the impact that the total project construction traffic would have on the community roadways. A detailed summary of the

project's commute trip generated by the workforce is provided in **TRAFFIC AND TRANSPORTATION Table 3**.

**TRAFFIC AND TRANSPORTATION Table 3  
Project Trip Generation Estimates**

Number of Employees	Daily Commute Trip Generation Rate <sup>1</sup>	Total Expected Daily Commute Trips <sup>2</sup>	Carpool Reduction <sup>3</sup>	Projected Daily Trip Generation	AM Project Peak Hour (6:00-7:00 a.m.)			PM Project Peak Hour (5:00-6:00 p.m.)		
					Total <sup>4</sup>	In <sup>5</sup>	Out <sup>5</sup>	Total	In	Out
700	2.2	1,540	-385	1,155	462	420	42	462	42	420
Notes: <sup>1</sup> – Daily trip generation rates based on similar power plant construction activities. <sup>2</sup> – Expected daily commute trips = number of employees (700) X daily trip generation rate (2.2 trips/employee). <sup>3</sup> – Carpool reduction = 25% (based on similar power plant construction activities). <sup>4</sup> – Total Project Peak Hour Trips (AM and PM) based on assumption that 80% of daily total one-way employee trips occur during the project peak hour (assumes 10% of daily trips will arrive before or after the peak hour and 10% of daily trips will include personal trips made by employees outside of peak hours: based on similar power plant construction activities). <sup>5</sup> – Peak hour total trips split .91/.09 favoring the heavy movement (i.e., inbound trips in the AM peak hour and outbound trips in the PM peak hour: based on similar power plant construction activities).										

The applicant has assumed that 32 percent of the workers will arrive from population centers located to the north and east along Highways 1 and 41. Those traveling from the north will take Highway 1 to the Main Street exit. Workers traveling from the east are expected to use Highway 41 to Highway 1 and then take Highway 1 to the Main Street exit. Fifty-one percent are expected to arrive from the south, using Highway 1. The remaining workers are assumed to be either local residents or people who have relocated to the area.

The applicant has proposed that employees traveling to and from the project site be required to use specific routes within the City of Morro Bay, and arrive and leave during specific times to avoid peak traffic levels on existing peak volume roadways. Construction workers will enter the plant site through what is called the “back gate”. To get to the back gate from Highway 1, the workers will use the Main Street exit, turning right off of Main Street, onto the road along the back of the MBPP and enter the site through the back gate by the PG&E Morro Bay Switchyard.

Use of the back gate will minimize the impact of morning construction traffic at the Morro Bay High School located off of Atascadero Road. Traffic counts collected on June 8<sup>th</sup> and 9<sup>th</sup>, 1999 indicated that the high school experienced morning hour peak traffic between 7:15 to 8:15 a.m., and afternoon hour peak from 2:00 to 3:00 p.m.

The construction workers are expected to leave the site through an exit to be located on the southwest corner of the plant site turning right on Embarcadero, then proceeding across the new bridge that the MBPP has proposed to build across Morro Creek. These workers would turn right onto Atascadero Road. Once on Atascadero Road, workers can continue to the east where Atascadero Road becomes Highway 41. From Atascadero Road workers can also take Highway 1 to the north or south or turn onto Morro Bay's Main Street. The end of the daytime construction shift would be scheduled such that project traffic will not impact the

Atascadero Road, Highway 1 and Main Street intersection during the peak afternoon hour for the High School (2:00-3:00 p.m.) or for the peak PM traffic hour for the community (4:00-5:00 p.m.).

The City of Morro Bay has raised concerns regarding the use of Atascadero Road by construction employees during the Morro Bay High School student lunch time as the high school campus is "open " allowing students to leave the campus for lunch. The proximity of fast food restaurants on the east side of Highway 1 creates a opportunity for students in vehicles, on bicycles, or on foot to use the segment of Atascadero Road between the high school entrances and Main Street during the lunch hour. Students frequently leave campus during lunch, so the concurrent use of this segment of Atascadero Road by construction employees could create a safety issue. As mentioned above, the concurrent use of this roadway segment by students and project workers is not expected to occur due to the scheduling of project-related trips outside of student peak hours (i.e., a.m., noon, and p.m. peak hours). Therefore, no impact is expected. However, conditions of certification that ensure compliance with this scheduling of project-related trips outside of student peak hours are discussed later in this section.

As mentioned above, access to the project site includes use of a proposed bridge to be built by the applicant over Morro Creek. The tentative design of this bridge has been reviewed and comments on the design of the bridge have been received by the City of Morro Bay, as they would assume ownership of the bridge. The bridge will be used by the City for pedestrian and bicycle traffic along the waterfront and as an emergency vehicle route. MBPP may also use the bridge as an access for major maintenance activities in order to avoid impacting traffic on Main Street and the Embarcadero. Potential issues associated with the bridge include its design, adequate turn around areas at both ends of the bridge, and maintenance. To ensure that the bridge will meet the City of Morro Bay standards, conditions of certification are discussed later in this section.

## **Parking Areas**

The roadways around the MBPP do not have sufficient parking spaces available for the construction workforce, local community residents and tourists. Therefore the applicant will need to provide off-street parking for the project. The applicant has stated (in Staff Data Response 120) that all construction-related parking would occur in off-street designated areas. These parking areas will be either on-site or at an off-site satellite parking area.

The applicant has proposed the development of an off-site parking area located approximately 3 miles southeast of the MBPP in an unincorporated portion of San Luis Obispo County, (see **TRAFFIC AND TRANSPORTATION Figure 2**). The proposed site would be adjacent to State Route 1 between the Quintana Road and South Bay Boulevard exits for Highway 1. The site would accommodate between 150 to 200 worker vehicles. The applicant will have a shuttle bus or van available to transport construction workers between the off-site satellite parking area and the MBPP site.

**TRAFFIC AND TRANSPORTATION FIGURE 2**  
**PROPOSED SATELLITE PARKING AREA**

Source: Duke Energy Offsite Satellite Parking, Figure 2.  
CONSTRUCTION STAGING/LAYDOWN AREAS

The applicant plans to have three staging/laydown areas located near the southern entrance of Camp San Luis Obispo approximately eight miles from the MBPP site off of Highway 1, (see **TRAFFIC AND TRANSPORTATION Figure 3**). This construction support area will be used as a construction lay-down area and will enable construction managers to schedule deliveries of equipment, construction material and supplies to the MBPP site and avoid peak periods of traffic on the local street system.

**TRAFFIC AND TRANSPORTATION** FIGURE 3  
OFFSITE LAYDOWN AREA CAMP SAN LUIS OBISPO

Source: Duke Energy, Construction Staging Areas (Figure 1) June 20, 2001

The expected route used to access the site is included below in the truck traffic section and illustrated on **TRAFFIC AND TRANSPORTATION Figure 3**.

### **Truck Traffic**

During Stage II construction, approximately 3,500 truck transports are expected over the 21-month period. According to Table 6.11-4 of the AFC, the estimated average number of truck trips during the first six to eight months of Stage II is 25 trips per day. During the last 13 months of Stage II twelve daily truck trips per day are expected.

Due to the location of the staging area and an adjacent bridge that is inadequate for heavy loads, the following route has been identified for access to and from the project site and the staging area:

- O'Connor Road from Camp San Luis Obispo to Foothills Boulevard; to
- Foothills Boulevard from O'Connor Road to Los Osos Valley Road; to
- Los Osos Valley Road from Foothills Boulevard to South Bay Boulevard; to
- South Bay Boulevard from Los Osos Valley Road to the SR 1 Northbound Ramps; to
- SR 1 from the South Bay Boulevard interchange to the SR 41 interchange; to
- Atascadero Road from SR 1 to the project entrance on Embarcadero.

The actual type of vehicle expected to use this off-site area has not been identified at this point. However, over-sized vehicles are expected to be used for project-related deliveries. The use of these vehicles requires attainment of various permits. The procedures and processes for obtaining such permits are fairly straightforward. Conditions of certification that ensure this compliance are discussed under Proposed Conditions later in this section.

The applicant has identified SR 41 as a route to be used by heavy vehicles for construction-related trips. Due to the terrain and design of SR 41 between Morro Bay and Atascadero, use of this facility by heavy vehicles may impact traffic safety. This potential impact would be caused by slow moving trucks and the resulting congestion. Safety impacts associated with construction truck traffic on SR 41 are also a concern because the highway has tight corners and steep grades. Mitigation measures and conditions of certification that address these impacts to SR 41 are discussed under Proposed Conditions later in this section.

During construction hazardous materials such as gasoline, diesel fuel, and oil and lubricants will be delivered to the plant site. The transportation and handling of hazardous substances associated with the MBPP can increase roadway hazard potential. To ensure that these materials can be transported safely to the plant site the applicant has indicated it will take the following precautions. Hazardous material deliveries for construction will be brought into the MBPP by way of the back entrance after exiting from Highway 1 to minimize travel over city roadways. The applicant will require that hazardous material arriving from the north or south use Highway 101, exit at Highway 1 in San Luis Obispo and travel north on Highway 1 to the Main Street exit. Furthermore, to avoid the ambient traffic peak periods, the applicant has

stated that it will prohibit deliveries of hazardous materials between the hours of 8:00 a.m. to 9:00 a.m. and 4:00 p.m. to 5:00 p.m.

The handling and disposal of hazardous substances as well as the significance of any accidents associated with the transportation of hazardous materials are addressed in the **WASTE MANAGEMENT and the HAZARDOUS MATERIALS MANAGEMENT** sections of the AFC. The applicant has agreed to adhere to the proposed route and delivery time stated above and comply 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.

### **Total Project Construction Traffic**

The combination of employee, delivery, and non-construction trips will total 1,232 trips per day during Stage II. As mentioned above, the applicant plans to schedule these project-related trips so that the trips do not occur during the ambient peak traffic periods. To evaluate the maximum impact the MBPP traffic could have on the community, the workforce trips outlined in Table 3 were assumed to occur during Morro Bay peak traffic hours. The addition of these trips to the existing traffic volumes was analyzed to determine project-related LOS. In that construction-related traffic for this project will be traveling primarily during off-peak times, the project will not result in the degrading of any of the intersections to a LOS of D or worse with the exception of Main Street at Atascadero Road. The intersection of Main Street and Atascadero is presently operating at LOS C during the p.m. peak hour. The addition of project trips will adversely impact this intersection by worsening operations to LOS D during the p.m. peak hour.

The decrease in the LOS to D for this intersection occurs only during Stage II construction when the workforce exceeds 400. The decreased LOS is for a short time period during the project p.m. peak hour. A Transportation Management Plan that improves the traffic flow at this intersection and/or reduces the volume of construction traffic by the use of offsite parking and the development of carpool and vanpool programs can be used to maintain the current LOS for this intersection. Mitigation measures and conditions of certification are discussed later in the Mitigation section that would allow the intersection to operate at an acceptable LOS of C.

The community of Morro Bay is also concerned about the impact of construction traffic on its access to public beaches and tourist recreation and shopping areas. The earlier morning start time for the construction workforce should allow the construction traffic to be clear of the city streets before beach traffic increases during the summer seasons. The afternoon traffic will be going away from the beach areas and should have minimum impact on beach access. The construction travel routes have also been arranged to minimize travel on City Street.

To aid in traffic control during the construction period the applicant has agreed to provide funding to support a Traffic Officer and provide overtime support. The office will act as a liaison between the Police Department and applicant. The functions to be performed by the officer are covered in the **FSA's SOCIOECONOMICS section**.

## **Roadway Wear**

Construction activity (i.e., additional traffic, heavy vehicles, and construction equipment) may impact local roadways by increasing roadway wear. This increase in roadway wear could result in potential damage to the surface of local roadways, and may deteriorate sections of roadway pavement on roadways serving the project (i.e., Embarcadero Road adjacent to the project, Main Street between the southbound SR 1 ramps and Atascadero Road, and Atascadero Road between Embarcadero Road and Main Street). This potential impact is also applicable to those routes identified for truck traffic from the offsite laydown area (i.e., O'Connor Road, Foothill Boulevard, Los Osos Valley Road, and South Bay Boulevard). Mitigation measures and conditions of certification are presented later in this analysis to ensure the mitigation of any project-related impact on the surrounding transportation system's pavement conditions.

## **Linear Facilities**

No new linear facilities are proposed as part of this project. Therefore, no significant impacts to local transportation facilities are expected.

## **Operational Phase**

### **Commute and Visitor Traffic**

The operational phase of the Morro Bay Power Plant will require a workforce similar to the number of existing full-time employees (approximately 75 employees). Therefore, the operational phase would not increase the number of trips generated from the site and would not create a significant impact on the surrounding transportation system.

### **Truck Traffic**

The operational phase of the proposed project will not result in increased volumes of truck transport activity for long-term operation of the plant. Therefore, since future operations and maintenance activity levels will be equivalent to current operating conditions, overall impacts for future operations and maintenance are not considered significant.

The transportation of hazardous substances associated with the project can increase roadway hazard potential. During operation approximately one truck delivery of aqueous ammonia will be made every four days to the facility. For an in-depth description of the amount and type of hazardous materials that will be used during the operation of the facility and the impacts associated with the transportation of those materials, see the **HAZARDOUS MATERIALS MANAGEMENT** section of the FSA.

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. To further ensure the safe delivery of hazardous material the applicant has indicated that during the operation of the MBPP it will adhere to the same deliver route and time stated for the transportation of hazardous material during construction.

## Linear Facilities

The operation of both the electric and gas transmission lines will not have an impact on area roadways except for short-term maintenance or unplanned difficulties. In either case, these potential impacts create traffic flow difficulties that are typically limited in duration and are not expected to cause any significant traffic impacts.

## CUMULATIVE IMPACTS

Section 6.11.2.3 of the AFC identifies local projects that could potentially create a cumulative impact on the area if combined with project traffic. To represent a worst-case scenario, these projects were assumed to be developed concurrently with the construction of the MBPP project. The projects identified in the AFC are spread throughout the community of Morro Bay. Because of the dispersion of the projects the traffic pattern associated with many of these projects will not impact the same roadways impacted by the MBPP construction activity. Therefore, the traffic volume from all cumulative projects, plus the power plant project, will not deteriorate the service levels to below acceptable levels, with the exception of the intersection of Main Street at Atascadero Road. Under cumulative conditions this intersection will operate at LOS D in the p.m. peak hour which is considered a significant impact. Mitigation measures and conditions of certification are discussed later in the Mitigation section that would allow the intersection to operate at an acceptable LOS of C. Table 4 includes a summary of study intersection operating conditions, in the cumulative project context.

**TRAFFIC AND TRANSPORTATION Table 4**  
**Level of Service Summary for Cumulative Conditions**

North/South Street	East/West Street	Intersection Control	Project Construction Plus Cumulative Conditions					
			AM Peak Hour on Adjacent Street (7:00-8:00)		PM Peak Hour on Adjacent Street (4:00-5:00)		PM Peak Hour of Project (5:00-6:00)	
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Main St.	Atascadero Rd.	All-Way Stop	15.4	C	15.6	C	25.6	D
Hwy 1 NB Ramps	Atascadero Rd.	Unsignalized	3.0	A	1.7	A	2.2	A
Hwy 1 SB Ramps	Atascadero Rd.	Unsignalized	1.8	A	3.1	A	3.6	A
MBHS East	Atascadero Rd.	Unsignalized	1.0	A	1.2	A	0.6	A
MBHS West	Atascadero Rd.	Unsignalized	1.4	A	0.9	A	0.3	A
Main St.	Hwy 1 NB Ramps	Unsignalized	1.2	A	1.8	A	1.9	A
Main St.	Hwy 1 SB Ramps	Unsignalized	1.9	A	1.7	A	1.5	A
Main St.	Quintana Rd.	Signalized	8.0	A	9.0	B	13.2	B
Main St.	Beach St.	All-Way Stop	9.8	A	6.9	A	12.6	B
Main St.	Harbor St.	All-Way Stop	9.6	A	3.9	A	10.3	B
Main St.	Pacific St.	Unsignalized	1.3	A	2.6	A	2.1	A
Embarcadero Rd.	Beach St.	All-Way Stop	7.9	A	2.3	A	8.9	A
Embarcadero Rd.	Harbor St.	Unsignalized	0.9	A	1.1	A	1.4	A
Embarcadero Rd.	Pacific St.	Unsignalized	1.2	A	1.9	A	2.1	A
Embarcadero Rd.	Main Duke Entr.	Unsignalized	0.2	A	0.8	A	0.8	A

Source: DUKE 2000a. Volume 1-B. Table 6.11-9 pages 6.11-69 through 6.11-70

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information for the minority population of Morro Bay. This review shows the minority population is less than 50 percent within a six mile radius of the

MBPP, (see **SOCIOECONOMICS Figure 1** ). Staff also reviewed the Census 1990 information, which presents low income population data within a six mile radius of the project. The review shows that the low income population within a six mile radius of the MBPP was less than 50 percent, (see **SOCIOECONOMICS Figure 1** ). Therefore no environmental justice traffic and transportation issues exists for this project.

## **FACILITY CLOSURE**

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The minimum design life of the power plant is expected to be 30 years. To ensure that the planned closure will be completed in a manner that complies with all LORS 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 approval. At the time of closure, all then-applicable LORS will be identified and the closure plan will address compliance with these LORS. The effects of Morro Bay Power Plant closure on traffic and transportation will be similar to those discussed for the construction of the project. 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 about the effects of project closure on traffic and transportation.

## **MITIGATION**

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Applicants for the Morro Bay Power Plant project have indicated their intention to comply with all LORS related to the transport of oversize loads and hazardous materials. The applicant should also implement the following traffic and transportation mitigation measures:

- The applicant should develop a Transportation Management Plan to:
- Enforce a policy that all project-related parking occurs in designated parking areas either at the plant site or in designated offsite facilities with van service to the plant site.
- Limit construction traffic to off-peak periods, to the satisfaction of Caltrans and the City of Morro Bay.
- Encourage the use of carpool and vanpool programs from offsite parking areas.
- Establish schedules for major work shifts outside of the ambient street traffic peak periods, and timing of heavy vehicle equipment and building materials deliveries.
- Ensure access to recreational areas such as Coleman Park, Morro Rock, and Atascadero State Beach during the construction and operational phases of the project.
- Arrange workforce travel routes and schedules to avoid peak traffic periods at the Morro Bay High School. This would include morning, noon, and afternoon peak periods.
- Prohibit the use of State Route 41 east of State Route 1 as a project delivery route using heavy vehicles. Alternative truck routes such as State Route 1 to Highway 101 or State Route 46 to Highway 101 should be used.

- The applicant should repair any damages to roadways adjacent to the site incurred during Morro Bay project construction to their pre-project construction condition;
- The applicant should mitigate (with approval from the City of Morro Bay) the cumulative impact of the project along the North Embarcadero Road from the foot of the Morro Creek Bridge to Atascadero Road including the decrease in the LOS at the intersection of Main Street at Atascadero Road. This would be done by the applicant contributing its fair share of the costs for improvements identified in the Project Study Report conducted by Caltrans for the SR 1 and SR 41 interchange, which includes the intersection of Main Street at Atascadero Road.
- Funds to cover the cost of hiring one additional traffic officer for the projects construction and demolition phase has been included in a public safety mitigation agreement that the applicant has reached with the City, which is implemented in CONDITION SOCIO-2.
- The proposed bridge over Morro Creek should be designed to include adequate turn around areas at both ends of the bridge since normal use by passenger vehicles will be prohibited. The design of the bridge will meet the City of Morro Bay standards and should consider on-going maintenance requirements (i.e., sand removal).

## COMPLIANCE WITH LORS

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Applicants for the Morro Bay Power Plant Project have stated their intention to comply with all federal, state, and local LORS. A condition of certification to ensure compliance is proposed below. Therefore, the project is considered consistent with identified federal and state LORS.

## RESPONSE TO PUBLIC COMMENTS

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On July 10, 2001 the California Coastal Commission filed its comments. Staff's response is provided.

Comment: "Identify potential construction impacts (e.g., noise, traffic, aesthetics) to public access/recreation at Morro Strand State Beach, Morro Rock, Coleman Park etc."

*CEC recognized the importance of these facilities to the community and the local tourist industry. A mitigation measure is provided in the FSA to prepare a construction-related Transportation Management Plan in consultation with the City of Morro Bay that will ensure public access to these recreational areas during the construction and operation phase. The staff also recommended a condition of certification **TRANS-6** that the Transportation Management Plan directly address ways to ensure access to recreational facilities.*

Comment: "Include information on the proposed realignment of Embarcadero Road and Coleman Drive."

*Any realignment of Embarcadero Road and Coleman Drive is not included as part of the Duke Energy's application for certification for modernization of the MBPP.*

On June 19, 2001 the City of Morro Bay filed the following comments. Staff's response is provided.

Comment: "The PSA failed to recognize the historic problem with the Main/Route 41/Route 1 intersection. The CEC staff indicated that they had communicated with City Staff and Penfield & Smith on the methodologies, issues, and analysis of the intersection operation and potential impact of the Duke project. The City's Traffic Engineer states that to the best of his knowledge, no one from the CEC staff has discussed these issues with Penfield & Smith."

*According to our records, CEC staff contacted Nick Muick in April, 2001 regarding the counts at this intersection. Staff was unaware of the City's consultant involvement in the PSR for the SR 41/SR1 interchange until very recently. The addition of project traffic to cumulative volumes at this intersection would cause the intersection to operate at levels below the City of Morro Bay standard. Therefore, an impact has been identified at this intersection, and both a mitigation and condition of certification are provided (**TRANS-7**).*

Comment: "In June of 2000, the City of Morro Bay, CALTRANS, San Luis Obispo Council of Governments, Duke Energy and Penfield & Smith initiated the first step in developing a solution for the existing congestion and future congestion at the Main/Route 41/Route 1 intersections. A Project Study Report or PSR has been prepared to evaluate the operation of the intersection and to develop potential improvements to the intersection to improve the safety and operation of the intersection. ... The entire PSR process was not disclosed in the PSA."

*In the FSA, the PSR is mentioned, in addition, an impact is identified at the Main Street/State Route 41 intersection under cumulative conditions in the PM peak hour.*

Comment: "The PSA analysis has incorrect notations for how intersections operate. Several of the intersections are listed as unsignalized, which would normally be acceptable if the criteria was signalized or unsignalized. However, the PSA indicates signalized, All-way STOP, and unsignalized. This is confusing and does not provide any indication of the methodology used to analyze the impacts of the Duke Project. No supporting data was provided to Penfield & Smith. The unclear methodology and no supporting information lead us to question the results of the analysis. These questions are further supported by the indications that the PSA noted that the existing level of service and delay for the NB Route 1 Ramp intersection with Route 41 operates with 2.7 seconds of delay per vehicle during the AM peak hour. The existing queue of vehicles currently waiting to turn left off of the ramp to go toward the High School exceeds 30 vehicles on a regular basis. The queue of traffic on northbound Main Street exceeds 30 vehicles during peak days as well. The vehicular delays associated with these queues greatly exceed the levels of service noted in the PSA."

*The methodologies used to measure intersection operations for signalized, unsignalized, and all-way stop controls are identified in the FSA. The applicant's analysis of the level of service for intersections in the City of Morro Bay was set forth in Appendix 6.11-1 of Duke Energy's Morro Bay Power Plant Application for Certification Traffic Analysis Report. The report states*

that the level of service significance standards which were analyzed for the traffic study's signalized and unsignalized intersections were developed by the City of Morro Bay.

These standards are defined as follows:

*Signalized Intersections – Peak Hour Conditions, (typical weekday or summer weekend day):*

1. *Pre-project LOS of C or better conditions with post project-added traffic LOS equal to or greater than LOS D, as defined by the most recent version of the HCM (55 seconds of delay or more).*
2. *Pre-project LOS D or worse conditions and project change of more than 5 seconds of average delay.*

*The analysis of these intersections uses the 1994 Highway Capacity Manual methodologies to evaluate all-way stops, signalized intersections and for roundabouts. A description of the methodology used to measure operations at a signalized intersection is included in AFC Appendix D. A description of the methodology used to measure operations at a all-way stop controlled intersection is included in AFC Appendix C.*

*Unsignalized Intersection – Peak Hour Condition, (typical weekday or summer weekend day):*

1. *Project added traffic greater than 10 peak hour vehicles per any approach during the peak hour when the resultant overall intersections is LOS D.*
2. *Project added traffic greater than 5 peak hour vehicles per any approach during the peak hour when the resultant overall intersection is LOS E or worse.*
3. *Project added traffic greater than 10 peak hour vehicles per and approach when that intersection approach is LOS D or worst, even if the intersection delay is LOS C or better.*

*The analysis of these intersections uses the 1994 Highway Capacity Manual methodology to evaluate the level of service for unsignalized side street stop controlled intersection.*

*The supporting traffic data used by CEC staff for the signalized and unsignalized intersection review was from the applicant's AFC.*

*Intersection operations at the northbound State Route 1 ramp intersection with Atascadero Road were analyzed under existing conditions using the Highway Capacity Manual 1994 unsignalized intersection methodology. This methodology is described in the AFC Appendix B. The AM peak hour intersection overall delay is 2.7 seconds per vehicle. The worst movement delay is the northbound left from the ramp to westbound Atascadero Road. This*

*is a delay of 10.2 seconds per vehicle which, according to the 1994 HCM methodologies is LOS C.*

*Staff reviewed the applicant level of service calculation for the intersections using the same evaluation program and conditions outlined above and have verified the results given in the AFC by the applicant.*

Comment: “Duke Energy provided a traffic analysis last fall that was supposed to address the traffic impacts of the proposed project. The City of Morro Bay, CALTRANS, and others provided comments on that analysis that pointed out several inconsistencies, inaccuracies, missing data, and the need for more information. To date, Duke has not provided any additional information to the City to address these issues. One key significant issue is the timing and number of employees expected to come to the site. The last information provided to the City indicated that approximately 800 employees would be expected to travel through the Main Street/Route 41/Route 1 intersection each day. A Transportation Demand Management Plan was not provided, nor was the timing, time of day, day of week, and month of year when the employees were expected to impact the City road system. The City of Morro Bay has significant seasonal variations of traffic flow due to their tourist-based industry. This information has a tremendous impact on the operation of the road system for Morro Bay. None of these issues have been addressed or specifically shared with the City of Morro Bay. Consequently, the City of Morro Bay requests that a condition of certification be added requiring that Duke complete a Transportation Demand Management Plan for City review and approval. A sample TDM condition is provided in the comment letter.”

***TRANS-6*** of the FSA requires the applicant to develop a Traffic Management Plan in conjunction with Caltrans, the City of Morro Bay, and other affected jurisdictions. The Traffic Management Plan will be used to schedule project-related trips outside of ambient peak hours of traffic on local roadways. Prior to approval of the Traffic Management Plan by the Compliance Project Manager the applicant will provide a copy to Caltrans, the City of Morro Bay, and other affected jurisdictions for review and comment.

Comment: “Another point that was not addressed in the PSA is the existing safety of the Main/Route 41/Route 1 intersection. The most recent three-year accident history is significantly above the average or expected rate for similar intersections. The City has indicated that this intersection has been getting more and more congested based on the Cuesta Grade (Highway 101) improvement project in San Luis Obispo. The Cuesta Grade project will continue to impact area circulation over the next couple of years concurrently with the Duke Energy project. The PSA did not address or acknowledge either of these points.”

*Staff recognizes that the intersection of Main Street/Route 41/Route 1 would experience a decrease in its level of service that would not be acceptable and that heavy truck traffic on State Route 41 could create safety concerns for traffic. These issues have been addressed in **TRANS-6** and **TRANS-7**. **TRANS-7** requires the applicant to contribute its fair share to the cost of improving the Main Street/Route 41/Route 1 intersection.*

Comment: "The City recommends that the conditions of certification include a requirement to implement the traffic program in the draft "Agreement to Lease" between the City of Morro Bay and Duke Energy."

*The CEC does not become involved in business agreements between the applicant and other parties. The CEC has required as part of the traffic mitigation program that the applicant prepare a construction Transportation Management Plan that will be approved by the CEC after receiving comments from interested parties. The goal of the plan is to minimize the impact of construction traffic on the community by limiting construction traffic to off-peak periods. The CEC staff has also recommended as a condition of certification that an approved Transportation Management Plan be required before the start of site preparation.*

Comment: "The City requests that a condition of certification be added requiring that any proposed improvements to public roads and/or for improvements intended to be offered to the City for dedication must be constructed in conformance with applicable City of Morro Bay standards and specifications pursuant to public improvement plans submitted to the City for its review and approval prior to commencement of construction."

*Staff has proposed two conditions of certification for roadway improvements and maintenance of the current roadway conditions. **TRANS-4** would require the applicant to be responsible for the restoring the local roadways used during construction to pre-construction conditions or as near to these as is possible. **TRANS-8** requires the applicant to submit its plans for the Morro Creek Bridge to the City of Morro Bay for review and comment before it is submitted to the Compliance Project Manager for review and approval.*

Comment: "The City requests that special consideration be given to the Coast Route Class I bike path that will traverse Atascadero Road west of Highway One."

*CEC recognized the importance to the community of this facility to its residents and the local tourist industry. Mitigation measures are provided that include the preparation of a construction Transportation Management Plan in consultation with the City of Morro Bay that will ensure access to recreational facilities during the construction and operation phase. The staff has also recommended a condition of certification **TRANS-6** that the Transportation Management Plan directly address ways to ensure access to recreational facilities.*

Comment: "The City requests that the CEC take note of the fact that Morro Bay High School is adjacent to Atascadero Road and is an open campus, with students allowed to leave during lunch hour. Also, sidewalks currently do not exist along the entire pedestrian route along Atascadero Road leading to the High School main entrance."

*This comment is addressed in Condition of Certification **TRANS-6**. Mitigation measures are provided in the FSA that include the preparation of a Transportation Management Plan for the Construction Phase of the project. The TMP includes measures to ensure non-use of the segment of Atascadero Road directly adjacent to the High School during AM, Noon, and PM peak hours.*

Comment: "The City requests that the project applicant provide evidence of coordination with the regional transportation planning agency for San Luis Obispo County (SLOCOG) and SLO Regional Rideshare concerning regional transportation/traffic issues related to the project."

*This comment is addressed in Condition of Certification **TRANS-6**. The Transportation Management Plan will be reviewed and commented on by Caltrans, the City of Morro Bay, and other affected jurisdictions, which include SLOCOG and SLO Regional Rideshare.*

Comment: "The role of the City traffic officer that will be funded by Duke should be clarified to indicate that this officer is not responsible for directing traffic and otherwise performing the duties of a flagman."

*As indicated in the FSA mitigation section the applicant is responsible for the preparation of a Transportation Management Plan that will be done in consultation with both Caltrans and the City of Morro Bay. The Transportation Management Plan will address how the applicant will ensure the safety of the public by the use of traffic control measures. This could include special signage, flagman, scheduling of work hours and the delivery of equipment outside of peak traffic times, etc. This activity will be the responsibility of the applicant and done at their expense.*

*The CEC recognizes that the funding for the City traffic officer was made in an agreement between applicant and the City and the duties are set out in the agreement.*

Comment: "The funding noted in Socio-2 does not include any City approved transportation improvements."

*The CEC recognizes that the condition set out in Socio-2 does not include any city approved transportation improvements. The FSA does recognize that improvements will be required in order to maintain the desired level of service on the city roadways. This has been addressed in **TRANS-7**, which insures that the applicant will pay its fair share for roadway improvements.*

On June 21, 2001 the San Luis Obispo County Green Party filed the follow comment. Staff's response is provided.

Comment: "CEC should provide a detailed feasibility study and cost analysis for transporting aqueous ammonia via tanker/barge."

*Staff did not feel that a detail feasibility study and cost analysis for the transporting of aqueous ammonia via tanker/barge was required. If the applicant follows all state and federal regulations for the transportation of hazardous material, the tanker transportation of aqueous ammonia should not result in a safety hazard. The FSA has proposed a condition of certification **TRANS-3** requiring the applicant to adhere to all state and federal regulations for the transportation of hazardous materials.*

On October 2, 2001 Cindy Wallace, co-chairman of the O'Connor Way/West Foothill Residents Association filed the following comments. Staff response is provided.

Comment: "Concerned about use of O'Connor Way for construction traffic for the laydown area. Approximately 4,500 cars per day travel on O'Connor Way already."

*The applicant has proposed the use of three areas located at Camp San Luis Obispo for construction staging. The applicant proposes to use the following roadways for access to and from the laydown area. Trucks will access the laydown area from Highway 101 at Los Osos Valley Road. The trucks will continue on Los Valley Road to Foothill Boulevard. The trucks will then make a right on Foothill Boulevard to O'Conner Road. The trucks will then turn left onto O'Conner Road and proceed to the staging area.*

*The trucks taking materials and supplies from the staging area to the project site located in Morro Bay will leave the staging area by way of O'Conner Road, turn right on to Foothill Boulevard to Los Osos Valley Road and The trucks will then turn right on Los Osos Valley Road and proceed to South Bay Boulevard.*

*Project related traffic volumes in and out of Camp San Luis Obispo construction staging area is expected to average 10 to 20 trucks over a 24 hour period. The maximum number of trucks over a 24 hour period is expected to be no more than 30.*

*The applicant indicates that traffic counts taken at the Foothill/O'Conner intersection in May of 2001 indicated a LOS of B at this intersection during the peak morning and evening periods. The additional truck traffic is not expected to be substantial or concentrated in a specific time period, therefore the impact on traffic is not expected to be significant.*

Comment: "Would like to appeal to the CEC to move the location of the laydown area."

*An organization or member of the public can attend hearings held by the Commission on this Application. During the hearings concerns may be expressed about the use of Camp San Luis Obispo as a construction laydown area for the Morro Bay project. Information about the location and time for future hearings can be obtained from Kae Lewis, the project manager, or the MBPP Web site [www.energy.state.ca.us](http://www.energy.state.ca.us).*

## **CONCLUSIONS AND RECOMMENDATIONS**

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The intersections and roadways that could be impacted by the construction of the MBPP are operating at acceptable levels of service (LOS of C or better). The primary impact of the MBPP on the area roadways and intersections will occur during construction. The impact of the construction traffic did not result in the LOS decreasing to an unacceptable level except for the all-way stop located at the intersection of Main Street and Atascadero Road. The LOS of this intersection worsens from LOS C to LOS D when MBPP construction traffic is included during the afternoon peak hour (5:00 p.m. – 6:00 p.m.). This unacceptable LOS can be mitigated if measures included in the conditions of certification are followed.

During the operational phase, no increase in vehicle trips is expected due to similar workforce requirements between what exists today and what is expected during the operational phase. Thus the daily movement of workers and materials under the operational phase will not have a significant impact on the area roadways and intersections.

All impacts due to the 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.

To minimize the impact of construction traffic on the area roadways and intersections it is recommended that:

1. The applicant works with the City of Morro Bay and Caltrans in its development of a Transportation Control Plan.
2. The applicant should be required to repair damaged roadways to their pre-construction condition.
3. The AFC indicates that parking for the construction workforce will be provided in designated areas either on the project site or at an alternate site with shuttle service. To ensure that construction-period parking does not cause a significant project impact the applicant should enforce a policy that all project-related parking occurs in designated parking areas.
4. The Morro Creek Bridge meets the City of Morro Bay standards for bridge construction.
5. The applicant should contribute its fair share of the cost for improvements identified in the Project Study Report conducted by Caltrans for the SR1 and SR 41 interchange.

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

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**TRANS-1** The project shall comply with California Department of Transportation (Caltrans) 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 roadway use.

**Verification:** In 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.

**TRANS-2** The project shall comply with California Department of Transportation (Caltrans) limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans, the City of Morro Bay, and any other relevant jurisdictions.

**Verification:** In 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.

**TRANS-3** The project 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 substances.

**TRANS-4** Following completion of construction of the power plant and all related facilities, the project owner shall repair Embarcadero Road adjacent to the project, Main Street between the Southbound SR 1 ramps and Atascadero Road, and Atascadero Road between Embarcadero Road and Main Street and the truck route along O'Conner Road, Foothill Boulevard, Los Osos Valley Road, and South Bay Boulevard associated with Camp San Luis Obispo off-site laydown areas to pre-construction conditions, or as near as possible.

**Protocol:** Prior to start of site mobilization, the project owner shall photograph the roadway segments and intersections described above. The project owner shall provide the CEC Compliance Project Manager (CPM), City of Morro Bay, and Caltrans with a copy of these photographs.

**Verification:** At least 60 days prior to the start of site mobilization, the project owner shall photograph the identified roadway segments and intersections, and provide copies to CPM, City of Morro Bay, and Caltrans. Within 30 days after completion of project construction, the project owner shall meet with the CPM, City of Morro Bay, and Caltrans to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to pre-construction conditions, or as near as possible. The project owner shall provide to the CPM, within 30 days of receipt letters from Caltrans and the City of Morro Bay stating their satisfaction with the road improvements.

**TRANS-5** During construction of the power plant and all related facilities, the project shall enforce a policy that all project-related parking occurs on-site or in designated off-site parking areas.

**Verification:** At least sixty days prior to start of site mobilization, the project owner shall submit a parking and staging plan for all phases of project construction to the City of Morro Bay for review and comment, and to the CPM for review and approval.

**TRANS-6** The project shall develop a construction Transportation Management Plan to limit construction traffic impacts in conjunction with Caltrans, the City of Morro Bay, and other affected jurisdictions. Specifically, this plan shall include the following components:

- prohibiting the transport of hazardous material on roadway segments that have residential uses fronting them;

- establishing construction work hours outside of the ambient peak traffic periods (7:00 a.m. to 8:00 a.m. and 4:00 p.m. to 5:00 p.m.) to ensure that construction workforce traffic occurs during off-peak hours;
- scheduling of heavy vehicle equipment and building materials deliveries to occur during off-peak hours;
- prohibiting the use of SR 41 east of SR 1 by heavy vehicles for project-related deliveries, (alternative routes must be identified);
- including measures to ensure the safety of individuals using the bicycle trails impacted by the construction activity;
- including measures to ensure continual access to recreation facilities adjacent to the project site.

**Verification:** At least 30 days prior to start of site mobilization, the project owner shall provide to Caltrans, the City of Morro Bay, and other affected jurisdictions for review and comment, and to the CPM for review and approval, a copy of their construction Transportation Management Plan.

**TRANS-7** The project shall mitigate expected LOS D operations at the intersection of Main Street at Atascadero Road to acceptable LOS C or better conditions during the p.m. peak hour under cumulative conditions by contributing its fair share of the cost to mitigate project-related impacts;

**Verification:** At least 60 days prior to start of intersection improvements, the project owner shall provide to the City of Morro Bay for review and comment, and to the CPM for review and approval, a fair share contribution for the mitigation of any project-related impacts at the intersection of Main Street at Atascadero Road. The fair-share amount shall be determined by the CPM.

**TRANS-8** Prior to the start of construction for the Morro Creek Bridge the project owner shall submit to the City of Morro Bay the plans for the Morro Creek Bridge for review and comment and to the CPM for review and approval.

Protocol: The project owner shall consult with the City of Morro Bay on the design and construction of the Morro Creek Bridge.

**Verification:** At least 120 prior to the start of construction for the Morro Bay Arch Bridge the project owner shall submit the design and specifications for the bridge to the City of Morro Bay for review and comment, and to the CPM for review and approval.

## REFERENCES

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# TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

## INTRODUCTION

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The energy from the Morro Bay Power Plant (MBPP) modernization project will be delivered to the Pacific Gas and Electric (PG&E) 230 kV transmission grid through the same PG&E-owned Morro Bay Switchyard and 230 kV lines currently used for the existing MBPP generating units. The line is proposed for use at the existing voltage and without structural modifications, meaning that there would be no change to the system's voltage-related electric fields. The only change to the system would be the increased electricity flow from the additional generation from the proposed modernization. Since magnetic fields are produced during current flow, this added energy would increase the intensity of magnetic fields in the existing system. The purpose of this staff analysis is to assess the proposed power delivery system to determine whether further field-reducing measures would be necessary to maintain post-modernization electric and magnetic field exposures within levels associated with similar lines designed according to applicable health and safety laws, ordinances, regulations and standards (LORS). Staff's analysis will focus on the issues noted below which relate primarily to the physical presence of each line, or secondarily to the physical interactions of its 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)

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Discussed below by subject area are design-related federal or state LORS and industry standards and practices applicable to the physical impacts of the MBPP-related lines and transmission systems in general. There presently are no local laws or regulations specifically applicable to 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 prevent such collisions.

## **Federal**

- Title 14, Part 77 of the Federal Code of Regulations (FCR), "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 perceivable impacts produced by the line's 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 or intensity 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, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff usually recommends specific conditions of certification to ensure compliance with this FCC requirement as necessary.

## **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**

There are no design-specific federal regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited instead by using 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. Such noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound or hum. 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. 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.

## **NUISANCE SHOCKS**

### **Industry Standards**

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern high-voltage lines, such shocks 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). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields. The line 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” specifies tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 Section 1250 of the California Code of Regulations, “Fire Prevention Standards for Electric Utilities” 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.

### **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 ensures the safety of the general public and line workers.
- Title 8, Sections 2700 through 2974, “High Voltage Electric Safety Orders” of the California Code of Regulations. These safety orders establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

### **Industrial Standards**

There are no design-specific federal regulations to prevent hazardous shocks from power lines. Safety is assured through compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line.

## **ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE**

The possibility of deleterious health effects from electric and magnetic field exposure 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 both together as EMF exposure. As noted by the applicant, Duke Morro Bay LLC, (Duke 2000a, pages 6.18-11), 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. Therefore, staff considers it appropriate, in light of present uncertainty, to reduce the strengths of such fields where feasible, until the issue is better understood. The challenge has been to establish when and how far to reduce them.

While there is considerable uncertainty about the EMF health effects issue, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant patterns 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.

## **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 below 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 PG&E and the other utilities 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 for each new or upgraded line with regard to redesign to reduce field strengths or relocation to reduce exposure levels. 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.

In keeping with this CPUC policy, the Energy Commission staff requires field strength calculations showing that each proposed line will be designed or upgraded 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. Therefore, it is up to each applicant to ensure that such measures are applied in ways that do not affect line operation.

The extent of the field-reducing measures would be reflected by ground-level field strengths as calculated in the application process and verified through actual measurements during operation. When estimated or measured for each 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. These field strength estimates can be made using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each proposed line is currently required to be designed to incorporate the EMF-reducing requirements of the utility in the service area involved, its fields are required under existing CPUC policies to be similar, in intensity, to fields from similar lines in that service area. A condition of certification is usually proposed by staff to verify implementation of the reduction measures necessary. The applicable condition for certification for this project is **TLN-1**.

### **Industrial Standards**

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 in intensity to those from existing lines. Some states (Florida, Minnesota, Montana, New Jersey, and New York) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most 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 themselves 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 relatively 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.

### **SETTING**

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As discussed in the information from the applicant (Duke 2000a, pages 6.18-1, 6.18-2, and 6.18-5), the existing PG&E Morro Bay Switchyard (to also be used to deliver power to the PG&E power grid after MBPP modernization), serves as a power distribution center from which the generated power is transmitted to regional substations (Gates, Mesa, Morro Bay, Midway, San Luis Obispo, and Templeton) in various central California locations. These substations also receive electric power from other power stations in California and provide electric power to communities in their general vicinity. These lines are owned and maintained by PG&E and are to be used without modification in transmitting the power from the modernized MBPP. As part of the PG&E power grid, the MBPP-related lines pass near

residential areas and also extend through farmland and open space after exiting the Morro Bay Switchyard (Duke 2000a, page 6.9-11).

The applicant has provided a detailed listing of the five existing system 115 kV and 230 kV transmission lines through which power from the modernized plant will be transmitted. The applicant has also identified the specific communities that are served and will continue to be served by each line some of which have been operated since the 1950s (Duke 2000a, pages 6.18-1, through 6.18-5). These lines are typically supported by 100-150-foot towers, as are similar lines in the PG&E service area. The applicant (Duke 2000a, Appendix 6.18-1) has provided the details of their structures as specifically related to effectiveness at field strength reduction. The lengths of the lines (from the PG&E Morro Bay Switchyard to the regional substations) range from approximately 14 miles to 80 miles. As is current practice at MBPP, the power in the post-modification phase will be transmitted in each line at levels that would depend on prevailing need conditions throughout the grid. These lines are located within separate rights-of-way in some areas but share the same rights-of-way with nearby lines in other areas (Duke 2000a, page 6.18-9).

## **IMPACTS**

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### **GENERAL IMPACTS**

GO-95 and Title 8, CCR Section 2700 et seq. provide the minimum regulatory requirements necessary to avoid the direct or indirect contact previously discussed in connection with hazardous shocks and aviation hazards. Of secondary concern are the field-related impacts manifesting as nuisance shocks, radio noise, communications interference and magnetic field exposure. The relative magnitude of all such impacts would be reflected in the field strengths characteristic of a given line design. Since the field strength-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. It is up to each project proponent to apply such measures (to each new or upgraded line) to the extent appropriate for the geographic area involved. It is such field-reducing measures that staff would recommend for this project if we were to find these fields to be of higher intensities than we consider appropriate for such lines. The potential for each type of impact is assessed separately.

### **PROJECT SPECIFIC IMPACTS**

#### **Impacts from Physical Presence**

The existing MBPP-related transmission system (to be used after the proposed modernization) was designed by PG&E according to PG&E's guidelines bearing on aviation safety, fire hazards, and hazardous shocks. Therefore, staff considers the use of this system during project operation as potentially safe with regard to these impacts. We do not recommend any of the safety-related conditions of certification normally required for new or upgraded lines.

## **Electric Field Effects**

The potential for electric field-related audible noise, nuisance shocks and interference with radio-frequency communication depends on electric field strengths, which in turn, depend on line voltage. Since (a) there will be no change in the voltage of the existing lines and (b) these lines were designed and are presently maintained by PG&E according to PG&E requirements bearing on these electric field effects, staff considers their proposed use for the proposed project as appropriate with regard to these perceivable electric field effects. No related conditions of certification are recommended.

## **Electric and magnetic field exposure**

The fields from the existing lines are the ones that humans will be exposed to along their respective routes. The applicant calculated the maximum electric and magnetic field strengths possible along the routes of the lines to be affected by the increased power generation (Duke 2000a, page 6.18-10). Although the electric fields from the existing lines would be unchanged after the proposed modernization, ground-level intensities may change at specific locations from the interactive effects of these project-related fields and fields from conductors of nearby lines. Staff has verified the accuracy of the applicant's calculations with regard to factors bearing on field strength and exposure assessment. The applicant calculated the maximum electric field strengths for the existing and post-modernization conditions along these routes as a way to demonstrate that these fields will not change without changes to the system's voltage. These calculated values range from 0.10 kV/m to 1.18 kV/m at the edge of the rights-of-way. The maximum value within the right of way is 7.06 kV/m. These values are typical of existing PG&E lines of similar voltage.

To assess the project-related increments in magnetic field exposure, magnetic field levels were calculated by the applicant for the existing and post-modification power flow conditions. Existing magnetic fields were calculated to range from 4.8 mG to 43.8 mG at the edge of the right-of-way. The maximum value within the rights-of-way is 126.9 mG. Maximum fields for the post-modification period were calculated as ranging from 4.9 mG to 51.8 mG at the edge of the rights-of-way and from 66.1 mG to 127.2 mG within the rights-of-way. These field strength increments are as staff would expect in PG&E-designed lines for the increased current flow associated with the modification proposed. The maximum calculated values of 66.1 mG to 127 mG for the post-modernization period are within the range associated with PG&E lines of similar voltage and current-carrying capacity. These values as further noted by the applicant (Duke 2000a pages 6.18-10) are within the average range of 150 mG to 250 mG established for transmission line right-of-way by the states with regulatory limits.

## **CUMULATIVE IMPACTS**

Calculations to assess the field impacts of operating the modernized MBPP were made to reflect the interactive impacts of fields from all the lines along the route of the proposed power delivery system. Therefore, any exposures along the route would reflect exposures of a cumulative nature. Since no separate transmission system is proposed in connection with the proposed modernization project, these calculated field values reflect all system exposures of a cumulative nature. As reflected in the calculated values, any such exposures would be similar to exposures associated with similar systems within the PG&E service area.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

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There were no public or public comments on the field and non-field issues of specific concern in this analysis.

## CONCLUSIONS AND RECOMMENDATIONS

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Since electric or magnetic field health effects have neither been established nor ruled out for the MBPP-related and similar transmission lines, the public health significance of any existing or post-modernization exposure cannot be characterized with certainty. However, the available evidence, as previously noted, has not established that these lines pose a significant health risk to humans at normally encountered levels. Although the additional current from the proposed modernization will increase the magnetic fields within some of the lines in the existing transmission grid, the calculated field strengths suggest that exposure to these fields would be within the range typical of PG&E lines of the same voltage and current-carrying capacity. Maintaining exposure within typical levels would be in keeping with the CPUC policy on the field exposure issue. The potential for nuisance shocks and other field-related impacts will continue to be minimized through current PG&E maintenance practices which reflect compliance with GO-90 and Title 8, Section 2700 et seq. of the California Code of Regulations. Since these lines were designed according to PG&E requirements for preventing aviation hazards, staff considers their continued use in the post-modernization period to be safe in this regard and does not recommend any related conditions of certification.

Since (a) the modernized Morro Bay Power Plant is proposed to be operated without significant modifications to the existing transmission system and (b) the project's operation will result in magnetic field exposure within ranges typical of similar PG&E transmission systems, staff recommends the use of the existing transmission system during project operations without additional modifications. Staff recommends the following conditions of certification to verify the accuracy of the applicant's assumptions with respect to the fields to be encountered after the proposed modernization.

## CONDITIONS OF CERTIFICATION

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**TLSN-1** The project owner shall engage a qualified consultant to measure the strengths of line electric and magnetic fields at the points along the routes for which the applicant provided estimates. The pre-construction measurements could be made any time before operations but the post-modernization measurements shall be made no later than 60 days after the start of operations.

**Verification:** The project owner shall file copies of the pre-and post-energization measurements with the CEC Compliance Manager 60 days after the post-modernization measurements are completed.

## REFERENCES

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- Duke (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes 1a-1b, and II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission, October 23, 2000.
- Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above
- Energy Commission Staff 1992. High Voltage Transmission Lines: Summary of Health Effects Studies. California Energy Commission Publication No. 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.

# VISUAL RESOURCES

Testimony of Michael Clayton

## SUMMARY

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Energy Commission staff analyzed both the potential visual impacts of the proposed Morro Bay Power Plant Project (MBPP) and the compliance of the project with applicable laws, ordinances, regulations, and standards (LORS). Staff concludes that from most public areas with views of the existing power plant and proposed project site, the proposed project would result in an overall long-term improvement in visual quality.

Staff has also concluded that the proposed project would cause adverse visual impacts during the six-year period of construction and demolition. However, given the long-term visual improvement that would occur with removal of the existing power plant, staff does not consider these interim construction impacts significant.

The proposed project also has the potential to cause long-term significant adverse visual impacts to Morro Strand State Beach and the Morro Dunes Trailer Park and Resort Campground. These long-term operational impacts would result from the project's contrasting appearance and foreground visibility. However, with proper implementation of the Applicant's proposed mitigation measures and revised landscape / screening plan as augmented by staff's proposed mitigation measures and conditions of certification, the proposed project would not result in significant and unavoidable adverse visual impacts to either of these areas.

The project also has the potential to cause nighttime lighting impacts when viewed from the elevated perspectives of the Sunset Plateau and Harbor Front Tract residential areas. The significance of the potential lighting impacts cannot be determined at this time because the project is lacking a detailed lighting plan. However, effective implementation of staff's proposed mitigation measure and condition of certification regarding lighting would reduce any potential nighttime lighting impacts to levels that are not significant.

Staff's proposed mitigation measures and conditions of certification would reduce any potential significant adverse visual impacts from the proposed project to levels that are not significant.

Staff's LORS consistency analysis has found that the proposed project would be consistent with all 27 applicable local objectives, policies, and programs, provided that there is effective implementation of the Applicant's proposed mitigation measures and revised planting and screening plan, as augmented by staff's proposed mitigation measures and conditions of certification.

## INTRODUCTION

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Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether MBPP would cause significant adverse visual impacts and whether the project would be in conformance with applicable laws, ordinances, regulations, and standards. The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by the California Environmental Quality Act (CEQA) Public Resources Code section 21000 et seq. and Title 20, California Code of Regulations, section 1701 et seq.<sup>1</sup> The determination of the conformance of the proposed project with applicable laws, ordinances, regulations, and standards is required by Public Resources Code section 25525.

## ORGANIZATION OF ANALYSIS

This analysis is organized as follows:

- Description of analysis methodology;
- Description of applicable laws, ordinances, regulations and standards;
- Description of the project aspects that may have the potential for significant visual impacts;
- Assessment of the visual setting of the proposed power plant site and related facilities;
- Evaluation of the visual impacts of the proposed project on the existing setting;
- Evaluation of compliance of the project with applicable laws, ordinances, regulations, and standards;
- Response To Comments
- Identification of measures needed to mitigate any potential significant adverse impacts of the proposed project and to achieve compliance with applicable laws, ordinances, regulations, and standards.
- Conclusions and Recommendations; and
- Proposed Conditions for Certification

## ANALYSIS METHODOLOGY

Visual resources analysis has an inherent subjective aspect. However, the use of generally accepted criteria for determining impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

### **Significance Criteria**

Commission staff considered the following criteria in determining whether a visual impact would be significant.

#### **State**

The CEQA Guidelines defines a “significant effect” on the environment to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance (Cal. Code Regs., tit.14, § 15382).

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<sup>1</sup> The California Energy Commission's power plant siting regulations.

Appendix G of the Guidelines, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

### **Local**

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Applicable Laws, Ordinances, Regulations, and Standards.

### **Professional Standards**

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities. Staff considers these questions in assessing whether a project would cause a significant impact in regard to any of the four CEQA criteria listed above.

- Will the project substantially alter the existing viewshed, including any changes in natural terrain?
- Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?
- Will the project eliminate or block views of valuable visual resources?
- Will the project result in significant amounts of backscatter light into the nighttime sky?
- Will the project be in conflict with directly identified public preferences regarding visual resources?
- Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?
- Will the project result in a substantial and persistent visible exhaust plume?

## **View Areas and Key Observation Points**

The proposed project would be visible from a number of areas in the project region. Energy Commission staff selected a representative subset of these locations from which to evaluate the potential visual impacts of the project. Staff used Key Observation Points<sup>2</sup>, or KOPs, as locations in these areas for detailed analysis and photographs of the existing setting and visual simulations of the proposed project. KOPs are selected to be representative of the most critical locations from which the project would be seen. However, KOPs are not the only locations that staff considered in each view area.

## **Evaluation Process**

During the preparation of the Application for Certification, the Applicant consulted with the City of Morro Bay and local residents with regard to the selection of KOPs. Following staff's review of the selected viewpoints and the Applicant's addition of a viewpoint to evaluate impacts on Highway 1, the total number of KOPs was 20. For each of the 20 KOPs, the Applicant prepared existing conditions photographs and proposed project simulations and conducted a view blockage analysis. Upon reviewing the Applicant's findings and simulations, staff determined that there were a number of KOPs from which visibility of the existing power plant and proposed project would be limited by distance. There were also several KOPs where views of the proposed project are limited by intervening screening from vegetation or structures. For all of these locations the visual change was determined to be positive since the project would result in a reduction of visible industrial structures and view blockage. The view characteristics from each of these additional view areas are summarized in a later section of this analysis and their respective photographs and simulations are provided in Appendix C.

The selection of a smaller subset of the original 20 KOPs was determined to be more effective in focusing the visual analysis on the key visual parameters of concern. Each of the subset of selected KOPs was subjected to a more rigorous visual analysis including an evaluation of the existing visual setting and the visual changes that the project would cause, leading to a determination of impact significance. Specific visual parameters that were evaluated included visual quality, viewer concern, viewer exposure, visual contrast, project dominance, and view blockage. Each of these visual parameters is discussed below. Additionally, the potential for visual impacts resulting from plume formation, night lighting, and construction activities was also assessed. The results of staff's analysis are summarized in the Visual Analysis Summary presented in Appendix A and discussed in detail in subsequent sections of this analysis. Existing conditions photographs and photosimulations from each of the selected KOPs are presented in Appendix B.

## **Elements of the Visual Setting**

To assess the existing visual setting, staff considered the following elements:

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<sup>2</sup> The use of KOPs or similar view locations is common in visual resource analysis. The US Bureau of Land Management and the US Forest Service use such an approach.

### ***Visual Quality***

Visual quality is an expression of the overall visual impression or appeal of a given landscape and the associated public value attributed to the visual resource. This analysis used an approach that considers visual quality as ranging from outstanding to low. Outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as “picture postcard” landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

### ***Viewer Concern***

Viewer concern is a measurement of the level of viewer interest regarding the visual resources in an area. Official statements of public values and goals reflect viewers’ expectations regarding a visual setting. This analysis also employed land use as an indicator of viewer concern. Uses associated with: 1) designated parks, monuments, and wilderness areas; 2) scenic highways and corridors; 3) recreational areas; and 4) residential areas are generally considered to have high viewer concern. Travelers on other highways and roads, including those in agricultural areas, may have moderate concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, that indicate high viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

### ***Viewer Exposure***

The visibility of a landscape feature, the number of viewers, the duration of the view, and the viewing distance to the landscape feature affect the exposure of viewers to a given landscape feature. Visibility is highly dependent on screening and angle of view. The smaller the degree of screening and/or the closer the feature is to the center of the view area, the greater its visibility is. Increasing distance reduces visibility. Viewer exposure can range from low values for all factors, such as a partially obscured and brief background view for a few motorists, to high values for all factors, such as an unobstructed foreground view from a large number of residences.

### ***Visual Sensitivity***

The overall level of sensitivity of a view area to impacts due to visual change is a function of visual quality, viewer concern, and viewer exposure and can range from low to high.

### **Types of Visual Change**

To assess the visual changes that the project would cause, staff considered the following factors:

### **Contrast**

Visual contrast describes the degree to which a project's visual characteristics or elements (consisting of form, line, color, and texture) differ from the same visual elements established in the existing landscape. The degree of contrast can range from low to high. The presence of forms, lines, colors, and textures in the landscape similar to those of a proposed project indicates a landscape more capable of accepting those project characteristics than a landscape where those elements are absent. This ability to accept alteration is often referred to as visual absorption capability and typically is inversely proportional to visual contrast.

### **Dominance**

Another measure of visual change is *project dominance*. Dominance is a measure of a feature's apparent size relative to other visible landscape features and the total field of view. A feature's dominance is affected by its relative location in the field of view and the distance between the viewer and the feature. The level of dominance can range from subordinate to dominant.

### **View Blockage**

View blockage describes the extent to which any previously visible landscape features are blocked from view by the project. Blockage of higher quality landscape features by lower quality features causes adverse impacts. The degree of view blockage can range from none to strong.

## **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS**

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### **FEDERAL**

The proposed project is located on private land. Therefore, the project is not subject to federal land management requirements.

### **STATE**

The proposed project is located adjacent to Highway 1—a State of California officially designated scenic highway. Official designation of a state scenic highway requires the local jurisdiction to enact a scenic corridor protection program that protects and enhances scenic resources. A properly enforced program can mitigate the effects of uses that might otherwise detract from the scenic values of the corridor landscape. A corridor protection program will typically stipulate specific siting, landscaping, and screening requirements; as well as require appropriate structural characteristics and surface treatments to make the development more compatible with the existing environment.

### **LOCAL**

Local plans and policies relevant to visual resources are contained in the City of Morro Bay Land Use Plan of the Local Coastal Plan (LCP) and the City of Morro Bay General Plan (General Plan). The LCP sets policies, standards, and objectives to guide coastal land use

decisions. The General Plan (with specific zoning ordinances) implements policies defined in the LCP.

The LCP addresses visual resources and community character, with the intent, as stated in the California Coastal Act, that “scenic and visual qualities of coastal areas are to be considered and protected as a resource of public importance with full consideration to private property rights.” The LCP includes goals and policies to protect, restore, and where feasible enhance visual quality in visually degraded areas. It emphasizes that any development permitted in scenic areas should be designed and located to be visually compatible with, and subordinate to, the natural setting.

The General Plan incorporates and implements visual resource policies from the LCP. The General Plan policies related to visual resources include: Scenic Roadway Establishment; Protection of Coastal Area’s Visual Resources; Implementation of LCP; Landscaping Standards; Property Maintenance Standards; Utility Undergrounding; and Roadside Amenities. For each policy, a number of specific programs are recommended.

A discussion of the proposed project’s consistency with local plans and policies is provided in a later section of this analysis.

## **PROJECT DESCRIPTION**

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The following section describes the aspects of the project that may have the potential for significant visual impacts. These facilities include the power plant and administration buildings; electrical takeoff towers and transmission line structures; a 20-foot high, 1000 feet long sound wall; water intake building, and construction laydown areas.

### **POWER PLANT**

The power plant would be located at the existing 107-acre, 1,030 MW Morro Bay Power Plant site that is owned and operated by Duke Energy. This site is located within the City of Morro Bay, San Luis Obispo County, near Morro Bay Harbor, bordered on the west by Embarcadero Road and on the east by Highway 1 (see **PROJECT DESCRIPTION Figures 3 and 4**). The new units would replace currently operating generation Units 1 and 2 (326 megawatts [MW], 1950’s technology) and Units 3 and 4 (676 megawatts [MW], 1960’s technology) with two state-of-the-art 600 MW combined cycle units. Each new unit would consist of two gas-fired turbines and one steam turbine. Each new unit would have two 145-foot tall stacks (four stacks total) compared with the existing plant’s three 450-foot tall stacks. **VISUAL RESOURCES Figure 1** (see Appendix B) presents a comparison of the sizes of the proposed and existing structures.

The proposed project would occupy approximately eight acres of the MBPP property and would include demolition of the on site fuel oil tank farm, all existing power plant equipment (boiler – steam turbine complex), and removal of three 450 feet tall exhaust stacks. Stage one—demolition of the tank farm – would take three months and be complete in 2002. Stage two—demolition of the three 450 foot stacks – would begin after commercial operation of the

new units and will be complete in 2004. Stage three—dismantling of the existing units – would be complete by the end of 2007.

The most visually prominent elements of the new power plant would be the 145-foot tall heat recovery steam generator (HRSG) exhaust stack structures, the four 95-foot tall HRSGs, the four 70-foot tall gas turbine generator (GTG) air inlets, the two 52-foot tall steam turbine generators (STGs), the 34-tall administration/warehouse and control room, and the 20-foot high, 1,000-foot long sound wall (see **VISUAL RESOURCES Figure 2** in Appendix B).

## **TRANSMISSION LINE STRUCTURES**

Most of the power produced by the project would be delivered to MBPP's interconnection with the existing PG&E Morro Bay Switchyard via new transmission ties. The H-frame takeoff structures would be 40 feet tall at the cross member and 50 feet tall at the tops, increasing to 100 feet tall on the north side to clear the pipe rack. The line would transition to 88-foot tall transmission line structures that carry the conductors to the existing PG&E switchyard on the site.

## **WATER INTAKE BUILDING**

**VISUAL RESOURCES Figures 3 and 4** depict the proposed architectural treatments that would be applied to the existing water intake building to make it more architecturally consistent and visually compatible with the Morro Bay waterfront. The updated design consists of vertical board and batten exterior siding, pitched metal roofs with dormers, and new pedestrian scale window treatments. The exterior colors are proposed to be muted gray tones with white trim detailing that blends with the existing color and patterns established on the Embarcadero (DUKE 2000j). The proposed design treatment would increase the structure's height from 46 feet to 63 feet.

## **CONSTRUCTION LAYDOWN AREAS**

Several construction laydown areas would be located onsite at MBPP. These areas are located south and west of the existing switchyard, and north, south, and west of the proposed plant site. Additionally, construction parking would be located adjacent and to the north of the existing power building and an optional batch plant could be situated immediately south of the existing switchyard.

In addition to the onsite laydown areas, the Applicant is proposing to establish three areas at Camp San Luis Obispo for construction staging. The three areas have a combined area of 39.2 acres. Area A/B is located at the former base motor pool complex, which is 4.8 acres in size. Area C/D is located at the site of the former Caltrans yard and is 12.4 acres in size. Area E is currently vacant and is located between Staging Areas A/B and C/D, and is 22 acres in size.

## SETTING

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### REGIONAL LANDSCAPE

The project region is within the southernmost portion of the Coast Range Geomorphic Province, which is characterized by a sequence of northwest trending mountains and valleys. The MBPP is located in the City of Morro Bay, 12 miles northwest of the City of San Luis Obispo. The project area is situated between the shoreline of Estero Bay to the west and the coastal foothills of the Santa Lucia Range to the east. The Morro Bay area includes diverse natural features, including the ocean and long beaches, bay, sand spit, wetlands, and harbor areas. Morro Rock, a major focal point of the area, rises abruptly from the ocean's near-shore waters. One-half mile east of the rock is the MBPP, with its large building and three tall stacks. The City of Morro Bay surrounds the plant on three sides, with grassy, rolling coastal hills surrounding the city (DUKE 2000a, p. 6.13-1).

Nine distinct landscape character units have been defined within the general vicinity of MBPP: (1) Grassy Coastal Hills (to the east of the site); (2) Ancient Volcanic Hills (a chain of 14 volcanic peaks extending to the southeast and including Morro Rock and Black Mountain); (3) Valley Floor (including the agricultural lands extending along the Highway 1 and 41 corridors); (4) Ocean, Beach, and Dunes (west of the City of Morro Bay); (5) Estuary, Wetlands, and Lowlands Complex (bordering Morro Bay to the south of the City); (6) Residential Neighborhoods (approximately 15 local neighborhoods situated to the north, east, and south of MBPP); (7) the Industrial Area (the immediate vicinity of MBPP bordered by Morro Bay High School on the north, Highway 1 on the east, MBPP on the south, and the dunes and beach on the west); (8) Morro Bay and the Harbor Area (to the west and south of the City); and (9) Other Developed Areas (see **VISUAL RESOURCES Figure 5**).

The ocean expanse, the more intimate environs of Morro Bay defined by the low-lying sand spit and harbor activities, the rolling grass-covered coastal hills, the linear ribbon of sand comprising Morro Strand State Beach, and the dramatic prominence of Morro Rock all contribute visual variety to a unique coastal landscape.

The general region is also subject to the influences of the coastal marine environment in which reduced visibility due to fog and haze sometimes occurs. Between September 30, 1997 and May 31, 1999, there were 53 days when visibility from the Morro Bay Harbor Department office was one mile or less during the day, typically due to rain or fog. According to the Continental Weather Service, periods of reduced visibility tend to occur more frequently from May to October than at other times of the year (DUKE 2000a, p. 6.13-33).

### POWER PLANT REGIONAL VIEWSHED

The MBPP is located on the west side of town, where Morro Creek meets the ocean, between Highway 1 and the Morro Bay shoreline. The project site is located on the northwestern side of the 107-acre MBPP property. The existing power plant is visually prominent in the region due to the three 405-foot tall exhaust stacks. **VISUAL RESOURCES Figure 6** shows the approximate area from which the existing stacks are visible. This image is based solely on topographic variation and does not consider the effects of view screening by

vegetation and structures. As shown on the map, the existing stacks are visible as far north as Cayucos, to the east along Highways 1 and 41, and south to Los Osos. The majority of viewers within this viewshed consist of residents, motorists on Highway 1, and recreationists and tourists on the beaches and Bay. The following paragraphs identify the general viewing areas within the MBPP viewshed.

### **Coastal Areas North of Toro Creek to Cayucos**

This area has distant views ranging from three to seven miles. Most views from this area are over the water, though some of the nearer views (from near Toro Creek) view directly down the beach. At this distance, the stacks and the main structure are barely discernable on clear days. Most of the 2,900 people in this area live along the coast within the plant viewshed.

### **North Morro Bay**

Views of the plant in this area are diverse in distance, ranging from views abutting the plant to those from a distance of approximately 2.5 miles. The population in the North Morro Bay area is approximately 4,100 people. This area generally encompasses the beach and flatlands north of the site and west of Highway 1 as well as the highlands north of the site and west of Highway 1. The City Planning Areas within this portion of the viewshed include North Morro Bay, Atascadero Beach, and Del Mar. Views of the site from residences in the low lands are frequently partially obscured by other homes and trees. Many views from highland residences (such as Sunset Plateau and Morro Del Mar Subdivisions 1 & 2) are unobstructed. In the vicinity of Morro Strand State Beach Campground, single-family homes along Beachcomber Drive and parts of Sandalwood Avenue have ocean views that extend as far south as the project site with some views being partially obscured. Closer in to the site, views from The Cloisters residential development are partially obscured by vegetation around Morro Bay High School. In these more distant views, the existing stacks are still prominent features in the viewshed.

### **Highway 41 Corridor**

Views from Highway 41 range from a closest distance of approximately four-tenths of a mile, extending out to approximately 3.5 miles. The land uses in this area are mostly agricultural and populations are low. Most viewers in this area are motorists driving westbound on Highway 41, where average Annual Daily Traffic is 4,400 vehicles. Views of the plant are intermittent. The stacks can also be seen from more distant vantagepoints on westward-facing slopes and hilltops.

### **Morro Highlands**

The Morro Highlands are located along the hill slopes east of Highway 1, extending from Highway 41 in the north to the city boundary in the south. The viewing distance to the project site ranges from approximately three-tenths of a mile to two miles. Many of the views of the project site from the Morro Highlands are from the Harbor Front Tract residential area and are direct and unobstructed. Approximately 700 people live within this area.

### **Highway 1 Corridor**

Highway 1 between Morro Bay and San Luis Obispo follows the agricultural valley floor, which is directed toward the power plant. This highway alignment allows for direct views of relatively long duration for motorists approaching the plant from the south. Similarly,

motorists approaching the site from the north are afforded relatively direct and extended views of the site. Viewing distances range from approximately 0.25 mile at the closest point to the proposed plant to approximately six miles to the south and five miles to the north.

### **South Morro Bay**

The neighborhoods of Old Town Morro Bay, within General Plan Areas 6 and 7, have a relatively high combined population of about 4,300 people. Viewing distances range from approximately 0.35 mile to 1.75 miles. The closest views from this area are from Scott Street, southeast of the power plant. Other direct views are from the Embarcadero and Bayfront areas. The most distant views are to the south near Fairbank Point. Structures and mature landscaping within the historic center of town partially obscure some views of MBPP.

### **Los Osos and Morro Bay**

Views from Los Osos and Baywood Park are approximately three miles distant. According to the 1990 Census for Los Osos, 7,100 people live approximately three to four miles from the plant, 5,900 people live approximately four to five miles away, while an additional 1,700 people live beyond the five-mile study boundary illustrated in **VISUAL RESOURCES Figure 6**. As in other residential areas, the presence of structures, vegetation, and topography limit views of the power plant for many of these residents. However, unobstructed views of MBPP are available to boats on Morro and Estero Bays.

The viewshed for the proposed project would be less than that indicated for the existing power plant in **VISUAL RESOURCES Figure 6** since the stacks of the proposed project would be less visible due to their substantially lower 145-foot height. However, it is pertinent to identify the broader viewshed since removal of the existing stacks as part of the proposed project would have a noticeable effect on much of this area. Project visibility would be attenuated with increasing distance, particularly at times of the year when conditions of poor visibility persist either from haze or fog. Vapor plumes from the project, which would extend above the tallest project structures, could be seen from greater distances than the power plant structures, particularly on clear days that coincide with favorable meteorological conditions for plume formation (low temperature and high humidity).

### **IMMEDIATE POWER PLANT VICINITY**

The MBPP would be located in a complex landscape consisting of a mosaic of industrial, residential, commercial, and natural features. The proposed project would be located within the boundaries of the existing Morro Bay Power Plant property on a site that is presently occupied by the tank farm, approximately 600 feet northeast of the existing stacks. The existing site is industrial in appearance and includes six 32-foot high tanks (five 150,000-barrel (bbl) capacity fuel oil storage tanks and one 35,000-bbl capacity displacement oil tank). The adjacent three 405-foot tall stacks (42 feet in diameter at the base, tapering to 17.5 feet in diameter at the top) and 150-foot tall, 500-foot long steam turbine generator complex dominate the immediate landscape.

Immediately west of the project site are coastal sand dunes, Coleman Park, the southern end of Morro Strand State Beach, and Morro Rock Natural Preserve. North of the site is Morro Creek, Morro Dunes Trailer Park Resort Campground, the City of Morro Bay Maintenance

Yard and Wastewater Treatment Plant, the Hanson Morro Bay Concrete Plant, Lila Kaiser Park, a Motel 6, an indoor roller rink, and Morro Bay High School. To the east of the site is Highway 1, a state designated scenic highway, and residential development along the hill slopes to the east. To the south of the project site is residential development; the City of Morro Bay central, the Embarcadero, and harbor areas; Morro Bay; and the sand spit comprising the Morro Dunes Natural Preserve.

While views of the site are available from all directions, immediate foreground views tend to be somewhat confined and are typically dominated by the geometric forms of the existing power plant with its three 405-foot tall stacks, tank farm and complex linear features of the switchyard. More distant views are generally panoramic in scope, capturing broad vistas of ocean, bay, coastal hills, and shoreline development. These views can capture scenes of great variety and vivid colors, often from elevated and/or unobstructed viewing perspectives. The availability of views to the site from residential areas is greatly dependent on the presence or absence of intervening vegetation and structural screening.

From the west, close-in views of the site are available from Embarcadero Road, Coleman Drive, Coleman Park, the Morro Rock parking areas, and the south end of Morro Strand State Beach. These views tend to be dominated by the existing stacks though the harbor entrance to Morro Bay and the City's structures (particularly along the Embarcadero) appear as prominent foreground to middleground landscape features depending on viewing location. The coastal hills east of the site are apparent background rolling landforms with curvilinear ridgelines that exhibit primarily a natural character except on the lower western slopes where residential development occurs and utility structures are prominent.

From the north, most foreground views of the site are at least partially screened by existing development and vegetation. From these views, the existing stacks are the dominant visual features. More distant views from the north encompass a broader landscape that is dominated by foreground coastal developed and natural features as well as the distinctly rounded yet irregular landform of Morro Rock.

From the east, with the exception of intermittent background views available along Highways 1 and 41, the topography of the coastal hills tends to limit most views of the site to foreground and middleground viewing perspectives. The most prominent features from these views are Morro Rock, the existing stacks, and, depending on viewing location, the numerous transmission lines that descend from the coastal hills to connect to the Morro Bay Power Plant. The more elevated perspectives from the hillside residential areas also afford panoramic vistas of the ocean and Morro Bay as well as the more distant hills and ridgelines to the north and south that define Estero Bay.

From the south, foreground views of the site are available from nearby residences and the Embarcadero/harbor area though many views are partially screened by vegetation and/or structures. The landscape is typically dominated by complex structural forms with a variety of coloration and, from certain viewpoints, the prominent rounded form of Morro Rock. More distant views from the south are available from the shoreline of Morro Bay and Morro Dunes Natural Preserve. From these viewing opportunities, the most prominent landscape features

include the blue-green expanse of Bay waters, the existing power plant stacks, and the trees and geometric structural forms of the City of Morro Bay commercial areas, residential neighborhoods, and harbor facilities.

## **TRANSMISSION LINE STRUCTURES, WATER INTAKE BUILDING, AND ONSITE LAYDOWN AREAS**

The proposed takeoff and transmission line structures, water intake building, and onsite laydown areas are within the power plant vicinity described above.

## **OFFSITE PROJECT MARSHALLING AREAS**

The Applicant has also proposed to establish three areas at Camp San Luis Obispo for construction staging. These staging areas would provide for the temporary holding of large HRSG components. The staging areas would also be the preferred delivery site for most large truck deliveries (DUKE 2000a, p. 2-63).

## **KEY OBSERVATION POINTS**

As discussed above, staff selected seven of the 20 Key Observation Points (KOPs) evaluated in the AFC for a more in-depth analysis of the visual setting and visual impact issues of concern. The seven key viewing areas selected for analysis were KOPs 5, 6, 8, 14, 15, 19, and 20. Those seven locations are discussed in detail below. A Visual Analysis Data Summary is provided for each of the seven selected KOPs in VISUAL RESOURCES Appendix A and their existing conditions photographs and photosimulations are presented in VISUAL RESOURCES Appendix B. The views from the remaining 13 KOPs are summarized in a subsequent section of this analysis entitled “*Additional Viewpoints.*” Existing photographs and visual simulations from the 13 additional viewpoints are presented in Appendix C. **VISUAL RESOURCES Figure 7** shows the location of all 20 KOPs.

### **KOP 5 – Morro Strand State Beach**

KOP 5 represents the view to the southeast from Morro Strand State Beach toward the project site (**VISUAL RESOURCES Figure 8A**). The viewpoint is located on the beach, directly across from the intersection with Atascadero Road.

#### **Visual Quality**

The view from KOP 5 is dominated by the foreground beach and coastal waters, sand dunes, and Morro Rock, as well as the existing power plant in the middleground. With the exception of the power plant and transmission line structures descending the coastal hills to the west of the plant, the landscape is predominantly natural in appearance. The low rolling coastal hills form the distant horizon to the east and south with the Pacific Ocean bordering on the west. The distinctive rounded form of Morro Rock rising abruptly from the surf adds visual variety and interest and provides a dramatic contrast to the broad, horizontal forms of beach and water. However, the prominence of the existing power plant with industrial visual character lessens visual quality, which is moderate-to-high.

## **Viewer Concern**

While beach users generally anticipate panoramic views of a predominantly natural landscape of ocean surf, sand, and low growing dune vegetation, viewer expectations are somewhat tempered by the presence of the existing power plant. Earthen sand colors provide a contrast to the blue-green ocean waters, while textures are matte and rough-hewn. The existing power plant is a prominent feature in the viewshed but its colors and texture are compatible with the overall natural character of the landscape. Viewers would perceive any additional intrusion of industrial character as a negative contribution to the beach viewing experience and viewer concern is high in this view area.

## **Viewer Exposure**

The viewing distance to the project site is approximately 2,300 feet. Views from the beach toward the proposed power plant site are direct (frontal) when walking south on the beach. For the purposes of this report, a view is considered direct or "frontal" if the angle of view is within 45° left or right of the primary view direction (typically the direction of travel for motorists or pedestrians. A view is considered indirect or "peripheral" if the angle of view is greater than 45° off the primary view direction. Site visibility is high because foreground to background views of the site are unobstructed. The number of viewers is moderate along the beach and the duration of views can be extended for people walking south on the beach. Therefore, viewer exposure is moderate-to-high.

## **Overall Visual Sensitivity**

The moderate-to-high visual quality, high viewer concern, and moderate-to-high viewer exposure all contribute to an overall moderate-to-high rating for visual sensitivity, a rating that would have been higher without the partially offsetting structural context of the existing power plant. The presence of the existing power plant provides visual characteristics that enable the existing landscape to absorb a moderate degree of additional structural influence before resulting in a substantial visual impact.

## **KOP 6 – Morro Dunes Trailer Park Resort Campground**

KOP 6 represents the view to the southeast toward the project site from the Morro Dunes Trailer Park Resort Campground (**VISUAL RESOURCES Figure 9A**). The most prominent features in the views from KOP 6 are the recreational vehicles within the trailer park and the existing power plant with its three 405-foot tall stacks.

## **Visual Quality**

The southeasterly view encompasses a mosaic of features including the geometric rectangular structures of vehicles, storage containers, and powerplant facilities; the linear power plant stacks with prominent vertical lines; and the irregular forms of intervening vegetation between the trailer park and project site. With the exception of the power plant facilities, the other landscape features contribute to a recognizable coastal recreation landscape that provides contrast to a prominent blue sky. The prominence of the existing power plant lessens visual quality, which is low-to-moderate.

## **Viewer Concern**

Users of the trailer park generally anticipate a coastal landscape in the immediate vicinity of the trailer park with limited industrial intrusion. Although the existing power plant is the dominant feature in the viewshed, its colors and texture are generally compatible with the overall coastal character of the general landscape. Viewers would perceive any additional intrusion of industrial character as a negative contribution to the coastal recreation experience and viewer concern is high.

## **Viewer Exposure**

The viewing distance to the project site is approximately 1,000 feet. Views to the southeast toward the project site are partially screened by intervening vegetation. Although some ground-level screening would limit views of the lower portion of the project, site visibility is still considered high due to the project's foreground position in the viewshed and the unobstructed views of the upper portions of the project that would be available. The number of viewers is low-to-moderate though the duration of views is extended. Therefore, viewer exposure is moderate-to-high.

## **Overall Visual Sensitivity**

The high viewer concern and moderate-to-high viewer exposure are partially countered by the low-to-moderate visual quality of the landscape, which is strongly influenced by the presence of the existing power plant. The resulting overall visual sensitivity is moderate.

## **KOP 8 – Morro Rock**

KOP 8 represents the view to the northeast toward the project site from Morro Rock (**VISUAL RESOURCES Figure 10A**). The viewpoint is located on Coleman Drive. The most prominent features in the viewshed of KOP 8 are the blue-green waters of Morro Bay harbor in the foreground, the existing power plant in the middleground, and the coastal hills in the background.

## **Visual Quality**

The northeasterly view from KOP 8 includes the foreground expanse of the harbor waters; the geometric forms of parked vehicles along Coleman Drive, the existing power plant with its prominent vertical stacks, the numerous vertical transmission line structures that descend the coastal hills to the existing power plant switchyard, and the mosaic of buildings within the City of Morro Bay, all backdropped by the low rolling landforms of the coastal hills with horizontal to curvilinear lines. All of these features contribute to the visual variety of the coastal landscape. The prominence of the existing power plant and motor vehicles (when parked along Coleman Drive) somewhat lessens the visual quality of this coastal scene, which is moderate-to-high.

## **Viewer Concern**

Viewers from Morro Rock and Coleman Drive generally anticipate a broad panoramic view of Morro Bay and the sand spit backdropped by the City of Morro Bay and the coastal hills. The presence of the existing power plant affects viewer expectations as it figures prominently in most views in and around the harbor area. Thus, residents and viewers alike do not

anticipate a landscape lacking prominent industrial features. However, the light colors and rough texture of the power plant are generally compatible with the overall coastal character of the general landscape. Viewers would perceive any additional intrusion of industrial character as a negative contribution to the coastal community landscape and viewer concern is high.

### **Viewer Exposure**

The viewing distance to the project site is approximately 2,600 feet. Site visibility is high because all portions of the site are fully exposed to viewers along Coleman Drive, allowing for unobstructed and direct foreground views. The number of viewers at this location is moderate-to-high due to the rock's importance as a visitor destination, and the duration of views is moderate-to-extended. Therefore, viewer exposure is moderate-to-high.

### **Overall Visual Sensitivity**

The moderate-to-high visual quality, high viewer concern, and moderate-to-high viewer exposure all contribute to a moderate-to-high rating for overall visual sensitivity of the existing view.

### **KOP 14 – Sunset Plateau**

KOP 14 represents the view to the south-southwest from the Sunset Plateau residential area (**VISUAL RESOURCES Figure 11A**). The viewpoint is located at a vacant residential lot at the end of Sunset Court.

### **Visual Quality**

KOP 14 provides an elevated, panoramic vista view of the north Morro Bay area encompassing a variety of landscape elements including such foreground urban features as Main Street, Highway 1, and the Motel 6 on Atascadero Road. Morro Rock and the existing power plant are the most prominent middleground elements, rising vertically above all foreground visual features. The hills and ridgelines that define the southern extent of Estero Bay provide a low horizontal background along with the blue waters of the Pacific Ocean. The prominent geometric rectangular and linear forms of the existing power plant stand in contrast to the natural, rounded form of Morro Rock, while the substantial influence of urban and built features reduces the visual quality of the coastal landscape which is moderate.

### **Viewer Concern**

Viewers from the residential area on Sunset Plateau generally anticipate a broad panoramic view of the Morro Bay coastal landscape including Morro Rock, Morro Bay, the harbor area, and the sand spit backdropped by the southern ridgelines and Pacific Ocean. Although the existing power plant is a prominent feature in the landscape and viewers expect to see the plant's industrial features in the view, residents and other viewers would be highly sensitive to any encroachment of industrial features upon Morro Rock and would perceive any such intrusion as a negative contribution to the coastal community landscape. Therefore, viewer concern is high.

## **Viewer Exposure**

The viewing distance to the site is approximately 2,900 feet. Project site visibility is high due to the elevated perspective available in the view area and the generally unobstructed middleground views. Some residences are oriented to the northwest away from the site but still have oblique views of the site. While the number of residential viewers is low, the view duration is extended. The resulting viewer exposure is moderate.

## **Overall Visual Sensitivity**

From the view area represented by KOP 14, the moderate visual quality, high viewer concern, and moderate viewer exposure contribute to a moderate-to-high rating for overall visual sensitivity of the existing viewshed which is substantially influenced by the presence of the existing power plant and foreground urban features.

## **KOP 15 – Harbor Front Tract**

KOP 15 represents the view to the west from the Harbor Front Tract residential area (**VISUAL RESOURCES Figure 12A**). The viewpoint is located at the intersection of Radcliff Street and Berwick Drive.

## **Visual Quality**

KOP 15 provides an elevated, panoramic vista view of the north Morro Bay area encompassing a variety of landscape elements including such foreground urban features as Main Street, Highway 1, and residences in the Harbor Front Tract residential area. The most prominent features in the landscape include the existing power plant, Morro Rock (which is partially obscured by the existing plant), and the transmission lines descending the coastal hills to the PG&E switchyard at the existing plant. The Pacific Ocean provides a low profile, horizontal backdrop. The substantial influence of urban features and energy infrastructure reduces visual quality to a low-to-moderate level.

## **Viewer Concern**

Viewers from the Harbor Front Tract residential area generally anticipate a broad panoramic view of the Morro Bay coastal landscape dominated by foreground residential development and the existing power plant and Morro Rock, all of which are backdropped by the Pacific Ocean. The existing transmission line corridor is also a prominent feature that contributes to overall viewer expectations of a landscape that is highly influenced by the complex industrial character of existing energy infrastructure. However, these industrial influences would not reduce viewer sensitivity to additional industrial intrusion into the viewshed that includes Morro Rock. Therefore, viewer concern is high.

## **Viewer Exposure**

The viewing distance to the site is approximately 2,900 feet. Site visibility is high due to the elevated perspective at KOP 15 and the availability of relatively unobstructed middleground views. However, the existing transmission lines descending the coastal hills cross in front of the site. While the number of residential viewers is low, the view duration is extended. The resulting viewer exposure is moderate.

## **Overall Visual Sensitivity**

From the view area represented by KOP 15, the low-to-moderate visual quality and moderate viewer exposure somewhat counter the high viewer concern, resulting in a moderate rating for overall visual sensitivity.

## **KOP 19 – Embarcadero Commercial District**

KOP 19 represents the view to the northwest from the Embarcadero Commercial District (**VISUAL RESOURCES Figure 13A**). The viewpoint is located on the steps above the giant chessboard at Centennial Park.

### **Visual Quality**

KOP 19 provides a somewhat elevated view over a portion of the Embarcadero commercial district. Although some natural features are visible, the landscape is predominantly developed and consists of a complex of geometric structural forms, many retaining the coastal fishing village character more reminiscent of a passing era. The rounded form of Morro Rock is a prominent though partially obscured background feature along with the existing power plant. Visual quality is moderate.

### **Viewer Concern**

The Embarcadero commercial area and harbor docks are at the center of the commercial and sport fishing industry and tourism within the City of Morro Bay. Visitors and residents alike frequent the area's shops, services, and restaurants. Viewers generally expect to experience the charm of a coastal fishing village community with minimal industrial intrusion. Although the prominence of the existing plant does temper viewer expectations, most viewers would regard additional or more prominent industrial features as a negative contribution to the area's visual character, detracting from the more scenic aspects of local views. Therefore, viewer concern is high.

### **Viewer Exposure**

The viewing distance to the site is approximately 3,300 feet and views to the site are partially screened by intervening structures along The Embarcadero. Visibility is low due to the site's more northerly middleground location relative to the commercial area and the partial screening by commercial structures. Although the number of viewers is high, the view duration varies from brief to extended depending on vantage point, the presence or absence of intervening structures, and whether the viewer is walking or driving. The resulting viewer exposure is low-to-moderate.

## **Overall Visual Sensitivity**

From the view area represented by KOP 19, the moderate visual quality and low-to-moderate viewer exposure somewhat counter the high viewer concern, resulting in a moderate rating for overall visual sensitivity.

## **KOP 20 – Highway 1**

KOP 20 represents the view to the west-southwest from southbound Highway 1's Main Street onramp (**VISUAL RESOURCES Figure 14A**). This viewpoint was selected to evaluate the

potential visual impact of the proposed project on Highway 1, which is a state-designated scenic highway.

### **Visual Quality**

The view from KOP 20 encompasses a complex landscape of energy and transportation infrastructure, roadside vegetation, and the partially obscured, rounded form of Morro Rock. Although some natural features are visible, the landscape is substantially influenced by industrial characteristics of the power plant, transmission lines that span the highway, and the adjacent switchyard. These features lessen visual quality, which is low.

### **Viewer Concern**

Highway 1 is a state-designated Scenic Highway and motorists on a designated scenic highway are typically considered to be highly sensitive to landscape changes. However, in this case motorists on the highway either anticipate a substantial presence of energy infrastructure as a result of their familiarity with the area or visually encounter the existing power plant and transmission lines from a substantial distance upon their approach to this location. Therefore, the substantial presence of the existing infrastructure tempers viewer expectations and viewer concern is moderate.

### **Viewer Exposure**

The viewing distance to the site is approximately 1,600 feet. Visibility of the foreground project site to travelers along this portion of Highway 1 is low because of the indirect angle of view away from the primary directions of travel and the partial screening provided by roadside vegetation, signage, and the existing transmission structures. Although the number of potential viewers is high, the view duration is brief due to the high travel speeds. The foreground viewing proximity is more than offset by the low site visibility and the brief duration of view, resulting in a low degree of viewer exposure.

### **Overall Visual Sensitivity**

From the view area represented by KOP 20, the low visual quality and low viewer exposure partially offset the moderate viewer concern, resulting in low-to-moderate overall visual sensitivity.

### **Additional View Areas**

This section provides brief descriptions of the existing views from each of 13 additional view areas. As previously indicated, visibility of the existing and proposed project from these 13 view areas is generally limited either by distance or screening from vegetation or structures. Photographs of the existing view from each of the 13 representative viewpoints are provided in VISUAL RESOURCES Appendix C.

### **KOP 1 – Black Mountain**

This viewpoint is located at the top of Black Mountain, looking west-northwest at a distance of approximately 1.8 miles (Visual Resources Appendix C, Figure C-1). The view encompasses the City of Morro Bay and Morro Bay in the middleground backdropped by Morro Rock and

the Pacific Ocean. Though the existing stacks are prominent vertical features in the landscape, the project site is barely noticeable at this distance.

### **KOP 2 – Morro Strand State Beach Campground Entrance**

This viewpoint is located at the entrance to Morro Strand State Beach Campground, looking south-southeast at a distance of approximately 2.08 miles and is representative of the views experienced by local residents and tourists visiting the campground (Visual Resources Appendix C, Figure C-2). The view is also representative of that experienced by residents, pedestrian, and motorists along North Beachcomber Drive. Panoramic views from this point encompass the ocean, beach, sand dunes, and Morro Rock in the distance. The existing power plant stacks are visible though not prominent at this viewing distance. The proposed project site is barely noticeable at this distance.

### **KOP 3 – Highway 1 at San Jacinto Street**

This viewpoint is located on the west side of Highway 1 at the San Jacinto Street crossing, looking south at a distance of approximately 1.32 miles and is representative of the southbound views on Highway 1 (Visual Resources Appendix C, Figure C-3). Panoramic views from this point encompass roadside residential and commercial development, the new Cloisters residential development, and Morro Rock. Although the existing stacks are prominent vertical features in the landscape, the project site is partially screened by vegetation and structures and is minimally noticeable at this distance.

### **KOP 4 – The Cloisters**

This viewpoint is located at The Cloisters Tract Public Park, looking south at a distance of approximately 0.93 mile and is representative of the views available to park users and residents of the developing community (Visual Resources Appendix C, Figure C-4). Panoramic views from this point encompass nearby residences, vegetation surrounding the High School, and Morro Rock. Although the existing stacks are prominent vertical features in the landscape, the project site is partially screened by vegetation. Additional development at The Cloisters has occurred since this photograph was taken and now views of the project site from this location are completely screened by new residential structures.

### **KOP 7 – Morro Creek at Embarcadero Road**

This viewpoint is located just south of Morro Creek at Embarcadero Road, looking east-southeast at a distance of approximately 1,000 feet and is representative of immediate foreground views from the west and northwest (Visual Resources Appendix C, Figure C-5). The unobstructed view of the project site from this location encompasses the existing power plant and tank farm, a portion of the sand dunes west of the site, an existing storage structure, and a portion of the RV campground to the north of the site. The coastal hills provide a backdrop of low, rolling landforms with curvilinear ridgelines. The existing stacks and tank farm are the dominant landscape elements from this viewpoint.

### **KOP 9 – North T Pier**

This viewpoint is located on the north T Pier, looking north-northeast at a distance of approximately 1,100 feet and is representative of immediate foreground views from the

Embarcadero/harbor area (Visual Resources Appendix C, Figure C-6). The view of the project site from this location encompasses the existing power plant, intake structure, harbor facilities, and commercial businesses along The Embarcadero. Although the existing power plant and stacks are the dominant landscape elements in this view, the proposed project site is substantially screened from view by structures and vegetation.

#### **KOP 10 – Scott Street**

This viewpoint is located at 1278 Scott Street, looking northwest at a distance of approximately 1,900 feet and is representative of residential and pedestrian views along Scott Street (Visual Resources Appendix C, Figure C-7). The view of the project site from this location encompasses the existing power plant, onsite vegetation, and Morro Rock. Although the existing power plant and stacks are a dominant landscape feature (along with Morro Rock) in this view, the proposed project site is substantially screened from view by vegetation.

#### **KOP 11 – Highway 41 at 1-Mile Distance**

This viewpoint is located on westbound (southbound) Highway 41, looking southwest at a distance of approximately 1.04 miles and is representative of the available westbound views on Highway 41 (Visual Resources Appendix C, Figure C-8). The view of the project site from this location is framed by the coastal hills and encompasses foreground agricultural uses with prominent middleground features including the coastal hills, the Morro Bay Power Plant and stacks, and Morro Rock. While views are typically focussed in the direction of the project site, both the existing power plant and proposed project site are partially screened by topography and vegetation.

#### **KOP 12 – Highway 41 at 0.75-Mile Distance**

This viewpoint is located on westbound Highway 41, in the center turn lane at the Miners Hardware entrance, looking southwest at a distance of approximately 3,900 feet. This view is representative of foreground views from westbound Highway 41 and local views in the general vicinity of Highway 41 and Main Street (Visual Resources Appendix C, Figure C-9). The view of the project site from this location encompasses roadside commercial and storage uses and residential development (to the north). In addition to existing structures and road surface in the immediate foreground, the existing power plant stacks and Morro Rock are the dominant landscape features. Views from this general location are constrained by structures and vegetation. From this viewing perspective, the proposed project site is partially screened by structures and vegetation.

#### **KOP 13 – Morro Del Mar Subdivision**

This viewpoint is located in the Morro Del Mar Subdivision near the intersection of Nutmeg and Casitas Avenues. The view is to the south-southwest at a distance of approximately 1.08 miles and is representative of unobstructed, hillside residential views from the subdivision (Visual Resources Appendix C, Figure C-10). This elevated perspective provides sweeping, panoramic views that encompass the coastal area of Estero Bay including Morro Bay, the sand spit and harbor entrance, Morro Rock, and urban development in the northern portion of the City of Morro Bay. Foreground residential development and the prominent

middleground features of the existing power plant stacks and Morro Rock dominate views from this location. Although the existing stacks are prominent vertical forms in the landscape, the proposed power plant would not be prominent at this viewing distance.

### **KOP 16 – Morro Bay Boulevard Exit from Highway 1**

This viewpoint is located at the Morro Bay Boulevard overcrossing of Highway 1, looking west-northwest at a distance of approximately 1.16 miles and is representative of pedestrian and motorist views (Visual Resources Appendix C, Figure C-11). The view of the project site from this location encompasses foreground commercial structures and paved roads, roadside landscaping, the lower slopes of the coastal hills, with Morro Rock and the existing stacks in the background. The existing stacks are prominent middleground landscape features in spite of their partial screening by structures and vegetation. However, the proposed project site is almost entirely screened from view by structures and vegetation.

### **KOP 17 – Morro Heights Neighborhood**

This viewpoint is located in the Morro Heights neighborhood, at the intersection of Piney Way and Olive Street. The view is to the west-northwest at a distance of approximately 1.17 miles and is representative of the available residential views from this neighborhood (Visual Resources Appendix C, Figure C-12). Immediate foreground structures and vegetation generally obscure views of the site from this neighborhood. However, some residences are afforded panoramic views over downtown Morro Bay to the project site and coastal area beyond. Where visible from this neighborhood, the existing stacks are prominent vertical features in the distant middleground landscape. At this viewing distance, the proposed power plant would be substantially less prominent than the existing power plant and would be partially screened by vegetation and structures.

### **KOP 18 – Tidelands Park**

This viewpoint is located on the public dock at Tidelands Park, looking north-northwest at a distance of approximately 1.02 miles and is representative of shoreline views from the City's southern bayfront (Visual Resources Appendix C, Figure C-13). The view from this location is dominated by the foreground expanse of Morro Bay, the sand spit, shoreline development, and Morro Rock. Boats at anchor in the Bay add variety and interest to the landscape and the existing powerplant and stacks are prominent middleground features. From this vantagepoint, the proposed site appears minimally noticeable as a background feature as a result of viewing distance and partial screening by structures and vegetation.

## **IMPACTS**

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### **CONSTRUCTION IMPACTS**

Project construction would include demolition of the tank farm, power block construction, project commissioning, demolition of the existing plant, and renovation of the water intake building. Project construction would also require activities and storage of equipment and materials at the construction marshalling areas. These activities would cause temporary visual impacts due to the presence of equipment, materials, and workforce. Construction

would involve the use of heavy equipment including vehicles and tall cranes for construction and demolition as well as temporary storage and office facilities. The Applicant has been unable to identify the number of cranes necessary for construction and demolition. Therefore it must be assumed that multiple cranes would be utilized concurrently at the construction and demolition sites. The Applicant has also been unable to identify the heights of the cranes. It must also be assumed that a number of the cranes would be of substantial height, particularly with regard to demolition of the three 405-foot stacks, the 140-foot tall turbine complex, and the storage tanks.

Based on a review of the project schedule provided as Figure 2-11 in the AFC (DUKE 2000a), it is clear that the sequence of construction and demolition would result in views of substantial construction and demolition activities and equipment over a period of approximately five years. During this time, a significant portion of the new plant and existing plant would be concurrently visible along with the necessary construction cranes, vehicles, and equipment. During this period, a substantially adverse visual impact would occur (increased structural contrast, project dominance, and view blockage of Morro Rock), particularly as experienced from the elevated perspectives of the Sunset Plateau and Harbor Front Tract residential areas (see **Visual Resources Figures 11B and 12B**). However, given the long-term visual improvement that would occur with removal of the existing power plant, these interim construction impacts are not considered significant.

The Applicant also proposes to grind and store on-site approximately 32,000 cubic yards of concrete rubble from the demolition of the stacks, power building and related structures though it is anticipated that at no time would the stockpiled material exceed 20,000 cubic yards, 1.75 acres in area, or ten feet in height (DUKE 2001h). Given the large quantities of material anticipated for on-site storage, a significant visual impact would occur if the rubble is visible from The Embarcadero area. Therefore, the rubble material must be completely screened from view from The Embarcadero. Effective implementation of staff's proposed Condition of Certification VIS-4 would ensure that a significant visual impact does not occur as a result of on-site storage of the rubble.

The Applicant has also proposed to establish three areas at Camp San Luis Obispo for construction staging. None of the three areas would be visible from Highway 1. Staging Area C/D would be highly visible from O'Connor Way, which enters Camp San Luis Obispo from the south. Given the relatively low numbers of potential viewers on O'Connor Way that would be able to see Staging Area C/D and the lack of site visibility from Highway 1, short-term visual impacts associated with the use of the three construction staging areas at Camp San Luis Obispo would be adverse but not significant.

## **OPERATION IMPACTS**

The analysis of operation impacts is presented below for each Key Observation Point (KOP) summarized in the Visual Analysis Summary table provided in Appendix A. For each KOP, an evaluation of visual contrast, project dominance, and view blockage is provided with a concluding assessment of overall visual change and significance of any resulting visual impact. A brief assessment of the visual change that would be perceived from additional view areas is also provided in a subsequent section of this analysis.

## **Key Observation Point 5 – Morro Strand State Beach**

**VISUAL RESOURCES Figure 8B** (see Appendix B) presents a photosimulation of the proposed project as viewed from KOP 5. The most obvious change to the landscape is the replacement of an existing power plant that exhibits prominent vertical elements with a new power plant exhibiting more prominent horizontal elements. The new facilities would be located closer to KOP 5 than the existing power plant that is being replaced. As a result, the apparent scale of the new plant would be similar to that of the existing plant. However, the new power plant has a much stronger industrial character as a result of a more visible structural complexity with highly metallic coloration and texture, resulting in a greater noticeability of the proposed facilities when compared to the existing structures.

### **Visual Contrast**

Although the KOP 5 viewshed encompasses an existing power plant with prominent geometric forms and lines, the proposed site is very exposed to viewers along Morro Strand State Beach and offers minimal screening potential for the proposed project. As a result, the site's ability to support additional industrial structures (visual absorption capability) is low-to-moderate. While the proposed project would eliminate the prominent linear forms of the existing stacks with their strong vertical lines, it would also introduce the highly visible linear, horizontal form of the sound wall, the horizontal lines associated with the transmission line, and the very complex forms and lines of the power plant facilities including pipe racks. The introduced forms and lines would be substantially different than the forms and lines already present in the landscape. Also, the plant facilities and sound wall are of a highly metallic appearance, both in terms of color and texture. Again, these characteristics are very dissimilar to the lighter, earth-tone colors and rough-hewn and granular textures that are characteristic of the existing coastal landscape. As presented in the Visual Analysis Summary table (see Appendix A), a high degree of visual contrast would be perceived from KOP 5 with implementation of the proposed project. This represents an increase in visual contrast over the moderate visual contrast associated with the existing power plant.

### **Project Dominance**

Although the existing power plant stacks are significantly taller than the replacement facilities, a much greater horizontal extent of the proposed project is visible as a foreground landscape feature. Due to the closer proximity of the proposed project relative to the viewer at KOP 5 and Morro Strand State Beach, the proposed project appears to be of similar scale and greater mass when compared to the existing power plant (a middleground feature). As a result, the proposed project's prominence is similar to that of the existing plant to be replaced. When compared to the other prominent foreground features in the landscape including the broad expanses of beach and ocean and the prominent rounded form of Morro Rock, the proposed project would appear co-dominant, which is a similar outcome compared to the co-dominance associated with the existing power plant.

### **View Blockage**

From Key Observation Point 5, the proposed project (lower quality features) would result in an increase in the blockage of sky, coastal hills, and vegetation (higher quality features) when compared to what is currently blocked by the existing power plant. In particular, much of the

coastal hills appearing low on the horizon would be blocked by the power plant and transmission line as shown in **VISUAL RESOURCES FIGURE 8B**. However, the background landscape elements that would be blocked from view by the proposed project are similar to those elements presently blocked from view by the existing plant. Also, the background features that would be blocked are not prominent in the viewshed. View blockage would be moderate. This represents a slight increase from the low-to-moderate view blockage that presently occurs with the existing power plant.

### **Overall Visual Change**

From KOP 5, the overall visual change that the proposed project would cause, would be adverse primarily due to the high degree of visual contrast that would result from the project as a co-dominant foreground visual element. As part of the proposed project, the Applicant has included a conceptual landscaping plan that would help to screen the project from view. **VISUAL RESOURCES Figure 8C** presents a photosimulation from KOP 5 showing the proposed landscaping at five years of maturity. The simulation clearly shows that the proposed landscaping would provide no meaningful screening of the project within the first five years following construction. **VISUAL RESOURCES Figure 8D** shows the landscaping at full maturity at 20 years. Although the trees at full height are effective in breaking up structural massing, gaps in the foliage and canopy still allow views of the complex, industrial forms of the project facilities.

### **Visual Impact Significance**

When considered within the context of the moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the adverse visual change that would be perceived from KOP 5 would result in an adverse and significant visual impact. Although the Applicant has proposed a landscaping plan, which would partially screen the project facilities from view, the screening is not adequately effective and the extended 20-year time frame to maturity is not acceptable. Under the proposed landscaping plan, the resulting screening would not adequately mitigate the significant visual impact that would occur at KOP 5 and a significant visual impact would remain. Therefore, staff has proposed additional mitigation measures VIS-1 and VIS-2 to reduce structural contrast and improve the effectiveness of the landscaping plan. When mitigation measures VIS-1 and VIS-2 are applied as discussed in the subsequent section entitled *Mitigation*, the final visual impact would be adverse but not significant.

### **KOP 6 – Morro Dunes Trailer Park and Resort Campground**

**VISUAL RESOURCES Figure 9B** presents a photosimulation of the proposed project as viewed from KOP 6. The most obvious change to the landscape is the replacement of the existing power plant with a new power plant. The new facilities would be located closer to KOP 6 than the existing power plant that is being replaced. As a result, the apparent scale of the new plant would be larger than that of the existing plant. Additionally, the new power plant has a much stronger industrial character as a result of a more visible structural complexity with highly metallic coloration and texture, resulting in a greater noticeability of the proposed facilities when compared to the existing structures. It should be noted that the simulation presented in Figure 9B does not include the transmission line and takeoff structures as shown in Figure 8B. However, in the Figure 9B image, these structures would

be only minimally visible at the far left of the image. The absence of these structures in this image does not substantially compromise the accuracy of the simulation.

### **Visual Contrast**

Similar to KOP 5, the views from KOP 6 encompasses the existing power plant with its prominent geometric forms and lines. However, the proposed project site is located close to KOP 6 and would be very visible to the trailer park residents and visitors. As a result, the landscape's ability to absorb foreground industrial structures without causing visual impacts (visual absorption capability) is low-to-moderate. While the proposed project would eliminate the prominent linear forms of the existing stacks with their strong vertical lines, it would also introduce the highly visible complex forms and lines of the power plant facilities. The introduced forms and lines would be substantially different than the forms and lines already present in the landscape. Also, the color of the plant facilities and texture of the metallic surfaces are very dissimilar to the lighter, earth-tone colors and rough-hewn, granular textures that are characteristic of the existing landscape. Therefore, the proposed project would result in a high degree of visual contrast when viewed from KOP 6. This represents an increase in visual contrast over the moderate visual contrast associated with the existing power plant.

### **Project Dominance**

Although the existing power plant stacks are significantly taller than the replacement facilities, the proposed project's foreground proximity to the viewer at KOP 6 creates the impression that the proposed project is of similar scale, greater mass, and greater horizontal extent compared to the existing power plant. As a result, the proposed project appears as the dominant feature in the landscape when compared to the other prominent foreground features including the trailer park facilities and vehicles and nearby vegetation. This represents an increase from the co-dominance associated with the existing power plant.

### **View Blockage**

From Key Observation Point 6, the proposed project (lower quality features) would cause a substantial increase in the blockage of sky (higher quality feature) when compared to the amount of sky that is currently blocked by the existing power plant. The overall extent of the blockage as viewed from KOP 6 is moderate-to-high. This represents a slight increase from the moderate view blockage that presently occurs at this location with the existing power plant.

### **Overall Visual Change**

From KOP 6, the overall visual change that the proposed project would cause would be adverse and is primarily due to the high degree of visual contrast and moderate degree of view blockage that would result from the project as a dominant foreground visual element. Figure 9B includes the Applicant's proposed landscaping at full maturity. However, given the distance of the trees from the trailer park viewers, they do not effectively screen the proposed power plant facilities from views within the trailer park.

## **Visual Impact Significance**

When considered within the context of the moderate visual sensitivity of the existing landscape and viewing characteristics, the adverse visual change that would be perceived from KOP 6 would result in an adverse and significant visual impact. Although the Applicant has proposed a landscaping plan, which would partially screen the project facilities from view, the screening is not adequately effective and the extended 20-year time frame to maturity is not acceptable. Therefore, staff has proposed additional mitigation measures in Conditions VIS-1 and VIS-2 to reduce structural contrast and improve the effectiveness of the landscaping plan. With these mitigation measures applied as discussed in the subsequent section entitled *Mitigation*, the final visual impact would be adverse but not significant.

## **KOP 8 – Morro Rock**

**VISUAL RESOURCES Figure 10B** presents a photosimulation of the proposed project as viewed from KOP 8. Visitors at Morro Rock and in the parking lot on Morro Rock have views of the harbor area and city that include the existing power plant. With the proposed project, viewers would not see a power plant from the Morro Rock parking lot though it would be visible upon returning along Coleman Road as shown in Figure 10B. The cars shown in the photograph are parked along the harbor entrance and not at the Morro Rock parking lot which is behind (to the west of) the viewpoint used for Figure 10B. With the exception of the water intake building located along Embarcadero, the new facilities would be located farther to the north of the existing plant's location. With the proposed structural design treatment, the intake building would appear taller than present but with an architectural treatment that would be more in keeping with the fishing village charm of the Embarcadero commercial area.

## **Visual Contrast**

The viewshed of KOP 8 encompasses the existing power plant with its prominent geometric forms and lines, the harbor area and sand spit of Morro Bay, much of the City of Morro Bay, and the coastal hills to the east. The landscape's ability to absorb the new foreground industrial structures without resulting in visual impacts (visual absorption capability) is moderate as a result of the structural context that has been established by the existing plant. While the proposed project would eliminate the prominent linear forms of the existing stacks with their strong vertical lines, it would also introduce the more complex forms and lines of the new power plant facilities. However, at this viewing distance, the new structural complexity is not as noticeable as it is from viewpoints closer to the project site. Also, visual contrast associated with surface color and textures is not as noticeable at this distance. Therefore, the proposed project would slightly reduce visual contrast in the view from KOP 8. This represents a slight reduction in visual contrast from the moderate-to-high visual contrast associated with the existing power plant when viewed from this location.

## **Project Dominance**

While the existing power plant appears co-dominant in the landscape with the water form of the Morro Bay harbor, the plant's three 405-foot vertical stacks are clearly the most visually dominant structural features in the view from KOP 8. These structures dominate not only all other structural forms in the viewshed but the surrounding landforms as well. The proposed

project would replace these dominant features and in the wide field of view available at KOP 8, the proposed structures would appear small-to-moderate in size. While the proposed project (including the power plant and water intake structure) would still be the most prominent structural features along the shoreline, the project would reduce overall prominence to a level co-dominant with the existing land and water forms in the landscape. This represents a reduction from the project dominance of the existing power plant.

### **View Blockage**

From Key Observation Point 8, the proposed project (lower quality features) would result in a net decrease in the blockage of sky and coastal hills (higher quality features) as a result of the removal of the existing plant and stacks. However, there are several offsetting factors with respect to this change in view blockage. First, the new power plant facilities would replace the existing tank farm but would result in the blockage of a coastal hill landscape that is currently undeveloped and is of higher visual quality than the hill slopes that would become visible with removal of the existing power plant. Second, while removal of the existing plant would eliminate all blockage of sky and open up views to the coastal hills to the east, those views would include the industrial appearance of numerous transmission lines (presently not visible) that descend the hills to the existing switchyard. Third, the new view would also encompass the Harbor Front Tract residential development on the hill slopes immediately east of the existing power plant. Views of the developed hillside partially offset the benefit of removal of the turbine building. Lastly, the increase in height of the water intake building would result in additional blockage of trees along Embarcadero Road. Therefore, view blockage associated with the proposed project is low. This represents a slight reduction from the low-to-moderate view blockage that presently occurs at this location with the existing power plant.

### **Overall Visual Change**

From KOP 8, the proposed project would be beneficial, reflecting several offsetting considerations in terms of visual contrast and view blockage.

### **Visual Impact Significance**

When considered within the context of the moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the beneficial visual change that would be perceived from KOP 8 would result in a non-significant visual impact. Although the visual impact is not considered significant, the importance of views from Morro Rock as a primary tourist attraction is such that Visual Resource Mitigation Measures VIS-1 and VIS-2 (see subsequent section entitled *Mitigation*) are recommended to further enhance the project view from KOP 8.

### **KOP 14 – Sunset Plateau**

**VISUAL RESOURCES Figure 11B** presents a photosimulation of the proposed project as viewed from KOP 14. The most obvious change to the landscape is the replacement of the existing power plant with a new power plant. Although the new facilities would be of a smaller scale and less prominent than the existing plant, they would encroach upon the sight lines to Morro Rock from the residences on Sunset Plateau unlike the existing plant.

## **Visual Contrast**

The proposed project would eliminate the prominent geometric and linear forms of the existing power plant and replace them with less conspicuous but more complex forms and lines. The structural forms and lines established by the existing facilities and the urban characteristics of the foreground transportation infrastructure enable the existing landscape to absorb much of the industrial character of the proposed facilities. Within this viewing context, the structural colors and textures of the proposed power plant do not appear incompatible with existing landscape characteristics. In the context of the moderate visual absorption capability of the KOP 8 viewshed, implementation of the proposed project would result in a low-to-moderate degree of visual contrast. This represents a reduction in visual contrast from the moderate-to-high visual contrast associated with the existing power plant.

## **Project Dominance**

The dominant features in the existing landscape viewed from KOP 14 are the existing power plant with its three 405-foot stacks and Morro Rock. These two middleground features are somewhat separated but co-dominant in the landscape. Under the proposed project, the prominence of the existing plant would be eliminated with its removal. The new facilities would be of a smaller scale and sited in much closer viewing proximity to Morro Rock as seen from the Sunset Plateau residential area. In this location, the proposed plant would appear less prominent and somewhat overshadowed by Morro Rock in the immediate background. Though still noticeable, the new plant would appear subordinate to co-dominant in relationship to Morro Rock. This represents a reduction from the co-dominance of the existing power plant.

## **View Blockage**

From Key Observation Point 14, the proposed project (lower quality features) would result in an increase in the blockage of harbor waters and ocean (higher quality features) and a net decrease in the blockage of sky and coastal hills (also higher quality features). Yet, as viewed from KOP 14, Morro Rock presently stands apart from the existing power plant, a spatial relationship that helps to maintain the rock's unique solitary character. The proposed project would place the new power plant much closer to the sightlines of Morro Rock from several of the Sunset Plateau residences. From these perspectives, the plant's location would slightly diminish Morro Rock's dramatic rise from the nearshore waters. This encroachment on views of Morro Rock is an adverse view blockage outcome. However, taken in balance with the removal of the existing power plant and its attendant view blockage issues, the view blockage outcome is low with implementation of the proposed project. This represents a reduction from the moderate view blockage presently associated with the existing power plant.

## **Overall Visual Change**

From KOP 14, the overall visual change that the proposed project would cause would be beneficial, reflecting some offsetting considerations with respect to view blockage.

## **Visual Impact Significance**

When considered within the context of the moderate visual sensitivity of the existing landscape and viewing characteristics, the beneficial visual change that would be perceived from KOP 14 would result in a non-significant visual impact. Although the visual impact is not considered significant, the importance of the elevated coastal views is such that Visual Resource Mitigation Measure VIS-3 (see subsequent section entitled *Mitigation*) is recommended to prevent night lighting impacts on the view area represented by KOP 14 (see subsequent section on *Lighting*).

## **KOP 15 – Harbor Front Tract**

**VISUAL RESOURCES Figure 12B** presents a photosimulation of the proposed project as viewed from KOP 15 in the Harbor Front Tract residential area. The most obvious change to the landscape is the removal of the existing power plant and its blockage of Morro Rock. The new power plant would be substantially less noticeable at its proposed location on the existing tank farm site.

## **Visual Contrast**

The proposed project would eliminate the prominent geometric and linear forms of the existing power plant and replace them with substantially less noticeable but more complex forms and lines. The structural forms and lines established by the existing power plant and the existing transmission lines and switchyard in particular enable the existing landscape to absorb much of the industrial character of the proposed facilities. The complex forms and lines of the lattice transmission line structures descending the coastal hills to the switchyard are effective in establishing viewshed characteristics similar to those of the proposed project. Also, within this viewing context, the structural colors and textures of the proposed power plant do not appear incompatible with existing landscape characteristics. In the context of the high visual absorption capability of the KOP 15 viewshed, implementation of the proposed project would result in low visual contrast. This represents a substantial reduction from the high visual contrast associated with the existing power plant when viewed from this location.

## **Project Dominance**

The dominant features in the existing landscape viewed from KOP 15 are the existing power plant with its three 405-foot stacks and Morro Rock. These two middleground features are co-dominant in the landscape. Under the proposed project, the prominence of the existing plant would be eliminated with its removal. The new facilities would be of a smaller scale and sited in a location that would not only be less noticeable but would increase Morro Rock's visual dominance in the landscape. Though still noticeable, the new plant would appear co-dominant with the existing transmission line structures in the foreground of views from KOP 15. However, it would be seen as subordinate to the more dominant middleground presence of Morro Rock. This represents a reduction from the co-dominant-to-dominant presence of the existing power plant.

## **View Blockage**

From Key Observation Point 15, the proposed project (lower quality features) would result in a slight increase in the blockage of the coastal dune and beach and ocean landscape (higher

quality features) and a net decrease in the blockage of sky and Morro Rock (also higher quality features). From the KOP 15 perspective, the proposed project would substantially improve the visual access to Morro Rock and the view blockage outcome would be low, representing a substantial reduction from the high view blockage caused by the existing power plant.

### **Overall Visual Change**

As viewed from KOP 15, the removal of the existing plant and the improvement of visual access to Morro Rock would constitute a substantially beneficial visual change.

### **Visual Impact Significance**

The substantially beneficial visual change that would be experienced at KOP 15 would not cause a significant visual impact.

### **KOP 19 – Embarcadero Commercial District**

**VISUAL RESOURCES Figure 13B** presents a photosimulation of the proposed project as viewed from KOP 19 in the Embarcadero commercial district. The proposed project and removal of the existing power plant would result in a substantial visual change to the district's landscape. A subordinate feature that would be substantially less visible and noticeable from the primary tourist commercial area would replace a co-dominant industrial feature.

### **Visual Contrast**

The proposed project would eliminate the prominent geometric and linear forms of the existing power plant and replace them with substantially less noticeable structures. This reduction in visible elements of industrial character would also result in a low degree of visual contrast. This represents a substantial reduction from the high visual contrast associated with the existing power plant when viewed from this area.

### **Project Dominance**

The existing power plant is a dominant vertical feature in the Embarcadero commercial district viewshed. The proposed facility would appear as a subordinate background feature to foreground commercial buildings in the landscape due to its apparent smaller scale (due to distance) and limited visibility. As a result, project dominance would be subordinate. This represents a reduction from the co-dominant-to-dominant presence of the existing power plant.

### **View Blockage**

From Key Observation Point 19, the proposed project (lower quality features) would result in a substantial reduction in the blockage of sky (a higher quality feature). The view blockage outcome would be low. This represents a reduction from the moderate view blockage that is caused by the existing power plant.

### **Overall Visual Change**

As viewed from KOP 19, the removal of the existing plant and limited visibility of the new facilities would constitute a substantially beneficial visual change.

## **Visual Impact Significance**

The substantially beneficial visual change that would be experienced at KOP 19 would not result in a significant visual impact.

### **KOP 20 – Highway 1**

**VISUAL RESOURCES Figure 14B** presents a photosimulation of the proposed project as viewed from KOP 20 at the Main Street northbound onramp to Highway 1. The proposed project and removal of the existing power plant would result in a substantial visual change in the viewshed from Highway 1. Presently, this portion of Highway 1 has a considerable amount of roadside vegetative screening that limits views to the west toward the existing plant and plant site. However, the height of the existing stacks is such that they are still visible to motorists approaching from either the north or south. With implementation of the proposed project, the existing plant and stacks would be removed. The new plant would have structures and stacks considerably shorter in height than the existing plant. As a result, northbound traffic would have a substantially reduced view of power generation facilities since the existing vegetation would more effectively screen the shorter structures. Southbound views in the vicinity of this KOP would have similarly constrained views of the power generation facilities. However, from farther north of the project site (one-half to one mile north) the new power plant would be more visible.

## **Visual Contrast**

The proposed project would eliminate the prominent geometric and linear forms of the existing power plant and replace them with substantially less noticeable but more complex forms and lines. To the extent that limited foreground views of the new power plant are available from Highway 1 over or through existing vegetation, views of the structural forms and lines established by the existing power plant, transmission lines, and switchyard would enable the existing landscape to absorb much of the industrial character of the proposed facilities. The complex forms and lines of the lattice transmission line structures are effective in establishing viewshed characteristics similar to those of the proposed project. Also, within this viewing context, the structural colors and textures of the proposed power plant would not appear incompatible with existing landscape characteristics. In the context of this high visual absorption capability, implementation of the proposed project would result in a beneficial reduction in visual contrast. Further north of the site, southbound views would have greater visual access to the new facilities but the result would be similar—less prominent vertical forms and lines but greater structural complexity, partially absorbed by the existing structural context. The overall reduction in the prominence of industrial-appearing structural elements would result in low visual contrast. This represents a reduction from the moderate visual contrast associated with the existing power plant when viewed from this location.

## **Project Dominance**

The dominant features in the existing landscape viewed from KOP 20 are the existing power plant with its three 405-foot stacks, the existing transmission lines that span Highway 1 to the switchyard, and Morro Rock. These foreground features are co-dominant in the landscape. Under the proposed project, the prominence of the existing plant would be eliminated by its removal. The new facilities would be of a smaller scale and less noticeable due to screening

by vegetation. Though the new plant facilities would still appear co-dominant with Morro Rock and the existing transmission lines, they would be less prominent than the existing plant. This slight reduction in project dominance from the co-dominant-to-dominant presence of the existing power plant would enhance Morro Rock's visual prominence in the landscape.

### **View Blockage**

Under the proposed project, removal of the existing plant and installation of the new facilities would result in a reduction of the view blockage of the sky (higher quality feature) by industrial structural elements (lower quality feature) as viewed from KOP 20. The view blockage outcome would be low-to-moderate, representing a slight reduction from the moderate view blockage caused by the existing power plant.

### **Overall Visual Change**

When viewed from KOP 20 (and Highway 1 in general), the reduction in visual contrast and view blockage associated with the removal of the existing plant and the smaller scale of the new facility would constitute a beneficial visual change.

### **Visual Impact Significance**

The beneficial visual change that would be experienced at KOP 20 and along Highway 1 would not result in a significant visual impact.

### **Additional View Areas**

This section provides brief descriptions of the change in views from several additional view areas as a result of project implementation. With the exception of KOP 7 near the intersection of Morro Creek and Embarcadero Road, all other view areas are expected to experience improvement in the available views. Simulations of the proposed project from each of the following 13 viewpoints are provided in Appendix C.

#### **KOP 1 – Black Mountain**

The proposed project would result in a reduction of structural visual contrast and blockage of the coastal landscape when viewed from Black Mountain (Visual Resources Appendix C, Figure C-1). The visual change represents a beneficial impact on the view from this location.

#### **KOP 2 – Morro Strand State Beach Campground Entrance**

The proposed project would result in a reduction of structural visual contrast and blockage of the coastal landscape when viewed from the entrance to the Morro Strand State Beach Campground (Visual Resources Appendix C, Figure C-2). The visual change represents a beneficial impact on the view from this location.

#### **KOP 3 – Highway 1 at San Jacinto Street**

The proposed project would result in a reduction of structural visual contrast and blockage of sky and coastal hills when viewed from southbound Highway 1 at San Jacinto Street (Visual Resources Appendix C, Figure C-3). The visual change represents a beneficial impact on the view from this location.

#### **KOP 4 – The Cloisters**

The proposed project would result in a reduction of structural visual contrast and blockage of sky when viewed from the Cloisters residential development (Visual Resources Appendix C, Figure C-4). The proposed project would no longer be visible from KOP 4 at this location due to additional residential development. Some of the more southerly residences would be able to see portions of the proposed plant above intervening vegetation. The visual change represents a beneficial impact on the view from the Cloisters development.

#### **KOP 7 – Morro Creek at Embarcadero Road**

The proposed project would eliminate the prominent vertical forms and lines of the existing power plant stacks but would introduce more prominent complex forms and lines of the new plant and increased blockage of the sky (Visual Resources Appendix C, Figure C-5). Overall, the resulting change in views from this location is anticipated to be neutral.

#### **KOP 9 – North T Pier**

The proposed project would result in a substantial reduction of structural visual contrast and blockage of sky when viewed from the T Pier (Visual Resources Appendix C, Figure C-6). Although the water intake building would have a greater mass and be more prominent in views from the pier, its architectural design would be more consistent with other waterfront structures along the Embarcadero. The new power plant would be barely visible due to intervening screening by structures and vegetation. The visual change represents a beneficial impact on the view from the T Pier.

#### **KOP 10 – Scott Street**

The proposed project would result in a substantial reduction of structural visual contrast and blockage of sky when viewed from Scott Street (Visual Resources Appendix C, Figure C-7). Elimination of the existing stacks would increase Morro Rock's dominance over the visible landscape. Although the new power plant would be partially visible above the intervening trees, it would appear subordinate to the new prominence of Morro Rock. The visual change represents a beneficial impact on the view from Scott Street.

#### **KOP 11 – Highway 41 at 1-Mile Distance**

The proposed project would result in a reduction of structural visual contrast and blockage of sky when viewed from Highway 41 at a distance of approximately one mile (Visual Resources Appendix C, Figure C-8). The new power plant would block a portion of Morro Rock but would appear less noticeable given the solid backdrop provided by Morro Rock and the smaller scale of the proposed facilities. Also, elimination of the existing stacks would increase Morro Rock's dominance over the visible landscape. Although the new power plant would be partially visible above intervening vegetation, it would appear subordinate to the increased prominence of Morro Rock. The visual change represents a beneficial impact on the view from Highway 41.

### **KOP 12 – Highway 41 at 0.75-Mile Distance**

The proposed project would result in a reduction of structural visual contrast and blockage of sky when viewed from Highway 41 at a distance of approximately three-fourths of a mile (Visual Resources Appendix C, Figure C-9). Also, elimination of the existing plant and stacks would increase Morro Rock's prominence in the landscape. Although the new power plant would be partially visible above intervening vegetation and in closer proximity to sight lines to Morro Rock from Highway 1, it would appear subordinate to the increased dominance of Morro Rock. The visual change represents a beneficial impact on the view from Highway 41.

### **KOP 13 – Morro Del Mar Subdivision**

The proposed project would result in a reduction of structural visual contrast and blockage of sky and coastal landscapes when viewed from the Morro Del Mar Subdivision (Visual Resources Appendix C, Figure C-10). The new power plant would block views of a portion of the harbor entrance and sand spit and would be located in closer proximity to sight lines to Morro Rock. However, the project would appear subordinate to Morro Rock and substantially less noticeable compared to the existing facilities. The visual change represents a beneficial impact on the view from the Morro Del Mar Subdivision.

### **KOP 16 – Morro Bay Boulevard Exit from Highway 1**

The proposed project would result in a reduction of structural visual contrast and blockage of sky and coastal landscapes when viewed the Morro Bay Boulevard exit from Highway 1 (Visual Resources Appendix C, Figure C-11). The new power plant would be almost completely obscured by intervening vegetation. The visual change represents a beneficial impact on the view from this location.

### **KOP 17 – Morro Heights Neighborhood**

The proposed project would result in a reduction of structural visual contrast and blockage of sky and coastal landscapes when viewed from the Morro Heights Neighborhood (Visual Resources Appendix C, Figure C-12). The new power plant would block a substantially smaller portion of sky and ocean compared to the existing power plant and would be substantially less noticeable in the viewshed. The visual change represents a beneficial impact on the view from the Morro Heights Neighborhood.

### **KOP 18 – Tidelands Park**

The proposed project would result in a reduction of structural visual contrast and blockage of sky and coastal hills when viewed from the public dock at Tidelands Park (Visual Resources Appendix C, Figure C-13). Although the new power plant would be visible above intervening vegetation, it would exhibit a minimal amount of structural contrast and block a substantially smaller portion of the sky compared to the existing power plant. It would also appear subordinate to Morro Rock and would be substantially less noticeable in the viewshed. The visual change represents a beneficial impact on the view from Tidelands Park.

## **Lighting**

Existing visible night lighting in the project vicinity ranges from softer amber colored light to intense white light (see **VISUAL RESOURCES Figure 15**). Night lighting at the existing

power plant is generally of low intensity, though some upward glare from older lighting equipment does occur. The red light warning beacons on the stacks conform to the Federal Aviation Administration Obstruction Marking and Lighting Advisory Circular (DUKE 2000a, p. 6.13-45). The following description of visible night lighting is based on the Applicant's response to Data Requests 134 and 135:

From the main gate of the Morro Bay Power Plant, light sources include: parking area lighting just inside the main gate, entrance lights at the Administration Building, bright lights illuminating the PG&E switchyard, highway lighting at the Highway 1 / Main Street interchange, bright lights at Lila Kaiser Park, industrial lighting at the cement plant, and the lower level lighting at the City of Morro Bay's sewage treatment plant and at the trailer park.

When viewed from KOP 5 at night, the Morro Bay city lights emanate from behind the coastal dunes while the brightest lights are from the Lila Kaiser ball field and the Morro Bay High School football fields. On evenings when there is fog or a low cloud ceiling, these lights further illuminate the area with reflected light. When the ball field lights are off, lighting from the power plant switchyard emanates upward, slightly brighter than the city lights behind. Parking lot lighting around the power plant is directed downward but does reflect back up the power plant walls, diminishing before reaching the top. Also, red aircraft beacons are visible on the stacks.

From KOP 6, prominent sources of night lighting include street lighting mounted on low wooden poles internal to the trailer park. Lights also emanate from the laundry located to the left of KOP 6. The existing aircraft beacon lights on the existing stacks are visible and the ball field lighting emanates into the area. From KOP 8, nearly all of the lights from the City of Morro Bay are visible in the distance from this perspective.

From KOP 14, When the lights are on at Lila Kaiser Park, they appear as the brightest light source in the vicinity of the site. Other sources of night light from this perspective include the gas station, street lighting, and the motel on Atascadero Road across Highway 1. Cars on Highway 1 also generate a near constant source of glare. More distant is the power plant. In addition to the visible aircraft warning beacons, the power plant reflects light from nearby sources. Other visible light sources include lighting in the industrial area, just behind the motel, and the glow of light from Old Town Morro Bay (see **VISUAL RESOURCES Figure 15**).

From KOP 15, the switchyard is the most prominent source of light at the existing power plant, which also reflects light up onto the power plant building. The red aircraft warning beacons are also visible and lower level lighting emanates from the parking area and occasionally from the tank farm. From KOP 20, the brightest sources of light and glare are the headlights of vehicles along Highway 1 and Main Street, street lights, and the lights at the PG&E switchyard.

The proposed project would require nighttime lighting for operational safety and security. The Applicant has indicated that they are unable to provide detailed lighting information because a lighting plan has yet to be developed. However, it is reasonable to assume that night

lighting would be used to illuminate exterior work areas, equipment and storage areas, building interiors, access ways, and parking areas. Project night lighting would be most visible from those KOPs closest to the project site (KOPs 5 and 6) and those KOPs with elevated perspectives (KOPs 14 and 15). Project night lighting viewed from KOP 8 would be seen within the context of the broader area lighting of the City of Morro Bay. Project night lighting would not be noticeable from KOP 19 but it would be visible from Highway 1 in the vicinity of KOP 20 but would be less noticeable in the context of oncoming headlights and other sources of lighting in the immediate project vicinity including roadside commercial uses, street lights, and the nearby ball fields.

Given the project site's closer proximity to prominent sources of night lighting including the High School and Lila Kaiser Park, when those fields are being used at night, it is likely that night lighting from the new power plant would be less noticeable than the night lighting at the existing power plant. This would be the case because the brighter field lighting would tend to overwhelm the lighting at the power plant.

With removal of the existing power plant and its associated night lighting, the proposed project lighting is not expected to substantially change ambient lighting conditions when the nearby ball fields are in use. When the ball fields are not in use and the playfield lights are not on, it is likely that the proposed power plant's closer proximity to KOPs 5 and 6 would noticeably increase visible ambient night lighting in those areas.

However, in order to reduce the offsite adverse impacts from night lighting, the Applicant has stated that caps would be provided on luminars to minimize upward glare (AFC: p. 6.13-58). The Applicant has also agreed to shield, conceal, reduce the intensity, and/or periodically eliminate sources of nighttime light (DUKE 2001c, Data Response 136, p. 1-4). The Applicant has further committed to using timers, sensors, and/or switches to keep lights off when they are not needed (DUKE 2001c, Data Response 137, p. 1-5).

Because of the potential for the project to cause adverse nighttime lighting impacts, the Energy Commission staff has expanded upon the Applicant's general commitment to the above quoted design measures in a proposed condition of certification VIS-3 (see below). Proper implementation of this condition is expected to minimize lighting and keep lighting impacts to less than significant levels.

### **Visible HRSG Exhaust Plumes**

The proposed project would involve the addition of two new combined-cycle gas turbine units, each served by two heat recovery steam generator (HRSG) stacks for a total of four exhaust stacks. An analysis of potentially visible plumes from the HRSG stacks was conducted by the Applicant using the Combustion Stack Visible Plume (CSVP) model. Staff reviewed that analysis and conducted an independent modeling analysis for comparison. The results of staff's analysis are presented here.

### **HRSG Plume Analysis**

The Applicant's Data Responses #s 128-130 and 142-156 (DUKE 2001c) were evaluated and an independent psychrometric analysis and dispersion modeling analysis was performed

to determine the validity of the Applicant's responses. The CSVP model was used to estimate the potential plume frequency, and to provide data on predicted plume length, width, and height. As stated above, the project has four separate HRSG stacks, and the plume data presented below represents plume frequencies and dimensions for each stack individually. While some plume interaction may occur, it would be limited due to the separation of the stacks.

**HRSG Parameters**

The Applicant modeled two turbine operating conditions (100% load, no duct firing; and 100% load, duct firing) for the entire year. The Applicant stated in the response to Data Request #128 that these two conditions represent the operating conditions for the proposed plant where duct firing is assumed to occur from 6 AM to 8 PM daily. Although the values presented were reasonable, the AFC did not provide sufficient data to confirm the Applicant's contention that the conditions modeled were in fact conservative for use under all cold weather operating conditions. The proposed plant would not use power augmentation (i.e. water injection) and duct burners are generally operated during high temperature low humidity ambient conditions when power output from the gas turbine is diminished. Therefore, staff has determined that the exhaust parameters provided in Table 1 should provide reasonable plume frequency results.

**Meteorological Data Summary**

The Applicant provided three years of onsite meteorological data, which included relative humidity data, but did not include weather phenomena data (i.e., occurrence of fog, rain, etc.). The significant variability of this data, particularly the relative humidity data, makes the validity of this data set somewhat questionable; and this data set may not provide representative long-term conditions at the site. However, this data is likely to represent the variability that may occur during each season of the year and the variability of each season from year to year.

**Table 1  
HRSG Exhaust Parameters Provided by the Applicant**

Parameter	HRSG Exhaust Parameters	
	100% Load, No Duct Firing	100% Load, Duct Firing
Stack Height	44.2 meters	44.2 meters
Stack Diameter	5.8 meters	5.8 meters
Exhaust Temperature	360.8°K	355.8°K
Exit Velocity (calculated)	20.08 m/s	19.96 m/s
Exhaust mass flow rate	3,609,000 lbs./hr	3,625,422 lbs./hr
Moisture Content (% by weight)	5.34%	6.28%

**Staff CSVP Modeling Assessment**

Initially, the conditions that the Applicant used for modeling the HRSG exhaust were reviewed. The 1994 through 1996 onsite meteorological data set provided by the Applicant

was used to model the HRSG plume potential using the CSVP model. The modeling results indicate plume formation would occur 1,380 hours of the modeling period. Of these 1,380 hours, 469 occurred at night and another 911 occurred during daylight hours. A summary of the predicted visible plume frequency is presented in Table 2 and is based on the total number of hours in that category. For example, the 479 day hours that a plume would have been visible in 1994, represents 11% of the daylight hours that occurred in that year (approximately 4,354 hours).

**Table 2  
Staff Predicted HRSG Steam Plume Frequency Summary**

	1994		1995		1996	
	Hours	Frequency	Hours	Frequency	Hours	Frequency
<b>Day</b>	479	11.0%	119	2.7%	313	7.1%
<b>Night</b>	331	7.7%	36	0.8%	102	2.3%
<b>Total</b>	810	9.4%	155	1.8%	415	4.7%

The frequencies predicted by the CSVP model are slightly greater than those predicted by the Applicant's plume model. Averaged over the three years, the frequency of daytime occurrence is approximately 6.9% inclusive of all viewing conditions. The predicted seasonal daylight HRSG visible plume frequencies are presented in Table 3.

Table 3 shows a significant seasonal and yearly variability regarding plume potential. The average values indicate that the daytime plumes are actually more frequent in the spring and summer than fall and winter, which is reasonable for this location considering that the warmest season is fall and that daytime fog events are predominantly marine influenced and the daytime onshore wind pattern is most pronounced in the summer. The total plume frequency predicted is slightly higher than that predicted by the Applicant.

**Table 3  
Staff Predicted Daylight Hours with HRSG Steam Plumes**

Season	1994		1995		1996		Totals	
	Hours	Percent	Hours	Percent	Hours	Percent	Hours	Percent
Spring		0%		5%		5%		4%
Summer		50%		5%		4%		6%
Fall		2%		5%		98%		8%
Winter		58%		0%		4%		2%
Total		97%		9%		5%		8%

The ambient conditions that occur during predicted plume events are characterized by cool ambient temperatures with high relative humidities. The range of ambient conditions where cooling tower plumes are predicted is presented in Table 4.

**Table 4  
Ambient Conditions During Hours with Predicted HRSG Plumes  
Morro Bay Meteorological Data 1994 - 1996**

Time of Day	Temperature	Relative Humidity
Maximum	57.3°F	100%
Minimum	38.1°F	51%
Average	51.0°F	95%
Median	51.9°F	96%
<b>Daylight</b>		
Maximum	57.1°F	100%
Minimum	39.7°F	51%
Average	51.9°F	95%
Median	52.5°F	96%

Plume frequencies and dimensions during clear daytime hours are the most important issues when determining potential significance. A review of several California Coastal meteorological data sets indicated that approximately 75 to 80% of the time when the relative humidity is above 95% there is some form of visibility obscuring weather phenomena (i.e. fog, rain, etc.). In order to assess when plumes are likely to occur under high visibility conditions it was conservatively assumed that 70% of the hours with greater than 95% relative humidity were visibility impaired. Using this basis the high visibility plume frequency data was obtained and is presented in Table 5. As shown in the table, under high visibility conditions, the frequency of plume occurrence drops from 6.9% under all viewing conditions (as previously discussed) to approximately 4%. The CSVP predicted plume size characteristics are presented in Table 6.

Also, for this site the direction of the plumes is important because Morro Rock is a significant visual resource. Staff determined the daytime plume direction frequencies presented in Table 7 through the direct analysis of the hourly wind direction of each hour with a plume predicted.

**Table 5  
Staff Predicted High Visibility Daylight Hours with HRSG Steam Plumes**

Direction	1994		1995		1996		Totals	
	Hours	Percent	Hours	Percent	Hours	Percent	Hours	Percent
None		0%		0%		0%		0%
Along		07%		5%		4%		3%
Over		5%		5%		3%		3%
Under		3%		0%		4%		3%
Total		0%		0%		7%		5%

**Table 6  
Staff Predicted HRSG Steam Plume Dimensions (meters)**

<b>Hours</b>	<b>Length</b>	<b>Height</b>	<b>Width</b>
Maximum	1009	620	55
Average	308	301	40
Median	237	264	41
<b>Daylight Hours</b>			
Maximum	606	620	54
Average	227	319	39
Median	203	304	41
<b>Daylight Hours &lt;95% RH</b>			
Maximum	606	620	54
Average	218	323	39
Median	199	307	41

The average and median values reflect the average and median dimensions when plumes occur.

The staff's determined plume direction frequencies are not exactly the same as those determined by the Applicant (see plume roses in Appendix D). However, the general finding by both staff's and the Applicant's analyses is that the majority of the plume frequencies occur in the westerly and easterly directions (i.e. offshore and onshore), while visible plumes in northerly and southerly directions are predicted to be considerably less frequent.

One issue of concern with respect to plume formation and direction of drift is the potential for plumes to block views of Morro Rock, particularly from the elevated perspectives of the Sunset Plateau and Harbor Front Tract residential areas. From the Sunset Plateau residential area (KOP 14), the direction of drift of most concern is the north to west quadrant. Given the average plume dimensions presented in Table 6, it is likely that some of the plumes drifting in the north to west directions would obscure views of Morro Rock from the Sunset Plateau residential area. The percentage of time that the plumes would drift into the north to west quadrant is approximately 30% (see Table 7). Given that plumes would occur approximately 4% of high visibility daylight hours, the maximum percentage of time that a plume might block views of Morro Rock when viewed from the Sunset Plateau residential area would be approximately 1.2% of the time (4% x 0.3).

Similarly, from the Harbor Front Tract residential area (KOP 15), the direction of drift of most concern is the east to south quadrant. Again, it is likely that some of the plumes drifting in the east to south directions would obscure views of Morro Rock from the Harbor Front Tract residential area. The percentage of time that the plumes would drift into the east to south quadrant is approximately 41% (see Table 7). Given that plumes would occur approximately 4% of high visibility daylight hours, the maximum percentage of time that a plume might block views of Morro Rock when viewed from the Harbor Front Tract residential area would be approximately 1.6% of the time (4% x 0.41).

**Table 7  
Staff Predicted HRSG Steam Plume Direction Frequencies**

Wind Direction (to)	Daylight Hours				Daylight Hours – RH<95%			
	1994	1995	1996	Average	1994	1995	1996	Average
North	0%	0%	0%	0%	0%	0%	0%	0.00%
North-Northeast	0%	0%	0%	0%	0%	0%	0%	1.56%
Northeast	0%	0%	5%	0%	0%	0%	0%	3.75%
East-Northeast	0%	0%	2%	0%	0%	0%	0%	3.13%
East	5%	0%	1%	0%	0%	0%	0%	6.25%
East-Southeast	1%	0%	2%	5%	1%	0%	0%	19.06%
Southeast	0%	0%	0%	0%	0%	0%	0%	3.75%
South-Southeast	0%	0%	0%	0%	0%	0%	0%	0.31%
South	0%	0%	0%	0%	0%	0%	0%	0.94%
South-Southwest	0%	0%	0%	0%	0%	0%	0%	0.63%
Southwest	0%	0%	0%	0%	0%	0%	0%	2.19%
West-Southwest	0%	0%	0%	0%	0%	0%	5%	9.69%
West	0%	5%	0%	0%	0%	5%	3%	10.00%
West-Northwest	0%	0%	0%	2%	0%	0%	0%	21.56%
Northwest	0%	0%	0%	0%	0%	0%	0%	6.56%
North-Northwest	0%	0%	0%	0%	0%	0%	0%	2.81%
Calm	0%	1%	0%	0%	0%	1%	0%	7.81%
Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%

### Conclusions and Recommendations Concerning Plumes

While visible plumes from the HRSG exhausts would occur from the MBPP Project during periods of cold weather or cool wet weather, the actual frequency of occurrence would vary from year to year. Additionally, HRSG plume formation can occur during the daytime or nighttime. However, based on the duct firing operating profile, the results indicate that the conditions for plume formation are most prevalent during daytime hours. Of all daylight hours with plumes predicted, a total of 71% were predicted to occur before 10 AM. Of daylight hours with relative humidities below 95% (i.e. likely high visibility daytime hours) a total of 81% were predicted to occur before 10 AM.

The results of the staff CSVP modeling analysis show slightly more frequent and slightly larger plumes than the Applicant. This difference may result in part from differences in the modeling programs used and slightly different mathematical representations of the saturation curve.

Given the relatively low frequency of daytime plume occurrence (6.9% of the time under all viewing conditions and 4% of the time under conditions of high visibility), plume formation is not expected to result in significant visual impacts. Also, the maximum frequency of view blockage of Morro Rock by plumes when observed from the elevated residential perspectives of Sunset Plateau and Harbor Front Tract would be very low, averaging approximately 1.5%

(maximum) of high visibility daylight hours. Given this low frequency of view blockage, the resulting visual impact would not be significant.

## **CONSIDERATION OF IMPACTS IN RELATION TO CEQA SIGNIFICANCE CRITERIA**

This analysis considered the potential impacts of the proposed project in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

1. Would the project have a substantial adverse effect on a scenic vista?

Although panoramic views are available to nearby recreationists, residents, visitors, and motorists, the proposed project would not adversely impact recognized or designated scenic vistas in the project viewshed. Therefore, the project would not cause significant visual impacts in regard to this criterion.

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Although the project is located within the viewshed of an adjacent state-designated scenic highway, the new facilities would be installed at the site of an existing tank farm of industrial character. Therefore, the power plant facilities would not cause significant visual impacts in regard to this criterion.

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

As previously discussed, the proposed project would introduce prominent structures of industrial character into the foreground of views from Morro Strand State Beach (KOP 5) and Morro Dunes Trailer Park Resort Campground. Viewers from these locations are considered highly sensitive to landscape change and the proposed project would substantially degrade the quality of views from these areas. Therefore, the project is expected to cause significant visual impacts in regard to this criterion. However, implementation of staff-proposed mitigation measures and conditions of approval (see below) would reduce project impacts to KOPs 5 and 6 to a level that would be less than significant.

Also, the sequence of construction and demolition would result in views of substantial construction and demolition activities and equipment over a period of approximately five years. During this time, the new plant and existing plant would be concurrently visible along with the necessary construction cranes, vehicles, and equipment. The resulting visual impact would be substantially adverse, particularly as experienced from the elevated perspectives of the Sunset Plateau and Harbor Front Tract residential areas.

4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

The project has the potential to create a new source of substantial light that could adversely affect nighttime views in the area. However, the exterior lighting control measures required under staff's mitigation measure VIS-3 (see below) would ensure that lighting impacts would be less than significant.

## **CUMULATIVE IMPACTS**

Cumulative impacts to visual resources could occur where project facilities or activities (such as construction) occupy the same field of view as other built facilities or impacted landscapes. It is also possible that a cumulative impact could occur if a viewer's perception is that the general visual quality of an area is diminished by the proliferation of visible structures (or construction effects such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; (3) visual quality is diminished; or (4) the project's visual contrast is increased.

Based on consultations with the City of Morro Bay and the County of San Luis Obispo, the Applicant has identified 25 projects to be evaluated for cumulative impact potential (Duke 2000a, Table 6.1-1). None of the county-identified projects are located sufficiently close to the proposed power plant to be visible or noticeable within the same viewshed as the power plant. Therefore, these projects would not have the potential to cause cumulative visual impacts in conjunction with the proposed project.

Of the 16 city-identified projects, Cumulative Project #1 (RV campground), which would be located near Coleman Park on the sand spit between Morro Rock and Embarcadero, would likely result in a cumulative visual impact with the proposed power plant when viewed from KOPs 5 and 8. Additional design details would need to be provided to determine if the resulting cumulative visual impact would be significant or not. However, Project #1 has been put on hold and no additional information is available.

Cumulative Project #2 (The Cloisters) would be visible in the same viewshed as the proposed project when viewed from KOPs 2 and 3. However, at these distances, the proposed project would not be prominent in the viewshed and portions of Project #2 would be screened by existing structures. The resulting cumulative visual impact would be adverse but not significant.

Cumulative Project #3 (Tri-W Shopping Center) would be visible within the same viewshed as the proposed project when viewed from KOPs 1 and 16. However, from KOP 1, Project #3 would appear as a continuation of the urban development boundary and would not be a prominent feature in the landscape. Also, the proposed project would be minimally noticeable and appear subordinate in the landscape when viewed from KOP 1. When viewed from KOP 16, Project #3 would be visible but the proposed project would be almost entirely screened from view by intervening vegetation. Taken together, these two projects would not result in a significant cumulative impact.

Cumulative Projects #4 (Colmer Housing Tract) and #5 (Harbor View Hotel) would not be noticeable in the landscape when viewed from any of the KOPs and thus, would not result in a significant cumulative visual impact when considered with the proposed project.

Cumulative Project #6 (Rock 'n Burger) would be visible from KOP 14 but in the context of adjacent buildings would not be prominent or generally noticeable. Therefore, it would not result in a significant cumulative visual impact when viewed in conjunction with the proposed project.

Cumulative Project #7 (small commercial project) would be visible from KOP 5 and may be visible from KOPs 14 and 15. It is possible that this project may result in a cumulative visual impact with the proposed power plant when viewed from KOP 5. However, additional design details would need to be provided in order to assess whether or not the project would be visible from KOP 5 above the intervening dunes and to determine if any resulting cumulative visual impact would be significant or not. From KOPs 14 and 15, it is doubtful that Project #7 would be substantially noticeable due to the greater distance and the potential screening that may be provided by intervening vegetation and the proposed power plant. Any cumulative visual impact perceived from KOPs 14 and 15 is not anticipated to be significant.

Cumulative Project #8 (small commercial project) may be visible from KOP 8 but would not be noticeable in the context of the surrounding commercial development. Therefore, a significant cumulative visual impact is not anticipated.

Cumulative Projects #9 and #10 (small commercial projects) may be visible from KOP 16 but would not be noticeable given the direction of the viewer's attention after exiting Highway 1 and the developed context surrounding these two cumulative projects.

Cumulative Projects #s 11 and 12 (small commercial projects) would not be visible from any of the selected KOPs and would not result in a cumulative impact when considered within the viewing context of the proposed project.

Cumulative Projects #s 13 to 16 are small residential projects and would not be noticeable from any of the selected KOPs and are therefore not expected to result in cumulative visual impacts in conjunction with the proposed project.

Finally, with removal of the existing power plant and elimination of its attendant plume, the addition of the proposed project would not be perceived as a proliferation of visible industrial structures and attributes contributing to a deterioration of visual quality.

## **FACILITY CLOSURE**

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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 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.

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 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.

## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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### STATE

The proposed project would result in an overall improvement in the Highway 1 viewshed in the project vicinity because the benefits due to the removal of the existing power plant would exceed the adverse effects of the proposed power plant. As a result, the project would be consistent with policies and planning guidance pertaining to the protection and enhancement of scenic resources within the scenic Highway 1 corridor.

### LOCAL

Table 8 provides a preliminary listing of applicable LORS of the City of Morro Bay. Relevant programs and policies pertain to both visual quality and landscaping. With proper implementation of the Applicant's proposed mitigation measures as augmented by staff's proposed mitigation measures and conditions of certification, the proposed project would be consistent with all 27 local objectives, programs, and policies identified in Table 8.

**Table 8  
Preliminary Determination of the Proposed Project's Consistency with  
City of Morro Bay LORS Applicable to Visual Resources**

LORS		Preliminary Consistency Determination Before Mitigation	Basis for Consistency Determination
Policy No.	Policy Description		
<b>CITY OF MORRO BAY GENERAL PLAN (GP)</b>			
Development Quality Objective 2	To preserve the unique coastal fishing village image by ensuring that new development must be sensitive to its surroundings, the environment within which it occurs and the overall	YES	Removing the existing power plant, locating the proposed power plant farther to the north of The Embarcadero, and redesigning the water intake structure would improve visual quality

**Table 8  
Preliminary Determination of the Proposed Project's Consistency with  
City of Morro Bay LORS Applicable to Visual Resources**

LORS		Preliminary Consistency Determination Before Mitigation	Basis for Consistency Determination
Policy No.	Policy Description		
	community image.		from The Embarcadero and help to preserve the unique coastal fishing village image.
GP Program C-1.4	Future walkways and bikeway on PG&E property along its Embarcadero frontage should be designed in a meandering fashion to minimize loss of existing trees and landscaping. Reduced walkway and/or bikeway widths (or a combined facility) may be allowed where necessary to retain landscaping.	YES	The proposed project improves coastal access by creating or improving three segments of a bike and pedestrian path around the plant site. Of particular importance is a bridge over Morro Creek and a new east-west bike path between Highway 1 and the Embarcadero. Proper implementation of the Revised Landscape Planting Plan (presented as <b>VISUAL RESOURCES Figure 16</b> ) would minimize loss of existing trees and landscaping.
GP Policy C-38	Hazards and adverse visual impacts caused by utility transmission and communication lines should be minimized.	YES	The proposed project does not include the construction of new utility lines other than the 50- to 100-foot tall H-frame transmission takeoff structures that would connect the new power plant to the existing PG&E switchyard on the site. The new structures would be limited to the power plant site and would not require the creation of a new transmission line corridor.  Proper implementation of the proposed landscaping plan would screen much of the proposed takeoff structures from sensitive viewing locations. This screening plan is further augmented by staff's proposed conditions of certification, which would further reduce the visual impact of the takeoff structures and project as a whole.
GP Program C-38.1	All new development and major redevelopment should be required to underground new utility lines and, when feasible underground existing utility lines on or adjacent to the project site.	YES	See GP Policy C-38 above.
GP Program LU-15	The present human scale and leisurely, low intensity appearance of Morro Bay should be maintained through careful regulation of building height, location and mass.	YES	The proposed project's height, location, and mass represent an improvement over the existing Morro Bay Power Plant. Also, removing the existing power plant, locating the proposed power plant farther to the north of The Embarcadero, and redesigning the water intake structure would improve visual quality from The Embarcadero

**Table 8  
Preliminary Determination of the Proposed Project's Consistency with  
City of Morro Bay LORS Applicable to Visual Resources**

LORS		Preliminary Consistency Determination Before Mitigation	Basis for Consistency Determination
Policy No.	Policy Description		
			and help to preserve the unique coastal fishing village image.
GP Program LU-17	Modern concepts of development should be utilized with special emphasis placed upon the blending of future housing, commerce and industry with the natural terrain and environmental features.	YES	The visual characteristics of the proposed project are generally consistent with those of the existing landscape as established by the existing Morro Bay Power Plant and PG&E Switchyard. Proper implementation of the Applicant's proposed screening plan, as augmented by staff's recommended mitigation measures and conditions of certification, would further reduce the proposed project's visual impacts.
GP Program LU-17.1	Natural terrain, vegetation, drainage courses and rock outcroppings shall not be disrupted as a result of development, unless found to be necessary to protect the health, safety and welfare of the community.	YES	The proposed project would be located at an existing power plant and would not significantly disrupt (following mitigation) the natural features identified in this General Plan Program.
GP Policy LU-19	The City should do everything it possibly can to keep the fishing village atmosphere and balance the mixture of the land uses on the Embarcadero.	YES	Removing the existing power plant, locating the proposed power plant farther to the north of The Embarcadero and redesigning the water intake structure would improve visual quality from The Embarcadero and help to preserve the unique coastal fishing village image.
GP Program LU-37.8	Public rest areas should be incorporated into the street rights-of-way in Downtown and along the Embarcadero. These areas should consist of benches, trash receptacles, drinking fountains, landscaping, information signing or kiosks, and decorative paving and planters.	YES	The Landscaping Concept Plan described in the Application provides interpretive signs and benches along Embarcadero Road.
GP Program LU-39.1	The City shall designate the existing PG&E parcel and the Chevron pier parcel as coastal-dependent industrial uses. Any proposals for energy-dependent industrial uses within zones designated general industrial development will require an amendment to the land use plan consistent with Section 30515 of the Coastal Act. Power plant expansion on PG&E owned property shall have priority over other coastal dependent industrial uses. Power plant	YES	The project's location would not significantly affect the views of Morro Rock from Highway 1 and high use visitor serving areas. Furthermore, removal of the existing plant opens some views to Morro Rock.

**Table 8  
Preliminary Determination of the Proposed Project's Consistency with  
City of Morro Bay LORS Applicable to Visual Resources**

LORS		Preliminary Consistency Determination Before Mitigation	Basis for Consistency Determination
Policy No.	Policy Description		
	expansion shall be limited to small facilities whose location would not further affect the views of Morro Rock from State Highway One and high use visitor-serving areas, consistent with Policy 12.11 of the LCP.		
GP Program LU-40	Measures shall be taken by the City to protect against the potential adverse environmental impacts created by energy development.	YES	The proposed project would not result in significant and unavoidable adverse visual impacts with proper implementation of the Applicant's incorporated mitigation measures as augmented by staff's proposed mitigation measures and conditions of certification.
GP Program LU-40.2	The routing of any new pipelines or transmission lines shall utilize whenever possible existing pipeline or transmission line corridors.	YES	See GP Policy C-38 above.
GP Program LU-40.4	The City will require that new pipelines and transmission lines are installed with suitable mitigation measures such as erosion control, revegetation, and other measures necessary to protect all scenic resources and habitat values.	YES	The proposed project includes a landscaping plan that would screen much of the proposed takeoff structures from sensitive viewing locations. This screening plan is further augmented by staff's proposed conditions of certification, which would further reduce the visual impact of the takeoff structures and project as a whole.
GP Program LU-40.16	As a condition of any expansion of the PG&E power plant, the City will require substantial landscaping and screening to mitigate the visual impacts of existing and future facilities; with particular emphasis on screening the facilities located between the power plant and Highway 1.	YES	Proper implementation of the revised Planting and Screening Plan presented, as VISUAL RESOURCES Figure 16 would provide adequate screening of views from KOPs 5 and 6.
GP Program LU-55.2	Development in areas adjacent to Environmentally Sensitive Habitat (ESH) areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall maintain the habitats' functional capacity.	YES	The proposed project would exhibit visual characteristics similar to those of the existing Morro Bay Power Plant. The proposed project would also reduce the prominence and view blockage of the power generation facilities on site through the removal of the existing Morro Bay Power Plant and construction of the smaller proposed power plant to the north of the existing plant. However,

**Table 8**  
**Preliminary Determination of the Proposed Project's Consistency with**  
**City of Morro Bay LORS Applicable to Visual Resources**

LORS		Preliminary Consistency Determination Before Mitigation	Basis for Consistency Determination
Policy No.	Policy Description		
			<p>the proposed project's industrial character, including complex forms and industrial metallic coloration and texture, would substantially contrast with the existing landscape when viewed from Morro Strand State Beach (KOP 5) and Morro Dunes Trailer Park and Resort Campground (KOP 6) and could result in significant visual impacts if left unmitigated.</p> <p>With proper implementation of the Applicant's proposed mitigation measures and revised landscape / screening plan (<b>VISUAL RESOURCES Figure 16</b>) as augmented by staff's proposed mitigation measures and conditions of certification, the proposed project would not result in significant and unavoidable adverse visual impacts to adjacent parks and recreation areas.</p>
GP Policy LU-62.1	All development at or adjacent to the harbor or beach areas shall provide for physical and visual public access to these features.	YES	Project development would provide physical and/or visual public access to the harbor or beach areas. The project would improve physical and visual access by removing the three existing 450-foot tall stacks and the existing power building for Units 1-4, constructing a bridge over Morro Creek, and creating a pedestrian and bike path circulation loop around the MBPP property. The Landscaping Concept Plan calls for the trimming of tall eucalyptus trees to improve viewsheds to the harbor, Morro Rock, and the Pacific from the Harbor Front Tract and Scott Street neighborhoods.
GP Program VR-2	The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic and coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and where feasible, to restore and enhance visual quality in visually degraded areas. New development	YES	See GP Program LU-55.2 above.

**Table 8  
Preliminary Determination of the Proposed Project's Consistency with  
City of Morro Bay LORS Applicable to Visual Resources**

LORS		Preliminary Consistency Determination Before Mitigation	Basis for Consistency Determination
Policy No.	Policy Description		
	in highly scenic areas such as those designated on Figure VR-1, shall be subordinate to the character of its setting.		
GP Program VR-2.1	Permitted development shall be sited and designed to protect views to and along the coast and designated scenic areas and shall be visually compatible with the surrounding areas.	YES	See GP Program LU-55.2 above.
GP Program VR-3.4	Industrial developments shall be sited and designed in areas specifically designated in the Land Use Plan to protect views to and along the ocean and scenic areas, to minimize land alteration, to be visually compatible with the character of the surrounding areas, and where feasible, shall include measures to restore and enhance visually degraded areas. In addition, industrial development shall be subordinate to the character of its setting.	YES	See GP Program LU-55.2 above.
<b>CITY OF MORRO BAY LOCAL COASTAL PLAN (LCP)</b>			
LCP Policy 5.06	See GP Program LU-40.2 above.	YES	See GP Policy C-38 above.
LCP Policy 5.08	See GP Program LU-40.4 above.	YES	See GP Program LU-40.4 above.
LCP Policy 5.21	See GP Program LU-40.16 above.	YES	See GP Program LU-40.16 above.
LCP Policy 11.02	See GP Program LU-55.2 above.	YES	See GP Program LU-55.2 above.
LCP Policy 12.01	See GP Program VR-2 above.	YES	See GP Program LU-55.2 above.
LCP Policy 12.02	See GP Program VR-2.1 above.	YES	See GP Program LU-55.2 above.
LCP Policy 12.08	Morro Bay shall request the division of Highways to develop a plan and program for landscaping the entire length of State Highway One as it traverses through the community that would: a) Frame and protect important views; b) Screen unattractive views; and c) Accentuate entrances to the City.	YES	The Applicant has committed to coordinating the landscaping of the site with the City of Morro Bay and PG&E.
LCP Policy 12.11	See GP Program VR-3.4 above.	YES	See GP Program LU-55.2 above.

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

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### CALIFORNIA COASTAL COMMISSION (CCC)

**Comment CCC-3:** Identify potential construction impacts (e.g., noise, traffic, aesthetics) to public access/recreation at Morro Strand State Beach, Morro Rock Coleman Park etc.

Response: The Visual Resources section includes a discussion of construction related impacts that would be applicable to the three areas referenced in the comment.

**Comment CCC-26:** VIS-1 and VIS-2 may not reduce impacts to less than significant levels at Key Observation Points 5 and 6, additional conditions should be considered.

Response: Staff has revised Visual Resources Condition of Certification VIS-1 to require the development of additional options to partially or completely enclose or cover the more industrial appearing aspects of the proposed project including the pipe racks. It is staff's conclusion that the project design proposed by the Applicant (with revised planting and screening plan), in conjunction with staff's additional mitigation measures and conditions of certification (as revised), would mitigate visual impacts of the proposed project to levels that would not be significant.

**Comment CCC-27:** We request that the treatment plan and landscaping plan, as required (by) VIS-1 and VIS-2, respectively, be reviewed and approved by the CEC, in consultation with the Executive Director of the Coastal Commission.

Response: All Conditions of Certification have been revised to provide for review and comment by the California Coastal Commission on the required submittals.

**Comment CCC-28:** To date, we understand that no alternative design treatments for the power plant have been provided, as requested by the CEC. A photosimulation of these treatments are necessary in order to assess their ability to soften the hard, industrial character of the proposed plant. We request that CEC staff require these treatments for public review and comment prior to the release of the FSA.

Response: It is understood by staff that the project design presented in the AFC resulted from a series of community workshops sponsored by the City of Morro Bay. These workshops included enclosure options, color options, and variations on structure orientation. In Data Requests 132 and 141, staff asked the Applicant to describe what design treatments were feasible to soften the hard, metallic, industrial character of the proposed project and to minimize the height of the intake structure. However, these requests did not "require" the Applicant to provide additional design treatments. The Applicant subsequently responded to these data requests by developing additional design details for the sound wall and reducing the height of the intake structure. Additionally, in response to staff comments on the planting

and screening plan, the Applicant has revised that plan such that much of the power plant would be screened from view from Morro Strand State Beach (KOP 5) and Morro Dunes Trailer Park and Resort Campground (KOP 6).

Staff's decision not to require additional project design exercises and presentations is based on four factors: (1) it was recognized from the outset that from most (though not all) viewpoints, the proposed project's removal of the existing power plant would result in a net improvement in views following construction of the new plant; (2) the design presented in the AFC reflected a substantial design review effort between the Applicant and the local community; (3) in response to staff's data requests; some additional design modifications were made to the sound wall and the water intake structure; and (4) the revised planting and screening plan developed by the Applicant and presented after publication of the Preliminary Staff Assessment would improve project screening when viewed from Morro Strand State Beach (KOP 5) and Morro Dunes Trailer Park and Resort Campground (KOP 6).

However, as a result of comments received from state and local agencies, staff's proposed Condition of Certification VIS-1 has been modified to require the submittal of optional design treatments to partially or completely enclose or cover the more industrial-appearing elements of the proposed project including the pipe racks.

**Comment CCC-29:** We also request photosimulations of a fully enclosed facility, as depicted in Figure 6.13-10 of the AFC, and a facility with combined stacks. Incidentally, there are significant portions of the plant in the figure that are not enclosed. We request clarification of this apparent discrepancy.

Response: Please see Response to Comment CCC-28 above.

**Comment CCC-30:** We understand that the proponent of another project, the Metcalf Energy Center, before your agency proposes innovative design features that significantly reduce the visual impacts of its facility. Those features are detailed on the project's web site. The project has incorporated many feasible and effective design features that should, at least, be explored by Duke in order to minimize adverse visual impacts from KOPs 5 and 6.

Response: Please see responses to Comments CCC-28 above.

**Comment CCC-31:** We concur with the PSA that adverse visual impacts will result during an interim period (5-6 years) when construction and demolition activities occur concurrently. Thus, all feasible mitigation measures to minimize such impacts should be explored in the FSA. As the City of Morro Bay suggests in its June 19, 2001 PSA comment letter, such measures, for example, could include: expediting the demolition schedule, enforcing the schedule through conditions of certification, requiring performance guarantees to ensure timely demolition, requiring removal of Units 1-2 concurrently with new plant construction, requiring early installation of any perimeter walls and landscaping, and strictly limiting on-site storage of stack rubble and other demolition debris.

Response: In the Visual Resources PSA Workshop, staff suggested to the Applicant that the sound wall and screening vegetation be installed early in the construction process in order to obtain sufficient growing time to meet the screening requirements set forth in staff's Condition of Certification VIS-2. This condition requires that screening vegetation reach maturity and full screening potential within five (5) years of completion of construction of the new power plant in order to avoid a long-term, significant visual impact.

**Comment CCC-32:** As a possible mitigation of adverse visual impacts, please consider requiring Duke to demolish its offsite tank farm in the County of San Luis Obispo.

Response: It is staff's position that removal of the existing Morro Bay Power Plant in conjunction with the proposed project's design treatments and vegetative screening plan adequately mitigates the visual impacts resulting from the new power plant.

**Comment CCC-33:** Because the proposed bridge over Morro Creek will be located in a highly scenic and environmentally sensitive habitat area, located in the Coastal Commission's original permit jurisdiction, we request that its design be reviewed and approved by the CEC in consultation with the Executive Director of the Coastal Commission.

Response: Condition of Certification VIS-5 has been added to provide for review of the bridge design by the City of Morro Bay and the California Coastal Commission.

## **CITY OF MORRO BAY**

**Comment CMB-34:** Visual simulations for any alternative plant design/cooling system should be provided for public review if such systems are likely to be recommended for further consideration.

Response: Condition of Certification VIS-1 has been modified to require the submittal of optional designs to partially or completely enclose or cover the more industrial appearing elements of the proposed project including the pipe racks. Furthermore, Condition VIS-1 (as do all of the Visual Resources Conditions of Certification) provides for City of Morro Bay review of the requested plans.

**Comment CMB-35:** A site restoration plan should be required for review and approval by the City for the site of the demolished plant, as well as for the site of the new plant once it is decommissioned and demolished. Appropriate standards relating to grading, compaction, landscaping, erosion control, drainage, lighting, security, aesthetics, etc., should be included in the site restoration plan.

Response: Staff's proposed Condition of Certification VIS-6 requires the submittal of a site restoration plan to the City of Morro Bay. Also, see the biological/vegetation section of this Staff Assessment for additional discussion of site restoration.

**Comment CMB-39:** Prior to commencement of construction, the design for the proposed bridge over Morro Creek should be submitted to the City for review and approval as the

bridge would be located on City-owned property. The bridge design should take into consideration the design guidelines in the City's Waterfront Master Plan.

Response: Condition of Certification VIS-5 provides for review of the Bridge Design/Plans by the City of Morro Bay and the California Coastal Commission.

**Comment CMB-40:** The design, color, and material of the sound wall should be subject to City's review and approval. An explanation of the need for the soundwall should also be provided including an evaluation of alternative techniques for addressing noise concerns (e.g. buffers, setbacks, facility enclosures, etc).

Response: Staff's proposed Condition of Certification VIS-1 pertaining to structural surface treatments and colors provides for the review of project plans by the City of Morro Bay. Also, see the noise section of this Staff Assessment for additional discussion of the sound wall.

**Comment CMB-41:** We urge your staff to revisit the conditions of certification proposed for the Metcalf project in the Final Staff Assessment dated October 10, 2000 and consider the applicability of similar conditions of certification to the Morro Bay project. Surely, the scenic value of the Morro Bay site is at least equal to that of the Metcalf site and should warrant similar consideration.

Response: As is the case with the Metcalf Project, staff's proposed Visual Resources Conditions of Certification for the Morro Bay project provides for the review of all project plans by the local jurisdiction (in this case the City of Morro Bay). However, it should also be noted that the Metcalf project and the Morro Bay project fundamentally differ in that the Morro Bay project includes the removal of the most prominent existing structural features along the Morro Bay shoreline. The end result is that from most potential viewing opportunities of the project site, the visual quality of the landscape will be improved with project implementation (as conditioned herein).

## MITIGATION

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### APPLICANT'S PROPOSED MITIGATION MEASURES

Beyond the design and landscaping proposals incorporated into the proposed project, the Applicant has proposed no mitigation measures.

### STAFF'S PROPOSED MITIGATION

Energy Commission staff generally agrees with the Applicant's proposed design and landscaping concepts. However, staff's position is that these proposals need to be modified and/or more precisely developed subject to conditions of certification, which staff proposes below. In particular, the color and surface treatment of proposed project features must be modified to minimize the project's highly contrasting industrial metallic character and blend the structures more effectively into the existing landscape (Mitigation Measure VIS-1). Most importantly, the Conceptual Planting Plan must be modified in order to provide more effective screening of the project as viewed from KOPs 5 and 6 and to reduce the overall time

necessary to achieve maximum screening (Mitigation Measure VIS-2). Additionally, the project has the potential to create a new source of substantial light that could adversely affect nighttime views in the area. Therefore, staff proposes the following four mitigation measures:

1. The project owner shall modify the surface treatment of the proposed facilities (including color and texture) to better blend the proposed project with the existing coastal landscape. In addition, the treatment plan shall include options to partially or completely enclose or cover the more industrial appearing elements (such as pipe racks) in order to reduce the visibility of these components from views from KOPs 5, 6, and 7 (see Condition of Certification VIS-1).
2. The project owner shall further revise the Revised Landscaping Plan to achieve more effective screening of proposed project facilities when viewed from KOP 5 on Morro Strand State Beach, KOP 6 at the Morro Dunes Trailer Park and Resort Campground, and KOP 7 located just west of the proposed Class II Bike Path. Trees and other vegetation must be strategically placed and of sufficient density to screen the sound wall and most lower structural forms (not the upper portions of the stacks or the upper piping). Trees must be planted sufficiently close to the southern boundary of the trailer park to effectively screen the power plant from views within the trailer park. Screening vegetation to be planted along the western (ocean) side of the project site must be extended to the north to intersect the screening vegetation to be planted along the north side of the site (see **VISUAL RESOURCES Figure 16**). Furthermore, vegetation must reach maturity and full screening potential within five (5) years of completion of construction of the new power plant in order to avoid the occurrence of a long-term, significant visual impact. Prior to project approval, the project owner shall submit to CEC staff for review and approval, revised photo simulations of the landscaping plan as viewed from KOPs 5 and 6 (see Condition of Certification VIS-2).
3. Prior to first turbine roll, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized (see Condition of Certification VIS-3).
4. The project owner shall appropriately locate and screen the demolition rubble such that it is not visible from The Embarcadero (see Condition of Certification VIS-4).

## **CONCLUSIONS AND RECOMMENDATIONS**

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### **CONCLUSIONS**

Staff concludes that from most viewing areas of the existing power plant and proposed project site, the proposed project would result in an overall long-term improvement in visual quality. Staff has also concluded that the proposed project would cause adverse visual impacts during the five-year period of construction and demolition. However, given the long-term visual improvement that would occur with removal of the existing power plant, these interim construction impacts would not be significant.

The proposed project also has the potential to cause long-term significant adverse visual impacts to Morro Strand State Beach and the Morro Dunes Trailer Park and Resort Campground. These long-term operational impacts would result from the project's contrasting appearance and foreground visibility. However, with proper implementation of the Applicant's proposed mitigation measures and revised landscape / screening plan (**VISUAL RESOURCES Figure 16**) as augmented by staff's proposed mitigation measures and conditions of certification, the proposed project would not result in significant and unavoidable adverse visual impacts to Morro Strand State Beach or the Morro Dunes Trailer Park and Resort Campground.

The project also has the potential to cause nighttime lighting impacts when viewed from the elevated perspectives of the Sunset Plateau and Harbor Front Tract residential areas. The significance of the potential lighting impacts cannot be determined at this time because the project is lacking a detailed lighting plan. However, effective implementation of staff's proposed mitigation measures and conditions of certification would reduce the long-term significant adverse visual impacts and any potential nighttime lighting impacts to levels that are not significant.

Staff LORS consistency analysis has found that the proposed project would be consistent with all 27 pertinent local objectives, policies, and programs, provided that there is effective implementation of the Applicant's proposed mitigation measures and revised planting and screening plan (**VISUAL RESOURCES Figure 16**), as augmented by staff's proposed mitigation measures and conditions of certification.

## **RECOMMENDATIONS**

The Energy Commission should adopt the following conditions of certification if it approves the project.

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**VIS-1** Prior to first turbine roll, the project owner shall treat project structures, buildings, and soundwall in appropriate colors or hues that minimize visual intrusion and contrast by blending with the surrounding landscape, and shall treat those items in a non-reflective, appropriately textured finish. In addition, the treatment plan shall include options to partially or completely enclose or cover the more industrial appearing elements (such as pipe racks) in order to reduce the visibility of these components from views from KOPs 5, 6, and 7. The plan shall be submitted to CEC for approval sufficiently early to ensure that any precolored buildings, structures, linear facilities, or pipe or facility coverings will have colors approved and included in bid specifications for such buildings or structures.

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 and to the California Coastal Commission and City of Morro Bay for review and comment. The treatment plan shall include:

- specification, and 11" x 17" color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;
- a list of each major project structure, building, and tank, specifying the color(s) proposed for each item;
- documentation that a non-reflective finish will be used on all project elements visible to the public;
- specifications, and 11" x 17" color simulations (from KOPs 5, 6, and 7), of optional pipe/facility covers and or enclosures;
- a detailed schedule for completion of the treatment and implementation of optional covers/enclosures; and,
- a procedure to ensure proper treatment maintenance for the life of the project.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall submit a revised plan to the CPM.

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, all structures to be treated in the field have been treated, all optional covers/enclosures have been installed, and the structures are ready for inspection.

**Verification:** At least 60 (sixty) 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 and to the California Coastal Commission and City of Morro Bay for review and comment.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Not less than thirty (30) days prior to the start of commercial operation, the project owner shall notify the CPM that all structures treated during manufacture, all structures treated in the field, and all optional covers/enclosures are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

**VIS-2** The project owner shall provide landscaping that is effective in screening a majority of project components from views from Morro Strand State Beach (KOP 5), the Morro Dunes Trailer Park and Resort Campground (KOP 6), and the area just west of the proposed Class II Bike Path (KOP 7). Trees and other vegetation must be strategically placed and of sufficient density to screen the sound wall and most lower structural forms (not the upper portions of the stacks or the upper piping). Trees must be planted sufficiently close to the southern boundary of the trailer park to effectively screen the power plant from views within the trailer park. Screening vegetation to be planted along the western (ocean) side of the project site must be extended to the north to intersect the screening vegetation to be planted along the north side of the site (see **VISUAL RESOURCES Figure 16**). Vegetation must reach maturity and full screening potential within five (5) years of completion of construction of the new power plant in order to avoid the occurrence of a long-term, significant visual impact.

Protocol: The project owner shall submit a landscaping plan to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment. The Plan shall include photosimulations of the landscaping at maturity as viewed from KOPs 5 and 6. The submittal shall also include evidence that the plan is satisfactory to the City of Morro Bay.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

Verification: Prior to first turbine roll and at least 60 (sixty) days prior to installing the landscaping, the project owner shall submit the plan to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within 7 (seven) days after completing installation of the landscaping, that the landscaping is ready for inspection.

**VIS-3** Prior to first turbine roll, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized.

Protocol: The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment. The lighting plan shall require that:

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;
- A lighting complaint resolution form (following the general format of that in Attachment 1) will be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Lighting shall not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

**Verification:** At least 90 (ninety) days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting is ready for inspection.

**VIS-4** The project owner shall appropriately locate and screen the demolition rubble such that it is not visible from The Embarcadero.

Protocol: The project owner shall submit a plan for screening the demolition rubble to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.

The project owner shall not implement the plan until receiving written approval of the submittal from the CPM.

**Verification:** At least ninety (90) days prior to beginning stack demolition, the project owner shall submit the plan to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment.

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.

**VIS-5** The project owner shall develop a design for the Embarcadero bike and pedestrian bridge over Morro Creek that is responsive to the concerns of the City of Morro Bay and the California Coastal Commission.

Protocol: The project owner shall submit a bridge design to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment. The design shall include at least one photosimulation of the bridge from KOP 7 and additional simulations from other view areas as necessary to convey the design and scope of the bridge and its environmental context.

If the CPM notifies the project owner that revisions of the design are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised design.

The project owner shall not implement the design until the project owner receives approval of the submittal from the CPM.

**Verification:** Prior to first turbine roll and at least 60 (sixty) days prior to construction of the bridge, the project owner shall submit the bridge design to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within 7 (seven) days after completing construction of the bridge, that the bridge is ready for inspection.

**VIS-6** The project owner shall ensure that visual impacts of project construction are adequately mitigated. To accomplish this, the project owner shall require the following as a condition of contract with its contractors to construct the proposed project:

Protocol: All evidence of construction activities, including ground disturbance due to staging and storage areas, shall be removed and remediated upon completion of construction to its pre-construction condition or as required by the approved landscaping plan. Any vegetation removed in the course of construction will be replaced on a 1-to-1 in-kind basis. Such replacement planting shall be monitored for a period of three years to ensure survival. During this period, all dead plant material shall be replaced.

The project owner shall submit a site restoration plan to the CPM for review and approval and to the California Coastal Commission and the City of Morro Bay for review and comment. The plan shall include grading to the original grade, contouring, and revegetation as appropriate.

The project owner shall not implement the restoration plan until receiving written approval from the CPM.

Verification: At least ninety (90) days prior to beginning implementation of the surface restoration, the project owner shall submit the restoration plan to the CPM for review and approval and to the California Coastal Commission and City of Morro Bay for review and comment.

If the CPM notifies the project owner that any revisions of the restoration 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 (7) days after completing the surface restoration that it is ready for inspection.

## REFERENCES

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- DUKE (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes 1a-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission on October 23, 2000.
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Requests 128-161, 164-176, dated and submitted to the California Energy Commission on February 20.

- DUKE (Duke Energy Morro Bay LLC/Luckhardt) 20001b. Letter from Downey Brand Seymour & Rohwer/Luckhardt to CEC/Lewis RE Objections to the Staff's Visual Data Requests, dated and submitted to the California Energy Commission on March 9, 2001.
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- U.S. Department of Interior (USDI), Bureau of Land Management (BLM). 1986a. *Visual Resource Inventory Manual*. USDI, BLM.
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ATTACHMENT 1

LIGHTING COMPLAINT RESOLUTION FORM

MORRO BAY POWER PLANT PROJECT Morro Bay, California
Complainant's name and address:
Phone number:
Date complaint received: Time complaint received:
Nature of lighting complaint:
Definition of problem after investigation by plant personnel:
Date complainant first contacted:
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.)

# **VISUAL RESOURCES APPENDIX A**

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## **Visual Analysis Data Summary**

## **VISUAL RESOURCES APPENDIX B**

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### **Visual Resources Figures 1 through 16**

# WASTE MANAGEMENT

Testimony of Alvin Greenberg, Ph.D.

## INTRODUCTION

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This analysis presents an assessment of issues associated with managing wastes generated from constructing and operating the proposed Morro Bay Power Plant Project (MBPP Project, 00-AFC-12). staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses wastes generated during facility construction (including demolition of existing structures) and operation, except wastewater discharged pursuant to National Pollutant Discharge Elimination System (NPDES) permits. Wastewater is discussed in the **Soil and Water Resources** section of this document.

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

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

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### FEDERAL

#### **Resource Conservation and Recovery Act (42 U.S.C. § 6922)**

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.

#### **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 §25100 et seq. (Hazardous Waste Control Act of 1972, as amended).**

This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency, or Cal EPA) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes.

### **Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)**

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

### **Title 22, California Code of Regulations, §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

City of Morro Bay Zoning Ordinance §17.52.090 requires compliance with standards on the discharge of harmful liquid and solid waste. The Central Coast Regional Water Quality Control Board (CCRWQCB) enforces this ordinance. Compliance with a NPDES permit is adequate to meet these requirements.

## SETTING

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### **PROJECT AND SITE DESCRIPTION**

On October 23, 2000 Duke Energy Morro Bay LLC filed an Application for Certification (00-AFC-12) seeking approval from the California Energy Commission (Energy Commission) to construct and operate the proposed 1,200-megawatt (MW) Morro Bay Power Plant Project (MBPP Project). The "modernization" Project is proposed to be located at the existing 1,030 MW Morro Bay Power Plant site that is owned and operated by Duke Energy. This site is

located within the City of Morro Bay, San Luis Obispo County, near Morro Bay Harbor, bordered on the west by Embarcadero Road and on the east by Highway 1.

The new units will replace four currently operating generation units with two state-of-the-art 600 MW combined cycle units. Each new unit will be capable of producing 600 MW, so that upon completion, the Plant will be capable of producing a total of 1,200 MW. Each new unit will consist of two gas-fired turbines and one steam turbine driven by the heat produced by the other two turbines. Each new unit will have two, 145-foot tall stacks compared with the existing plant's three 450 foot tall stacks.

Natural gas will be delivered from Pacific Gas and Electric Company's Kettleman Compressor Station through PG&E pipeline 306. Natural gas originates from the south with El Paso Natural Gas in Arizona and from the north with PG&E/Northwest in Oregon.

The Project will include demolition of the on site fuel oil tank farm, all existing power plant equipment (boiler – steam turbine complex), and removal of three 450 feet tall exhaust stacks (Duke 2000a). Stage one consists of the demolition of the tank farm in three months and will be completed in 2002. Stage two includes the demolition of the three 450 foot stacks and will begin after commercial operation of the new units commences. This stage will be completed in 2004. Stage three involves the dismantling of the existing generation units by the end of 2007.

Duke Energy purchased the MBPP facility from Pacific Gas and Electric (PG&E) but PG&E retained responsibility for cleaning up onsite contamination created prior to the sale. PG&E commissioned a Phase I Environmental Site Assessment (ESA) at MBPP in April 1997 (PG&E 1997a). The purpose of the ESA was 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 Phase I ESA identified a number of environmental conditions at the site (summarized in AFC Table 6.14-1) including:

- Total petroleum hydrocarbons (TPH), rust-inhibiting oil, and paint chips in soils near and beneath the fuel oil storage tanks;
- TPH, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) in soils near tank 1 and the former oil transfer pond;
- Asbestos containing materials (ACM) at the fuel oil tank farm;
- No. 6 fuel and displacement oils in the tank farm pipelines;
- Displacement oil in the upper impounding basin area; and
- TPH and lead in soils around the Rock Blotter Area (transformer banks 1-4 north of the power building)

The Phase I ESA provided the basis for additional sampling and analysis of soil and groundwater performed as part of a Phase II ESA to further define the extent of existing contamination (PG&E 1997b, c, d). Analytical results of the Phase II investigation helped identify remediation issues for nine identified localized areas at the MBPP (summarized in AFC Table 6.14-2). These areas comprise ~1.35 acres out of the ~107-acre site (~1% of the area). The contaminants identified include TPH at levels greater than 150 ppm in soil and 100 ppb in groundwater. PG&E has retained remediation responsibility for all nine areas. No schedule for remediation has been prepared other than to state that remediation will be completed as per the terms and conditions of the Purchase and Sale Agreement (AFC Table 6.14-2).

## **IMPACTS**

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### **PROJECT SPECIFIC IMPACTS**

#### **Construction and Demolition**

Demolition, site preparation, and construction of the generating plant and associated facilities will generate both nonhazardous and hazardous wastes. Individual contractors are considered to be the generators of construction wastes, and as part of its contract specifications for construction contractors, the MBPP will require that materials be handled and disposed in accordance with applicable LORS (Duke 2000a, AFC p. 6.14-20). The most likely disposal site for nonhazardous waste would be the Cold Canyon Landfill.

Nonhazardous waste streams from construction include paper, wood, glass, scrap metal, and plastics, from packing materials, waste lumber, insulation, and nonhazardous chemical containers (AFC Table 6.14-5). Duke Energy estimates that about 40 cubic yards of these types of wastes will be generated on a weekly basis, or a total of about 4000 cubic yards during the 21-month construction period (Duke Energy 2000a, AFC Table 6.14-5).

Hazardous wastes typically generated during construction include waste oil and grease, paint, used batteries, spent solvent, welding materials, and cleanup materials from spills of hazardous substances. Table 6.14-5 (Duke Energy 2000a) lists types, estimated amounts, and management methods of hazardous wastes. Duke Energy estimates that a total of about 1 cubic yard of hazardous wastes will be generated per week of construction activities. Additionally, about 165 gallons of solvents, used oil, paints, and oily rags will be generated. Duke Energy estimated that 300,000 – 700,000 gallons of HRSG cleaning waste (some hazardous and some nonhazardous) would also be generated during construction.

In addition to the construction hazardous wastes noted above, there will be additional wastes associated with the demolition of three 450-foot tall exhaust stacks used for units one through four and the existing buildings. For example, asbestos may be found in the high temperature piping thermal insulation, some plant equipment is coated with lead based paint, mercury may be used in small quantities in electrical switches, and older capacitors or transformers may contain insulating oil with polychlorinated biphenyls. Material from demolition of the exhaust stacks may include both hazardous and nonhazardous wastes, depending on

analytical results. Portions classified as hazardous would be transported offsite to a Class I (hazardous) disposal facility. Duke Energy estimates that about 32,000 cubic yards (64,000 tons) of demolition debris from the stacks, concrete, and slabs could be generated over the course of demolition (Duke 2000a, Table 6.14-5). On-site reuse of much of these demolition wastes, such as the use of ground-up concrete for fill material, is expected to greatly reduce the need for off-site disposal. Other wastes from these demolition activities include 9600 tons of ACM, 8024 tons of power generators, 40,064 tons of steel, and 9100 tons of flooring, valves, and insulation.

Further wastes will be generated by the demolition of the fuel oil tanks. Approximately 2000 tons of displacement oil and oily water wastes will be generated along with 600 tons of steel, 90 tons of ACM, and 1800 tons of fuel oil and oily sludge wastes.

### **Operation**

The proposed facility will generate both nonhazardous and hazardous wastes under normal operating conditions. However, according to Duke Energy (Duke 2000a, Table 6.14-6), shutting down the existing power plant and operating the proposed MBPP will result in a net decrease of total hazardous and nonhazardous wastes generated.

Nonhazardous wastes generated during plant operation are expected to be similar to those generated by the present facility and include trash, office wastes, empty containers, broken or used parts, used packing material, and used filters. The quantities of nonhazardous wastes generated from gas-fired facilities are typically minor and operation of the new units is expected to generate the same amount as currently generated, less than 0.43 tons per day (Duke 2000, Table 6.14-3). Nonhazardous solid waste at the existing facility is routinely segregated according to recyclable content to minimize the quantity disposed offsite (Duke 2000a, AFC p. 6.14-10). This practice will continue for operation of the proposed MBPP.

Hazardous wastes likely to be generated during routine project operation include oily water, CTG washwater, heat recovery steam generator (HRSG) washwater, spent selective catalytic reduction (SCR) catalysts, and minimal amounts of used cleaning solvents. About 25 tons per year (tpy) of oily water, 85 tpy of CTG washwater, 420 tpy of HRSG washwater, and 100 tpy of SCR catalyst (containing heavy metals such as vanadium) are expected to be generated on an annual basis from the new combined cycle units (Duke 2000a, Table 6.14-6). About 4228 tons of hazardous solid and liquid wastes are generated by the present facility each year. The new combined-cycle units will generate approximately 630 tons each year.

Solid wastes will be disposed of at either Class I, II, or III landfills (depending on the waste type) while liquid wastes will be either discharged to municipal sewage treatment plants, transported to hazardous waste treatment or disposal facilities, or discharged to the ocean after treatment by an oil/water separator (if nonhazardous).

### **IMPACT ON EXISTING WASTE DISPOSAL FACILITIES**

AFC Table 6.14-3 lists landfills in San Luis Obispo County, which accept nonhazardous wastes. Solid waste currently generated by the present power plant at ~0.45 tons per day (tpd) is taken to the Cold Canyon Landfill (Duke 2000a, AFC p. 6.14-13). The Cold Canyon

Landfill has a permitted disposal capacity of 750 tpd and is expected to remain operational until 2020. Other landfills in the area have additional capacity and include Chicago Grade Landfill (500 tpd, 2020) and City of Paso Robles Landfill (250 tpd, 2034). Project nonhazardous waste generation will be less than 3 tpd during the 21-month construction period and ~0.43 tpd during operation. Thus, waste generation rates are only a small portion of daily permitted capacity for any one landfill. Even discounting the effects of recycling on the total amount of non-hazardous wastes destined for landfilling, the amounts of waste generated during project construction and operation are insignificant relative to existing disposal capacity.

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. In total, there is in excess of 22 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with remaining operating lifetimes up to the year 2050. The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators, and the transport of waste out of state that is hazardous under California law, but not federal law.

Much of the hazardous waste generated during facility construction and operation will be recycled, such as used oil and spent catalysts. Even without recycling, the generation of hazardous waste from MBPP would be a very small fraction (less than one percent) of existing capacity and not significantly impact the capacity or remaining life of any of the state's Class I landfills.

In addition to Class I landfills, asbestos containing materials (ACM) can be transported to the Forward Landfill north of Mateca, Ca. in San Joaquin County. This Class II landfill has a remaining capacity of 17 million cubic yards and is expected to remain open through 2050. Furthermore, Duke Energy identified three soil treatment and recycling providers in the state alone with three waste oil hauler and recycling providers, four hazardous waste transporters, and eight other treatment, storage, or disposal facilities.

## **CUMULATIVE IMPACTS**

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Additional waste management impacts which could contribute to those from construction and operation of the MBPP project include those associated with the demolition of the existing fuel oil storage tanks with related environmental remediation, and installation of selective catalytic reduction (SCR) pollution control to the new units.

Annual generation of wastes from operation of the present power plant is described in Table 6.14-6 (Duke 2000a). About 4228 tons of hazardous solid and liquid wastes are generated each year. The new combined-cycle units will generate approximately 630 tons each year. Nonhazardous solid wastes total about 156 tons annually from the existing units and the new units are expected to generate a similar amount.

Demolition of fuel oil storage tanks, buildings, stacks, etc. is a separate phase and wastes generated by demolition are significant, including more than 138,000 tons of hazardous and

nonhazardous wastes. Much of this waste (~83%), however, will be recycled or used on-site. Condition of Certification WASTE-2 would require at least 80% of demolition wastes to be recycled. Once the tanks are removed, soil or groundwater contamination may be present, and remediation may be required. As noted earlier, PG&E is responsible for remediating existing contamination at the MBPP site; however, there is currently no designated "lead" regulatory agency. Until the tanks are removed, the extent of potential contamination is unknown, but is expected to be localized.

Installation of SCR pollution control will not result in any significant waste related impacts. Periodically, the catalysts must be replaced to maintain operating efficiency, and are typically recycled. In the event that recycling is not pursued, the catalyst would require disposal in a class I (hazardous) landfill. The amount of catalyst, which must be recycled or disposed, is estimated at 100 tons annually.

The quantities of wastes generated during construction and operation of the MBPP project will not result in any significant waste management related impacts. Similarly, quantities of wastes associated with the activities described above, including continued operation of units six and seven, demolition of existing tanks, and installation of SCR catalyst, will not be significant. Considering the lack of 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**

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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 be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure requires 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, MBPP will 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.

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

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Energy Commission staff concludes that Duke Energy will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during MBPP construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the CCRWQCB or the CAL EPA Department of Toxic Substances Control. Because hazardous wastes will be produced during project construction and operation, Duke Energy should utilize its existing EPA identification number as a hazardous waste generator. Accordingly, Duke Energy 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 Evaluation Review and Plan has been prepared by Duke Energy, which meets the requirements of SB-14 (Duke 2000a, AFC p. 6.14-10).

## **MITIGATION**

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Based on the analysis of impacts and the design and operational features that have been incorporated into the project, Duke Energy has not proposed mitigation measures beyond those in place at MBPP (Duke 2000a, AFC p. 6.14-26). However, as part of waste management operations associated with the ongoing operation of the existing power plant, measures are routinely employed to minimize the amounts of wastes generated. The measures are incorporated in the Source Reduction Evaluation Review and Plan, and include recycling, operational improvements, changes in production processes, and administrative controls (Duke 2000a, AFC p. 6.14-10).

As an additional measure to help ensure proper waste management practices, staff proposes that Duke Energy develop and submit a waste management plan which will include details on the handling, packaging, labeling, storage, treatment, and disposal of wastes (proposed Condition of Certification WASTE-2).

Staff has reviewed the Phase I and II ESAs and has concerns about the lack of remedial investigations conducted beneath existing structures, which are to be demolished. Angle borings beneath these structures were not obtained and thus investigations will not occur until the structures are removed. Staff has proposed a condition of certification (WASTE-3), which would require Duke Energy to prepare a Remedial Investigation Workplan (RI Workplan) prior to demolition. This plan would include a detailed site characterization plan with soil and groundwater sampling and analysis to determine the extent and nature of contamination existing beneath these structures. The RI Workplan would be provided to the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, the CCRWQCB, and the CEC CPM for review and approval. If

contaminated soil or groundwater is found to exist, the project owner would contact representatives of the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, and the CCRWQCB for further guidance and possible oversight.

No request for designation of an administering agency to oversee site investigation and remedial action has been made pursuant to California Health and Safety Code section 25260 et seq., by PG&E or Duke Energy. Therefore, there is no lead agency and DTSC and the CCRWQCB have separate and equal jurisdiction on this site.

DTSC has reviewed MBPP's plans for hazardous waste handling and site remediation and has informed Commission staff that it has two concerns or comments (DTSC 2001). DTSC requests that the project application identify the mechanism to initiate remedial investigations and to identify the appropriate oversight agency. DTSC further requests that if soil contamination is suspected during construction, appropriate Health and Safety procedures should be implemented. The concerns raised by DTSC will be addressed by staff's proposed conditions of certification WASTE-3, WASTE-4, and WASTE-5.

The Central Coast Regional Water Quality Control Board (CCRWQCB 2001a and b) has reviewed the Phase I and II ESAs and has also issued comments. The CCRWQCB shares staff's concern about the potential for hazardous wastes to be present in the soil and groundwater under the footprints of the structures to be demolished, particularly the rock blotter area and under the tanks. Furthermore, the CCRWQCB expressed a desire that Duke Energy allow sufficient time between demolition of these structure and commencement of construction of the proposed facility for remedial investigations and cleanup to be completed. Both these concerns are addressed by staff's proposed condition of certification WASTE-3.

Staff has examined the waste management related measures proposed by the Applicant and concluded that, together with applicable LORS and the additional measure proposed by staff, they will adequately assure that no significant environmental impacts will result from the management and disposal of project-related waste.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS**

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### **AGENCY COMMENTS**

SWRCB-1 *The State Water Resources Control Board requests that the conditions of certification include a discussion of soil and groundwater investigations.*

A discussion of soil and groundwater investigations is not appropriate for placement in a condition of certification. These discussions are included in this staff report.

SWRCB-3 *The State Water Resources Control Board requests a clarification whether the AGT farm would be demolished and which COC would apply.*

It is unclear if the AGT farm is part of the "project".

CMB-43 *The City of Morro Bay is concerned that unsightly storage of waste will have significant visual and socio-economic impacts on tourism and property values.*

Staff's recommended Conditions of Certification **WASTE-3, 4, 5, 6, & 7** require a schedule for removal of hazardous and non-hazardous wastes and an RI workplan for identifying and remediation the presence of hazardous waste found beneath tanks and structure. The City of Morro Bay will be provided the plans required by these COCs for review and comment.

IWMA-1 *The San Luis Obispo County Integrated Waste Management Authority is concerned that the waste generated during demolition represents two years of waste from the City of Morro Bay.*

Comment noted, however, this amount of waste would still not have a significant impact on the capacities of the landfills which would receive the wastes. It is not unusual to have a large project in a small community whereby the amount of wastes sent to landfills for a short period of time (during demolition activities) would be much higher than what the community typically generates and sends to a landfill.

IWMA-2 *The San Luis Obispo County Integrated Waste Management Authority would like to see at least 83% of construction waste recycled or reused.*

The waste management plan must comply with IWMB requirements regarding the minimal amount of waste to be recycled. While the CEC encourages more, it will not require more.

IWMA-3 *The San Luis Obispo County Integrated Waste Management Authority would like to see Duke fully participate in the local recycling program.*

The project owner should participate in the local recycling program to the extent that the local program is consistent with state law. This has been added to proposed condition of certification **WASTE-2**.

IWMA-4 *The San Luis Obispo County Integrated Waste Management Authority requests that the Waste Management Plan be submitted to them also for review and comment.*

Proposed condition of certification **WASTE-2** has been revised to add the IWMA as a review and comment agency. Final approval rests with the CEC.

IWMA-5 *The San Luis Obispo County Integrated Waste Management Authority requests that **WASTE-2** be expanded to include demolition as well.*

Demolition wastes have been added as a clarification to **WASTE-2**.

IWMA-6 *The San Luis Obispo County Integrated Waste Management Authority requests that the Annual Compliance Report include the actual tonnage of material recycled and disposed.*

This has been added to **WASTE-2**.

## **PUBLIC COMMENTS**

*WHW-2 Walter H. Wolf is concerned that chemicals fro open air evaporation ponds will effect the residents located 50 feet east of the ponds.*

These ponds are part of the demolition and will be drained and removed.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Management of the wastes generated during demolition, construction and operation of MBPP will not result in any significant adverse impacts if Duke Energy implements the waste management measures proposed in the Application for Certification (00-AFC-12) and the proposed conditions of certification.

## **CONDITIONS OF CERTIFICATION**

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**WASTE-1** Upon becoming aware of any impending waste management-related enforcement action, the project owner shall notify the CPM of any such action taken or proposed to be taken against it, or against any waste hauler or disposal facility or treatment operator that the owner contracts with.

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

**WASTE-2** Prior to the start of demolition, construction, and operation activities, the project owner shall prepare and submit to the IWMA, the City of Morro Bay and to the CEC CPM, for review and comment, waste management plans for all wastes generated during demolition, construction and operation of the facility, respectively. The plans shall contain, at a minimum, the following:

- A description of all expected waste streams, including projections of frequency 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.
- A stated goal that not less than 50 percent of all construction and operation wastes and 80 percent of all demolition wastes will be recycled. Measures that will allow that goal to be achieved should be identified.
- A statement that the project owner will participate in the local recycling program to the extent that the local program is consistent with state law.

**Verification:** No less than 60 days prior to the start of either demolition and construction, the project owner shall submit the demolition and construction waste management plans to

the IWMA and the City of Morro Bay for review and comment, and to the CPM for review and approval. 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 and the actual tonnage of material recycled and disposed.

**WASTE-3** Before demolition of the fuel oil tanks, the existing generator buildings, the existing stacks, and any other building, the project owner shall prepare a Remedial Investigation Workplan (RI Workplan). This plan shall include a detailed site characterization plan with soil and groundwater sampling and analysis to determine the extent and nature of contamination existing beneath these structures. The RI Workplan shall be provided to the City of Morro Bay for review and comment, and to the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, the Central Coast Regional Water Quality Control, and the CEC CPM for review and approval. If contaminated soil or groundwater is found to exist, the project owner shall contact representatives of the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, and the Central Coast Regional Water Quality Control Board for further guidance and possible oversight.

**Verification:** At least sixty (60) days prior to commencement of tank or structure demolition, the project owner shall provide the RI Workplan to the City of Morro Bay for review and comment, and to the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, the Central Coast Regional Water Quality Control, and the CEC CPM for review and approval. Within thirty (30) days of completion of the sampling and analysis and prior to the initiation of any construction activities, the project owner shall provide the results of the sampling and analysis to the City of Morro Bay, San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, the Central Coast Regional Water Quality Control Board, and the CPM for review and guidance on possible remediation.

**WASTE-4** The project owner shall have an environmental professional available for consultation during soil excavation and grading activities. The environmental professional shall meet the qualifications of such as defined by the American Society for Testing and Materials designation E 1527-97 (or updated) 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, 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, prior to any further construction activity at that location. If, in the opinion of the environmental professional, significant remediation may be required, the project owner shall contact representatives of the San Luis Obispo County Division of Environmental Health, the Central Coast Regional Water Quality Control Board, and the California Department of Toxic Substances Control for guidance and possible oversight, and the City of Morro Bay for informational purposes.

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

**WASTE –6** Prior to commencement of site mobilization or tank or structure demolition, the project owner shall prepare a schedule describing the remediation of hazardous wastes on the site. This schedule shall also include the name of the Responsible Party for hazardous waste remediation and shall be provided to the City of Morro Bay, the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, and the Central Coast Regional Water Quality Control Board for review and comment, and to the CPM for review and approval.

**Verification:** At least sixty (60) days prior to commencement of site mobilization or tank or structure demolition, the project owner shall provide the schedule to the City of Morro Bay, the San Luis Obispo County Environmental Health Department, the California Department of Toxic Substances Control, and the Central Coast Regional Water Quality Control Board for review and comment, and to the CEC CPM for review and approval.

**WASTE –7** The project owner shall ensure that all waste, rubble, and debris is removed promptly from the site or that it is hidden from view from the site fenceline. A plan indicating the removal schedule and screening of stockpiled waste, rubble, and debris shall be prepared and submitted to the City of Morro Bay for review and comment and to the CPM for review and approval.

**Verification:** At least sixty (60) days prior to commencement of site mobilization or tank or structure demolition, the project owner shall provide the plan to the City of Morro Bay for review and comment and to the CEC CPM for review and approval.

## REFERENCES

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- DUKE (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes 1a-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission on October 23, 2000.
- DUKE (Duke Energy Morro Bay LLC) 2000b. Topographic Maps (USGS 7.5 minute series), Quadrangles: Morro Bay North, Morro Bay South, Atascadero, San Luis Obispo, and Cayucos. Submitted to California Energy Commission on October 25, 2000.
- DUKE (Duke Energy Morro Bay LLC) 2000c. Geotechnical Investigative Report dated August 2000. Submitted to California Energy Commission on October 25, 2000.
- DTSC (California Department of Toxic Substances Control) 2001. Letter to CEC/Ringer from DTSC/Jeche, dated April 6, 2001. Submitted to California Energy Commission on April 6, 2001.
- PG&E (Pacific Gas and Electric Co.) 1997a. Phase One Environmental Site Assessment, Morro Bay Power Plant, April 1997
- PG&E (Pacific Gas and Electric Co.) 1997b. Phase Two Environmental Site Assessment, Vol. I, July 1997
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- PG&E (Pacific Gas and Electric Co.) 1997d. Phase Two Environmental Site Assessment, Vol. III, July 1997
- CCRWQCB 2001a. Personal communication with David Schwartzbart, Central Coast Regional Water Quality Control Board. April 23.
- CCRWQCB 2001b. Letter to CEC/Kae Lewis from Roger W. Briggs, Executive Officer, CCRWQCB, dated April 27, 2001.

# WORKER SAFETY AND FIRE PROTECTION

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

## INTRODUCTION

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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 the worker safety and fire protection measures proposed by the Morro Bay Power Plant Project and to determine whether the applicant has proposed adequate measures to:

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

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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### FEDERAL

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970. 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 and clearly define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. Most of the general industry safety and health standards now in force under this OSH Act 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 OSH Act. Applicable Federal requirements include:

- 29 U.S. Code § 651 et seq. (Occupational Safety and Health Act of 1970);
- 29 CFR §1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations);
- 29 CFR §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 et seq. 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 California 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 CFR §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 (8 CCR §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 CFR §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, 8 CCR §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:

- 8 CCR §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- 8 CCR §337, et seq. Cal/OSHA regulations;
- 24 CCR § 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 of the California Code of Regulations § 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 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. Specifically NFPA 850 is included.

Similarly, the Uniform Fire Code (UFC) 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 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 (and in particular Articles 79 and 80)

## **SETTING**

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The Morro Bay Power Plant is located in the City of Morro Bay in San Luis Obispo County (Duke 2000a). The existing plant is located west of Highway 1, near the Morro Bay Harbor and east of Estero Bay. The area includes mixed land use including light industry, commercial establishments and marine, recreational and residential neighborhoods. 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. Fire support services to the site will be under the jurisdiction of the Morro Bay Fire Department. The Morro Bay Fire Department consists of two stations, of which only the station at 715 Harbor Street is staffed. This station is approximately one mile away from MBPP and thus is the closest station to the site and is assigned as the off-site first responder to the Morro Bay Power Plant. The response time is estimated to be 3 minutes (MBFD 2001).

The Morro Bay Fire Department is also assigned as the off-site hazardous materials first responder for the Morro Bay Power Plant. As first responder, MBFD would assess the need for backup by the San Luis Obispo County Hazardous Materials Team. The County Hazmat team is a multi-agency team with 12-18 personnel from County and City Fire Departments with equipment strategically located in the County (MBFD 2001). This team has 24-hour hazardous materials spill response capability. The response time of the County Hazmat team is unknown, depending upon the availability and location of the team members at the time of a hazmat incident. There are personnel in MBFD who serve on the County Hazmat Team. The County Fire Department maintains a Hazmat trailer at San Luis City Fire Department Station #1 (CFD 2001).

## **COMPLIANCE WITH LORS**

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### **WORKER SAFETY**

Industrial environments are potentially dangerous, during both demolition and construction and operation of facilities. Workers at the proposed project 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 Morro Bay Power Plant Project 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 demolition, construction and operation of the proposed Morro Bay 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 demolition, construction and operation of Morro Bay Power Plant Project, combined with existing industrial facilities, to result in impacts on the fire

and emergency service capabilities of the Morro Bay Fire Department. Staff found that cumulative impacts during operations would be insignificant due to the fact that this project represents a replacement of an existing power generating facility. However, due to the small size of the Morro Bay Fire Department and its limited ability to over-see demolition and construction projects of this magnitude over a long period of time, staff finds that cumulative impacts during demolition and construction may be significant. Staff notes that the MBFD and Duke Energy have entered into an agreement to provide the MBFD with funding (see FSA section on **Socioeconomics**), which will mitigate these impacts.

## **APPLICANT'S PROPOSED WS/FP MEASURES**

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### **WORKER SAFETY**

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during demolition, construction and operation (AFC page 6.17-21). 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 demolition, construction and operational phases of the project.

#### **Demolition and Construction Safety and Health Program**

The Morro Bay Project encompasses demolition of existing structures, 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 demolition, construction and operation of a gas-fired combined cycle facility.

Construction Safety Orders are published at 8 CCR § 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the demolition and construction phases of the project. The Demolition and Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509);
- Construction Fire Protection and Prevention Plan (8 CCR § 1920); and
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522).

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 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 demolition and construction at the Morro Bay Power Plant project, detailed programs and plans will be provided pursuant to the condition of certification **WORKER SAFETY-1**.

### **Operations and Maintenance Safety and Health Program**

Upon completion of demolition and construction and prior to operations at the Morro Bay Power Plant Project, the Operations and Maintenance Safety and Health Program will be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Emergency Action Plan (8 CCR § 3220);
- 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).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) will be applicable to the project. Written safety programs, which the applicant will develop, for the Morro Bay Power Plant Project will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Safety Training Matrix (AFC Table 6.17-1), Facility Emergency Plan (AFC Table 6.17-3), and the Demolition and Construction Health and Safety Program (AFC Table 6.17-4). Prior to operation of the Morro Bay Power Plant Project, all detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-2**.

### **Safety and Health Program Elements**

The Applicant provided the proposed outlines for both a Demolition and 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)***

The Applicant will submit an expanded Demolition, Construction and Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to demolition, construction and operation of the project.

The IIPP will include the following components as presented in the 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;
  - contractors.

#### ***Emergency Action Plan***

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (Table 6.17-3).

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 Operations 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 Morro Bay Fire Department 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 Morro Bay Power Plant Project 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.

### ***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 Demolition and 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 (AFC 6.17 Worker Safety) 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 from the Morro Bay Fire Department.

The information in the AFC indicates that the project will meet the minimum fire protection and suppression requirements. Elements include both fixed and portable fire extinguishing systems. The water and hose system is based on an underground firewater piping network. The on-site fire suppression water is stored in a million gallon tank onsite and a 500,000-gallon tank on a hill near the plant. This location supplies a higher head for water and serves as a source of raw and domestic water. Extensions of the existing underground firewater piping network will be installed to continue to provide water from the on-site and off-site storage tanks.

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

The on-site fire suppression system is designed and operated in accordance with National Fire Protection Association standards and guidelines. Fire hydrants and hose stations will be connected to the existing MBPP system already in operation. Hydrants or hose stations will be placed at approximately 300-foot intervals around the proposed facility as per NFPA 24 guidance.

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 Morro Bay Fire Department, prior to demolition, construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

Fire protection is provided by the Morro Bay City Fire Department, which operates from a primary station on Harbor Street in downtown Morro Bay, approximately 4,000 feet from the MBPP. A second station north of the MBPP contains additional equipment that can be utilized for reserve or off-duty personnel to respond to if called in for emergencies. The Department is staffed by nine full-time fire suppression personnel (three on duty at all times) plus a chief. Eight of the nine are paramedics. In addition, the Department has a staff of 12-20 reserve firefighters, approximately half of who are also paramedics. The latter are called in for large-scale incidents or to handle a second incident (MBFD 2001).

Plant operations formerly included an internal fire brigade, which was disbanded when the plant shifted to operate exclusively on natural gas fuel. In exchange for additional fire

protection service from the City and special training required, Duke Energy assists the Department to enhance its capability (AFC, page 6.10-21). For 2001, this contribution is \$28,000, which will increase \$1,000 per year through 2003 (MBFD 2001). For the Department, Duke will provide approximately \$2.5 million to retain a fire marshal, four additional fire fighters, equipment, facility improvements, professional development training, and plan review services. Funding for the equipment and facility improvements will be front-loaded during the first year of construction, but the remaining funding will be spread over the six-year construction period. (AFC, Appendix 6.10-5, page 4).

## **FACILITY CLOSURE**

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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. A facility closure plan will be developed prior to closure to incorporate these requirements.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS**

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### **AGENCY COMMENTS**

*CMB-44 City of Morro Bay is concerned about the risk presented by the thousands of gallons of lube and hydraulic oils stored on site during operation.*

Staff notes that the majority of lube, hydraulic, and mineral oils will either be in the operating systems and equipment or pipe lines. If these facilities are re-built or re-placed they will be required to meet current codes. Existing facilities, not part of the project are subject to the codes in existence when they were constructed.

*CMB-45 The City of Morro Bay requests that NFPA 850 and the Fire and Building Codes be followed in order to mitigate the risk presented by the oils to a reasonable degree.*

The entire NFPA was referenced by staff under LORS therefore NFPA 850 was included and the request of the MBFD it will be specifically referenced.

*CMB-51 The City of Morro Bay requests that all plans and submittals be reviewed and approved by the Fire Department as authorized by the State Fire Code.*

The facility must comply with all LORS including local LORS. However, pursuant to the Warren-Alquist Act, the CEC retains approval authority. The MBFD will be provided with all plans and submittals for review and comment and those comments will be given the highest consideration by the CPM. A proposed COC **Worker Safety-3** will implement this provision.

## CONCLUSION AND RECOMMENDATIONS

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If the Applicant for the proposed Morro Bay Power Plant Project provides a Project Demolition and 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 may have a significant impact on local fire protection services and thus proposes a condition of certification **WORKER SAFETY-3** where an agreement must be reached between the project owner and the MBFD over the services needed, the schedule for review and comment on plans, and reimbursement of costs to the City.

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 Demolition and Construction Injury and Illness Prevention Program and the Operations Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

## PROPOSED CONDITIONS OF CERTIFICATION

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**WORKER SAFETY-1** The project owner shall submit to the CPM a copy of the Project Demolition and Construction Injury and Illness Prevention Program, containing the following:

- A Demolition and Construction Safety Program;
- A Demolition and Construction Personal Protective Equipment Program;
- A Demolition and Construction Exposure Monitoring Program;
- A Demolition and Construction Emergency Action Plan; and
- A Demolition 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 approval concerning compliance of the program with all applicable Safety Orders. The Demolition and Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the Morro Bay Fire Department for review and acceptance prior to submittal to the CPM.

**Verification** At least 30 days prior to the start of demolition, the project owner shall submit to the CPM for review and approval a copy of the Project Demolition and Construction Injury and Illness Prevention Program. The project owner shall provide a letter from the Morro Bay Fire Department stating that they have reviewed and accepted the Demolition and Construction Fire Protection and Prevention Plan Emergency Action Plan. The letter shall include all comments and recommendations.

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

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- 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 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 also be submitted to the Morro Bay Fire Department for review and comments.

**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 Operations and Maintenance Safety & Health Program. It shall incorporate Cal/OSHA Consultation Service's comments, stating that they have reviewed the specified elements of the proposed Operations and Maintenance Safety and Health Plan.

**WORKER SAFETY-3** The Project Owner shall negotiate and enter into an agreement with the City of Morro Bay for Fire Protection and Hazardous Materials Services. These services shall include a detailed description of the services to be provided, a list of the plans requested and/or required by the CMBFD for site preparation, demolition, construction and operation of the proposed facility (only for those which are part of the CEC-certified project), a schedule for the submittal of those plans, and the cost reimbursement to the City from the Project Owner for these services. The schedule shall take into account all requirements for submittal to the CMP as per the Worker Safety and Hazardous Materials COCs. When implementing this agreement, the CPM will review and approve all plans after receiving comments from the MBFD. The CEC will give the highest consideration to comments received from the MBFD.

**Verification** At least 30 days prior to the start of site preparation activities, the project owner shall submit to the CPM a copy of the final executed Agreement between the City of Morro Bay and the Project Owner.

## REFERENCES

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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.

DUKE (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes! a-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission on October 23, 2000.

Morro Bay Fire Department (MBFD). 2001. Personal communication with Jeff Jones, Fire Chief. April 6, 2001.

San Luis Obispo County Fire Department (CFD). 2001. Personal communication with Nate Herring, Fire Apparatus Engineer and member of County Hazmat team, Merician Fire Station #36. April 4, 2001.

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.

# **ENGINEERING ASSESSMENT**

# FACILITY DESIGN

Testimony of Brian Payne

## INTRODUCTION

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Facility Design encompasses the civil, structural, mechanical, and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety or environmental protection; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the 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 discussed 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; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to protect environmental quality and assure public health and safety and comply with all applicable LORS.

## SETTING

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Duke Energy Morro Bay LLC (applicant) proposes to construct and operate the new 1,200-megawatt (MW) Morro Bay Power Plant Project. This plant is proposed for construction at the existing Morro Bay Power Plant site, which is located near Morro Bay Harbor, bordered on the west by Embarcadero Road and on the east by Highway 1. This facility is proposed to include two 600 MW natural gas fired, combined cycle combustion turbine facilities. Once the new facilities have been constructed, the existing 1950's and 1960's technology power generating units 1, 2, 3, and 4 will be demolished (Duke 2000a). For more information on the site and related project description, please see **Project Description**.

The site lies in seismic zone 4, the zone of greatest seismic shaking in the United States. Additional engineering design information is presented in the Application for Certification (AFC), Volume IB, Section 8.0 and Volume IV, Appendices 8-3 through 8-8 (Duke 2000a).

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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The applicable LORS for each engineering discipline (civil, structural, mechanical and electrical) are summarized in the Section 7.2 and Table 7.1 of the AFC, Volume 1B (Duke 2000a). The following appendices, included in Volume IV of the AFC, describe the applicable LORS and design standards for each engineering discipline (Duke 2000a):

- Civil Engineering – Appendix 8-3
- Structural Engineering – Appendix 8-4
- Mechanical Engineering – Appendix 8-5
- Electrical Engineering – Appendix 8-6
- Control Systems Engineering – Appendix 8-7
- Chemical Engineering – Appendix 8-8

## ANALYSIS

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The basis of this analysis is the applicant's proposed analysis and construction methods and list of LORS and design criteria set forth in the AFC.

## 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 short natural gas pipeline extension and electric transmission connection. The applicant proposes to use accepted industry standards, design practices, and construction methods in preparing and developing the site. (See AFC Section 7.0, Section 8.0 and Appendices 8-3 through 8-8 for a representative list of applicable government regulations, industry codes, and standards.) Staff concludes that the project, including its linear facilities, will likely comply with all applicable site preparation LORS, and

proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

## **MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT**

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace, that require a long lead time to repair or replace, or that are used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects the environment and public health and safety.

The project shall be designed and constructed to the 1998 edition of the California Building Code (CBC), and other applicable codes and standards in effect at the time design and construction of the project actually commence. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed 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.

## **NATURAL GAS PIPELINE**

A short, high pressure, natural gas pipeline and some modification to the existing natural gas primary regulating station and metering station are proposed to be constructed. The new line will connect upstream of the existing primary gas regulator station at the Pacific Gas and Electric Company's site at the Morro Bay Power Plant. The existing and proposed lines will be operated and maintained in accordance with U.S. Department of Transportation (DOT), Title 49, Code of Federal Regulations (CFR) Chapter 1, Part 192 "Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards," and the California Public Utilities Commission, General Order 112-E (CPUC GO 112-E). Compliance with these requirements will help mitigate the impacts of pipeline rupture by ensuring proper operation and maintenance of the existing and proposed line segments. Therefore, no mitigation beyond a pipeline operated and maintained to applicable regulations is necessary.

## **PROJECT QUALITY PROCEDURES**

Sections 8.5.2.2.5 and 8.5.2.2.6 of the AFC (Duke 2000a) summarize a Project Quality Control 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 Control program will ensure that the project is actually designed, procured, fabricated and installed as contemplated in this analysis.

## **COMPLIANCE MONITORING**

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 will invite the local building authority, either the City of Morro Bay or San Luis Obispo County, or a private contractor, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegate agents.

Staff has developed proposed Conditions of Certification to ensure protection of the environment and public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-9**). 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 in scheduling construction activities, these conditions are written to require that no element of

construction of permanent facilities, which would be difficult to reverse or correct, may proceed without prior approval of plans by 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 bear 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**

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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 and restoration of the site. 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 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 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.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure Plan.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS**

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### **CITY OF MORRO BAY**

**CMB-71** – *The City of Morro Bay indicated that Condition of Certification GEN-3 should remain as proposed by staff.*

The proposed Condition of Certificate GEN-3, included in this document, conforms to the City's request.

**CMB-72** – *The City of Morro Bay requested that Condition of Certification GEN-9, included in the Preliminary Staff Assessment, be corrected to show the appropriate City and County.* The proposed Condition of Certification GEN-9, included in this Final Staff Assessment, includes the correct City and County names.

## CONCLUSIONS AND RECOMMENDATIONS

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1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable LORS.
3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed 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 CBO or other Energy Commission delegate agent. Staff will audit the CBO to ensure satisfactory performance.
4. 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.
5. 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 as required in the **General Conditions** portion of this document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable LORS.

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to protect environmental quality, to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 1998 CBC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking and perform field inspections during construction, and Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

## CONDITIONS OF CERTIFICATION

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**GEN-1** The project owner shall design, construct and inspect the project in accordance with the 1998 California Building Code (CBC) 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 the **Transmission System Engineering** Section of this document.

**Protocol:** In the event that the initial engineering designs are 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 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** Prior to submittal of the initial engineering designs for CBO review, 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 list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

**Verification:** At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List, and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Table 1** below. Major structures and equipment shall be added to or deleted from the Table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

**Table 1: Major Structures and Equipment List**

<b>Equipment/System</b>	<b>Quantity (Plant)</b>
Combustion Turbine Generator Foundation and Connections	4
Heat Recovery Steam Generator Structure, Foundation and Connections	4
Steam Turbine Generator Foundation and Connections	2
Auxiliary Transformer Foundation and Connections	6
CT Inlet Air Plenum Structure, Foundation and Connections	4
HRSG Exhaust Stack, Foundation and Connections	4
Isolated Phase Bus Duct	4
HRSG Transition Duct from CTG — Structure	4
Electrical/Control Center	4
Buildings and Building Foundations and Connections (e.g. Gas Compressor Building, Control Room, Motor Controls)	2
Condenser Structure, Foundation and Connections	2
Feed Water Pump Foundation and Connections	8
Condensate Pump Foundation and Connections	4
Air Compressor Foundation and Connections	2
CT Static Starter Skid Foundation and Connections	4
CT Mechanical Accessory Compartment Foundation and Connections	4
Switchgear Equipment Building Structure, Foundation and Connections	4
CT Generator Step-up Transformer Foundation and Connections	4
ST Generator Step-up Transformer Foundation and Connections	2
Condensate Pump Foundation and Connections	4
Circulating Water Pump Foundation and Connections	8
Fuel Gas Filter/Separator Foundation and Connections	4
ST Lube Oil Package Foundation and Connections	2
Air Receiver Foundation and Connections	2
Ammonia Tank Foundation and Connections	2
Ammonia Injection Blower Foundation and Connections	8
Demineralized Water Package Foundation and Connections	1
Demineralized Water Pump Foundation and Connections	2
Demineralized Water Tank and Foundation	1

**GEN-3** The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 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], adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

**Verification:** The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that 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 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:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the name, qualifications and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-5** Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer 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 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.

A: The civil engineer shall:

1. Design, or be responsible for design, stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads, and sanitary sewer systems; and
2. Provide consultation to the RE during the construction phase of the project, and recommend changes in the design of the civil works facilities and changes in the construction procedures.
3. B: The geotechnical engineer or civil engineer, experienced and knowledgeable in the practice of soils engineering, shall:
4. Review all the engineering geology reports, and prepare final soils grading report;
5. 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;
6. 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;
7. Recommend field changes to the civil engineer and RE;
8. 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
9. 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:

10. Be directly responsible for the design of the proposed structures and equipment supports;
11. Provide consultation to the RE during design and construction of the project;
12. Monitor construction progress to ensure compliance with LORS;
13. Evaluate and recommend necessary changes in design; and
14. 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:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-6** Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 1998 CBC, Chapter 17, Section 1701, Special Inspections, 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 the **Transmission System Engineering** Section of this document.

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector, certified 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 transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**GEN-8** The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. 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 in the next Monthly Compliance Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans.

**GEN-9** The project owner shall file a closure/decommissioning plan with San Luis Obispo County and the City of Morro Bay for review and comment, and the CPM for review and approval, at least 12 months (or other time mutually agreed to by the project owner and the CPM) 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:

1. The proposed closure/decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
2. All applicable LORS, all local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
3. Activities necessary to restore the site if the MVPP decommissioning plan requires removal of all equipment and appurtenant facilities; and
4. Closure/decommissioning alternatives, other than complete restoration of the site.

**Verification:** At least 12 months (or other period of time mutually agreed to by the project owner and the CPM) prior to closure or decommissioning activities, the project owner shall file a copy of the closure/decommissioning plan with San Luis Obispo County and the City of Morro Bay for review and comment, and the CPM for review and approval. Prior to the submittal of the closure plan, a meeting shall be held between the project owner and the CPM for discussing the specific contents of the plan.

**CIVIL-1** Prior to the start of site grading, the project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils report as required by the 1998 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report and Section 3309.6, Engineering Geology Report].

**Verification:** At least 15 days prior to the start of site grading (or a lesser number of days mutually agreed to by the project owner and the CBO), 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 earthworks 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 to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

**CIVIL-3** The project owner shall perform inspections in accordance with the 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 for which a grading permit is required shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report 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 of any major structure or component listed in Table 1 of Condition of Certification **GEN-2**, above, 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 the following items (from Table 1, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and
5. Switchyard structures.

Construction of any structure or component shall not commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (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];
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures 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
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations and specifications shall be signed

and stamped by the responsible design engineer [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 of any structure or component listed in Table 1 of Condition of Certification **GEN-2**, above the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the nonconforming submittal with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and are in conformance with the requirements set forth in the applicable LORS.

**STRUC-2** The project owner shall submit to the CBO the required number of sets of the following:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and
5. Reports covering other structural 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.

**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 toxic or hazardous materials, 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 major piping construction, the project owner shall submit, for CBO review and approval, the proposed final design, specifications and calculations for each plant major piping system. (Major piping is defined here as piping other than domestic water, plumbing and 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. Upon completion of construction of any such major 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].

The responsible mechanical engineer shall submit a signed and stamped statement to the CBO when the proposed final design, specifications and calculations for all of the major piping systems subject to the CBO review and approval have been designed, fabricated and installed in accordance with all applicable ordinances, regulations, laws and industry standards [Section 106.3.4, Architect or Engineer of Record], including but not limited to:

American National Standards Institute (ANSI) B31.1 (Power Piping Code);

ANSI B31.2 (Fuel Gas Piping Code);  
ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);  
ANSI B31.8 (Gas Transmission and Distribution Piping Code); and  
Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [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 major 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 major piping systems. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

**MECH-2** For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation [1998 CBC, Section 108.3 – Inspection Requests].

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for review and approval, final design plans, specifications and calculations, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

**MECH-3** 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.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of 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 CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

**MECH-4** Prior to the start of each increment of plumbing construction, the project owner shall submit for CBO's approval the final design, specifications and calculations 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: 1998 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The project owner shall design, fabricate and install:

1. Plumbing, potable water, all drainage systems, and toilet rooms in accordance with Title 24, California Code of Regulations, Part 5 (the California Plumbing Code); and
2. Building energy conservation systems and temperature control and ventilation systems in accordance with Title 24, California Code of Regulations, Part 6 (the California Energy Code).

The final design, 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 applicable LORS.

**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, 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 to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

**ELEC-1** Prior to the start of any increment of electrical construction for electrical equipment and systems 480 volts and higher, listed below, with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations [CBC 1998, Section 106.3.2, Submittal documents]. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS [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 in the **Transmission System Engineering** section of this document.

A. Final plant design plans to include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. system grounding drawings.

B. Final plant calculations to establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the Monthly Compliance Report:

- receipt or delay of major electrical equipment;

- testing or energization of major electrical equipment; and
- 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 construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

## REFERENCES

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Duke (Duke Energy Morro Bay LLC) 2000a. Application for Certification, Volumes 1a-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission, October 23, 2000.

City of Morro Bay 2000b. Dated June 19, 2001. Submitted to the California Energy Commission.

# **GEOLOGY AND PALEONTOLOGY**

Testimony of Neal Mace

## **INTRODUCTION**

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The Geology and Paleontology section discusses the setting of the Duke Energy of North America's (DUKE) Morro Bay Power Project and its potential impacts regarding geological hazards and geological and paleontological resources. 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 during project construction, operation and closure. The section concludes with the staff's proposed monitoring and mitigation measures with respect to geological hazards and geological and paleontological resources, with the inclusion of nine conditions of certification.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

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The applicable LORS are listed in the Application for Certification (AFC), in Sections 7.2.1, 7.4.5 and 7.4.8 (DUKE 2000a). A brief description of the LORS for geological hazards and resources, surface water hydrology, and paleontological resources follows.

### **FEDERAL**

There are no federal LORS for geological hazards and resources, or grading and erosion control. The Morro Bay Power Project 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 for 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.
- Section (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.

- Section (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

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The Morro Bay Power Project is a proposed 1200-megawatt combined cycle generation, combustion turbine facility to be located at the existing Morro Bay Power Plant site. The proposed improvements will be located within the area currently occupied by the onsite tank farm, at the northern end of the power plant site. The new facility will utilize the existing natural gas supply line. The project modifications to the existing natural gas facilities include:

- Short extensions of pipeline from PG&E's onsite pressure regulating station to the combined-cycle combustion turbines.
- Onsite gas compression enhancements to support needed gas pressure requirements for combined-cycle operation.
- Meter modification to meet pressure requirements.

The Morro Bay Power Plant facility is located on a low-lying coastal terrace at the northern end of Morro Bay. The terrace is underlain by bedrock of the Franciscan Formation at elevations of –50 to –80 feet (mean sea level datum) beneath the proposed project site. Morro Rock is located approximately 2000 feet east of the site. Morro Rock comprises a Tertiary age intrusive igneous rock composed of dacite.

Morro Creek (located immediately north of the Morro Bay Power Plant site) has incised a channel into the coastal terrace. The channel was subsequently filled with fluvial sediments. At the site of the proposed combustion turbine facility, dune sand, estuarine deposits and hydraulic fill also blanket the coastal terrace.

The hydraulic fill unit was dredged from Morro Bay and placed on the tidal flats by the United States Navy in 1941 and 1942 (DUKE, 2000a). The fill unit averages 8 feet in thickness and raised the elevation of the proposed site for the combustion turbine facility to between 15 to 20 feet above sea level.

No indications of surface faulting were observed at the site during the site visit. In addition, no known active faults cross the Morro Bay Power Project footprint.

# IMPACTS

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## 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). No active or potentially 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 Los Osos fault, which is located 8 kilometers south of the project site. The Los Osos fault is a 56 to 60 kilometer long, west northwest trending, southwest dipping reverse fault that separates the San Luis Range from the Morro Bay structural basin. It is designated as a class "B" fault under the CBC (a fault with a maximum magnitude earthquake greater than 6.5 and less than 7 and a slip rate of less than 5 mm/year). The maximum moment magnitude earthquake for the Los Osos fault is a magnitude 6.8 event.

In addition, the Hosgri fault is located approximately 17.5 kilometers offshore and the San Andreas fault is located approximately 66 kilometers northeast of the Morro Bay Power Plant. Both the Hosgri and San Andreas faults are north northwest trending, right lateral, strike slip faults. The Hosgri fault is part of an offshore system of right lateral strike slip faults that extend from Point Arguello to the San Francisco Bay Area. The maximum moment magnitudes for the Hosgri and San Andreas faults are 7.3 (DUKE, 2000a) and 7.8 (CDMG, 1996), respectively.

The applicant performed both deterministic and probabilistic analyses of the peak ground accelerations at the site. The deterministic analysis used Blake's EQFAULT program (1989) to determine peak ground accelerations at the project site resulting from maximum magnitude events on the San Juan, Los Osos, Hosgri, Rinconada, and San Andreas faults. Because of its proximity to the Morro Bay site, the Los Osos is the most critical fault. The applicant calculated a peak ground acceleration at the Morro Bay Power Plant site of 0.33g associated with a magnitude 6.8 earthquake on the Los Osos fault (DUKE, 2000a).

The applicant's geotechnical consultant, Hushmand Associates (2000a), performed the probabilistic analysis. They used the Abrahamson-Silva (1997), Campbell (1997) and Sadigh (1997) attenuation relationships to calculate peak ground accelerations at the Morro Bay Power Plant site for the Design Basis Earthquake and Upper Bound Earthquakes. These events are defined by the 1997 UBC as having probabilities of exceedance of 10 percent in 50 years and 10 percent in 100 years, respectively. The peak ground acceleration associated with the Design Basis Earthquake is 0.30g. The peak ground acceleration associated with the Upper Bound Earthquake is 0.39g. The peak ground acceleration associated with the Design Basis Earthquake (0.30g) will be used for design of the project facilities (DUKE, 2001).

These values are generally consistent with the California Division of Mines and Geology (CDMG) Map Sheet 48, which predicts a peak ground acceleration with a 10 percent chance of exceedance in 50 years of between 0.3 and 0.4g for the project area. Design and construction of the project to conform to the California Building Code (1998) requirements outlined in **Conditions of Certification Geo-1 and Geo-2** will reduce the impact of strong seismic ground shaking to less than significant.

On February 22, 2001 Energy Commission staff visited the project location and did not observe any evidence of surface faulting. The potential of surface rupture on a fault at the power plant footprint is considered to be very low, since no active faults are known to have ruptured the ground surface of the project site.

### **Liquefaction, Hydrocompaction, and Expansive Soils**

Liquefaction is a condition in which a cohesionless soil loses its shear strength due to a sudden increase in pore water pressure. The soils most prone to liquefaction during earthquakes are fine-grained, poorly graded, saturated sands and silts.

One of the most serious liquefaction hazards results when a competent soil overlies deeper liquefiable soil layers. Liquefaction of the deeper layers may result in substantial lateral spreading or sliding of the upper competent soil along the liquefied layer. Lateral spreading can occur along slopes as shallow as two percent, extend several hundred feet back from a slope, and produce displacements of tens of feet if soil conditions are favorable and earthquake shaking is of sufficient duration. Lateral spreading is particularly likely in the vicinity of unlined stream and river channels or other sloping locations. Damage induced by lateral spreading and liquefaction is generally most severe when liquefaction occurs within 15 to 20 feet of the ground surface. Lateral spreading was responsible for most of the pipeline failures in San Francisco during the 1989 Loma Prieta Earthquake.

During the geotechnical investigation, the depth to groundwater beneath the proposed site generally varied from approximately 4 feet below existing grade to 14 feet below existing grade (Hushmand Associates, 2000a). The sand dune deposits, fluvial deposits and hydraulic fill beneath the site all contain layers and lenses of saturated, loose, sand and silt. The combination of saturated soils of varying density and a potential for a moderately high peak ground accelerations at the site points to a potential for liquefaction. Hushmand Associates (2000a) used blow counts, or n-values, from their bore hole logs and cone penetrometer sounding data to analyze the liquefaction potential of the site during an upper bound earthquake, i.e. an earthquake that produces a peak ground acceleration at the site of 0.39g. They concluded that localized liquefaction could occur in unconsolidated sand layers up to several feet in thickness, which could result in several inches of settlement. As a result, their report recommends the use of pile foundations for "relatively heavy structures" (Hushmand Associates, 2000a).

The potential for liquefaction induced lateral spreading within the soils beneath most of the site is considered low because of the low surface gradients at the project site and the heterogeneous nature of the liquefiable soils. Liquefiable layers do not appear to be continuous over distances of more than a few feet to a few tens of feet. However, lateral spreading may occur immediately adjacent to the Morro Creek channel. Liquefaction and

lateral spreading are to be accounted for during the final design of the project's foundation. Design and construction of the project to conform to the California Building Code (1998) requirements outlined in **Conditions of Certification Geo-1 and Geo-2** will reduce the impact of liquefaction to less than significant.

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. Based on the site investigations, clayey estuarine soil layers are present at depths of 15 to 70 feet below the ground surface. Several of these soil layers are classified as high plasticity clay (Hushmand, 2000a). However, at these depths, the estuarine deposits are saturated. As a result, the potential for damage to the project facilities from expansive soils is expected to be low.

### **Tsunami**

Earthquakes or undersea landslides can trigger seismic waves, or tsunamis. Tsunamis are particularly dangerous if they occur at high tide. The National Oceanic and Atmospheric Administration (NOAA) is currently producing a tsunami inundation map for the Morro Bay area, however, it is not yet available (DUKE, 2001). Tsunamis occurred in the Morro Bay area in 1878, 1946, 1953, 1960, and 1964. These tsunamis resulted in localized damage to piers, wharves, and buoys in Morro Bay Harbor (DUKE, 2000a). The NOAA Tsunami Database describes a maximum runup (i.e. the advance of water up the beach or structure following the breaking of a wave) of 1.5 meters, with some unsubstantiated reports of a 2.4 meter runup due to the tsunami on April 1, 1946 (DUKE, 2001). The ground surface elevation at the proposed site is 15 to 23 feet (4.6 to 7.1 meters) above mean sea level. Consequently historic tsunamis have not inundated the proposed project site.

### **Slope Failures**

The potential for slope failures at the power plant site is considered to be low. The project is located on coastal terrace that has a slope of between 1 and 2 %, and there are no significant slopes adjacent to the site except at the edge of Morro Creek. The Morro Creek channel appears to be far enough from the project site that slope failures within banks of the channel will not impact the levees surrounding the site. However, the stability of the levees surrounding the site could potentially be impacted during a 100-year flood event. The stability of the levees is to be evaluated in the geotechnical report required by **Condition of Certification Geo-2**.

## **GEOLOGICAL AND PALEONTOLOGICAL RESOURCES**

No significant sand and gravel resources of the quality required to produce Portland cement concrete have been identified in the project area (DUKE, 2001). No other significant mineralogical resources are known to exist in the project area.

Fran Govean, PhD (1999), conducted a paleontological resource assessment of the Morro Bay Power Plant site. The paleontological assessment included both an archival record search from the University of California, Berkeley, Museum of Paleontology and a field survey of the project site on February 1, 1999 (Govean, 1999).

The archival search did not reveal any fossil localities in the immediate project area. During the field survey Dr. Govean noted several pieces of broken bivalves within the disturbed sandy soils that form the berms at the proposed project site. Dr. Govean concluded that the shell fragments were not in situ and were likely of modern origin. No fossil remains were observed (Govean, 1999).

Artificial fill, Quaternary Alluvium, Older Quaternary Dune Sands, and Recent Dune Sands underlie the Morro Bay Power Plant site. Dr. Govean (1999) concluded that since these sediments are geologically very young and the proposed project site footprint was highly disturbed during the construction of the original Morro Bay Power Project, the proposed site has a low paleontologic sensitivity. As a result, no significant paleontological resources are expected to be encountered during construction of the project.

## **SITE SPECIFIC IMPACTS**

Excavations, drilling, clearing and brushing operations, and grading of the fill and alluvium at the power plant site associated with construction of the project are considered to present a low potential impact to paleontological resources. At the time that this document was prepared, the site was not known to contain any fossils. The adoption and implementation of the proposed **Conditions of Certification Pal-1 through Pal-7** should mitigate any potential impacts to paleontological resources, should such resources be encountered during construction of this project.

The discussion of the potential impacts with respect to water quality, including the impacts on turbidity and temperature, is found in the **Soils and Water Resources** section of this document. Flooding and storm water run-off are 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.

No geological and paleontological resources are considered to be significantly impacted by the construction and operation of the proposed project.

## **CUMULATIVE IMPACTS**

It is staff's opinion that the potential for significant adverse cumulative impacts on paleontological resources or geological resources is unlikely, if the Morro Bay Power Plant 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.

## CONCLUSION AND RECOMMENDATIONS

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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 facilities. 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 and geological and paleontological resources for the project.

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 the impacts of the geologic hazards on project facilities should be less than significant, if the design and construction of all project facilities comply with the applicable LORS. Staff proposes to ensure compliance with the LORS for geological hazards and geological and paleontological resources with the adoption of the proposed **Conditions of Certification** listed below, and the **Conditions of Certification** for surface water hydrology, that are located in the **Soils and Water Resources** section of this document.

## PROPOSED CONDITIONS OF CERTIFICATION

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**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). A Geotechnical Engineer may also perform the functions of the Engineering Geologist, 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) or Geotechnical Engineer(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) or Geotechnical Engineer(s) and will notify the Project Owner of his/her findings within 15 days of receipt of the submittal. If the Engineering Geologist(s) or Geotechnical Engineer(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 notify the Project Owner of their approval or disapproval of the Engineering Geologist(s) or Geotechnical Engineer(s) within 15 days of receipt of the notice of personnel change.

**GEO-2** The assigned Engineering Geologist(s) or Geotechnical Engineer(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, including the liquefaction potential and foundation 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 also submit a statement that, to the best of his or her knowledge, the work within his or her 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 ground disturbance activities (defined as the removal of soil or vegetation clearance, boring, trenching, or alteration of the site surface), the Project Owner shall ensure that the Designated Paleontological Resource Specialist (DPRS) approved by the CPM is available for field activities and prepared to implement the conditions of certification.

The DPRS 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 DPRS.

The statement of qualifications for DPRS 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 DPRS do not satisfy the above requirements, the Project Owner shall submit another individual's name and qualifications for consideration.

If the approved DPRS is replaced prior to completion of project mitigation, the Project Owner shall obtain CPM approval of the new DPRS 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 DPRS.

Should emergency replacement of the DPRS become necessary, the Project Owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

**Verification:** At least 30 days prior to the start of construction, the Project Owner shall submit the name and resume and the availability for its DPRS to the CPM for review and approval. The CPM shall provide written approval or disapproval of the proposed DPRS.

At least ten (10) days prior to the termination or release of a DPRS, the Project Owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new DPRS. Should emergency replacement of the DPRS 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 DPRS shall prepare a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) 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 DPRS shall be available to implement the PRMMP, 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 PRMMP 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 DPRS 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 30 days prior to the start of construction on the project, the Project Owner shall provide the CPM with a copy of the PRMMP prepared by the DPRS for review and approval. If the plan is not approved, the Project Owner, the DPRS, 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 DPRS 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 DPRS 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 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 DPRS, 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 DPRS 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 DPRS determines that full-time monitoring is not necessary in certain portions of the project area, the DPRS shall notify the Project Owner.

**Verification:** The Project Owner shall include a summary of paleontological activities conducted by the DPRS in the Monthly Compliance Report.

**PAL-5** The Project Owner, through the DPRS, 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 his/her compliance files copies of signed contracts or agreements with the DPRS 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 DPRS. 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 DPRS 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 DPRS 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 12 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.

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# POWER PLANT EFFICIENCY

Testimony of Dr. Hamid Rastegar and Richard Minetto P.E.

## INTRODUCTION

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The Power Plant Efficiency (PPE) analysis provides the basis for the findings in the Energy Commission's decision. This Final Staff Assessment (FSA) indicates whether or not the proposed power plant project conforms to all applicable laws, ordinances, regulations and standards (LORS) required for efficiency, and provides conditions of certification for compliance if required.

The Energy Commission makes findings as to whether energy use by the Morro Bay Modernization Project (MBMP) 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 MBMP'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.

Duke Energy North America, LLC (DENA), the applicant, proposes to modernize the Morro Bay Power Plant (MBPP) with a new combined-cycle generating facility. The property and project are referred to as the Morro Bay Modernization Project (MBMP).

In order to support the Energy Commission's findings, this analysis will:

- Determine whether the facility will likely present any adverse impacts upon energy resources;
- Determine whether these adverse impacts are significant; and if so,
- Determine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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### 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**

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DENA is proposing to construct and operate the 1,200-megawatt (MW) Morro Bay Power Plant Project (MBMP). The "modernization" project is proposed to be located at the existing 1,030 MW Morro Bay Power Plant site that is owned and operated by Duke Energy. This site is located within the City of Morro Bay, San Luis Obispo County, near Morro Bay Harbor (Figure 1). DENA proposes construction of two new generating units to replace the currently operating generation Units 1 and 2 (326 MW, 1950's technology) and Units 3 and 4 (676 MW, 1960's technology) with two, state-of-the-art 600 MW combined cycle units. Upon completion of the project, the Plant will be capable of producing a nominal 1,200 MW net. Each new unit will consist of two gas-fired combustion turbines (CTs) and one steam turbine (ST) driven by the heat recovered from the hot exhaust of the CTs in a heat recovery steam generator (HRSG). Each new unit will have two, 145-foot tall stacks compared with the existing plant's three 450 foot tall stacks. The new combined cycle units will continue to use the existing once-through seawater cooling system that includes an intake structure that draws water from Morro Bay and an ocean outfall which discharges into Estero Bay. Power from the combined cycle units will tie into the Pacific Gas and Electric Company's (PG&E) Morro Bay Switchyard that is located immediately adjacent to the power plant. No offsite transmission lines or transmission line upgrades are required by the power plant (DENA 2000a, AFC §§ 1.1, 1.2, 8.1, 8.3, 8.3.1). Natural gas will be delivered by the existing PG&E pipeline and distribution system. Commercial operation will begin in the fall of 2003 (DENA 2000a, AFC §§ 1.1, 1.2).

The proposed new MBMP will consist of two combined cycle trains, each composed of two General Electric model PG7241 "7FA" gas turbines (without inlet air coolers) producing approximately 170 MW each, two triple-pressure heat recovery steam generators (HRSGs) with duct-firing capability, and a single steam turbine producing a maximum of about 189 MW arranged in a two-on-one combined cycle train, totaling approximately 516 net MW. The gas turbines will be equipped with dry low-NO<sub>x</sub> combustors and the HRSGs will incorporate selective catalytic reduction (SCR) to control air emissions. Additional steam turbine capacity of about 84 MW per unit can be obtained by duct firing in the HRSG at a lower efficiency (DENA 2000a, AFC §§ 1.2, 2.22.2.3, 2.2.3.1, 2.2.3.2, 2.2.3.3, Figures 2-14 & 2-15, Appendix 8-1).

## **ANALYSIS**

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### **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 MBMP will burn natural gas at a nominal rate up to 185 billion Btu per day LHV (lower heating value) (DENA 2000a, AFC Appendix 8-1). 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 53 percent LHV (DENA 2000a, AFC Appendix 8-1) compared to the average fuel efficiency of a typical utility company baseload power plant at approximately 35 percent LHV.

#### **Adverse Effects On Energy Supplies and Resources**

The applicant has described its sources of supply of natural gas for the MBMP (DENA 2000a, AFC §§ 2.2.3.12, 8.5.1, 8.5.1.1, 8.5.1.2). Natural gas for the MBMP will be supplied from the Pacific Gas & Electric (PG&E) system via PG&E's Line 306 from Kettleman Compressor Station, approximately 70 miles from the MBPP. This natural gas system, which provides access to gas from the Southwest through the Topock compressor station and from the North through Malin, Oregon, represents a resource of considerable capacity. These systems offer access to far more gas than the plant would require (DENA 2000a, AFC §§ 2.2.8, 8.3.1). It is therefore highly unlikely that the MBMP could pose a substantial increase in demand for natural gas in California.

#### **Additional Energy Supply Requirements**

The MBMP will not use any alternative or backup fuel in its operation. Only natural gas from PG&E Line 306 will be used. The MBMP has no other significant energy requirements. Because the natural gas resource supplying the MBMP is more than adequate to meet project needs there is no real likelihood that the MBMP will require the development of additional energy supply capacity.

#### **Compliance With Energy Standards**

No standards apply to the efficiency of the MBMP or other non-cogeneration projects.

## **Alternatives To Reduce Wasteful, Inefficient and Unnecessary Energy Consumption**

The MBMP 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 proposed modernization of the MBPP will replace the existing four Rankine cycle units (Unit 1, year-on-line 1956, 169.1 MW; Unit 2, year-on-line 1955, 169.1 MW; Unit 3, year-on-line 1962, 359.0 MW; and Unit 4, year-on-line 1963, 359.0 MW (UDI)), with a total nominal capacity of 1056.2 MW, with two new combined units with a total nominal capacity of 1200.1 MW (DENA, 2000a, AFC 1.1, 1.2, Appendix 8-1). These new units will be a typical two-on-one configuration with two CT/triple-pressure HRSG trains providing steam to a single ST. The triple-pressure HRSG sequentially produces steam at high, intermediate, and low pressures to improve the efficiency of the heat-recovery-based steam cycle. These new units will not include CT bypass stacks that would allow CT operation with the HRSGs offline, nor will they include a steam dump/condenser system to allow peak CT operation with the ST offline. This operational limitation is not a serious reliability issue, however, because the ST system technology is the most proven and reliable major component. Bypass stacks would only allow continued operation of the CT in simple cycle mode until repairs could be undertaken on the HRSG and/or ST system because of worker safety issues. The CTs will have to shut down before workers could enter the HRSG to undertake repairs (even protective pressurized double damper barriers are not considered to offer adequate worker protection). And while repairs could be performed on the ST system with operating CTs if a suitably designed steam dump condenser was available, such a system would require a very large cooling system that could exceed the capabilities of the MBPP site under peak demand periods. In any case, simple cycle operation of the MBPP CTs will not be efficient compared to the combined cycle mode and the ability to use CT stack bypass or steam dump condensers to allow for simple cycle operation is a reliability/flexibility issue and not an efficiency issue.

The MBMP proposes to use fuel gas preheating (DENA 2000a, AFC Appendix 8-1) and a new multiple pump system for circulating cooling water that operates on load requirements (DENA 2000a, AFC § 1.2). Staff believes these two features contribute meaningful efficiency enhancements to the MBMP. The two-train CT/HRSG configuration also allows for high efficiency during unit turndown because one CT can be shut down at 50 percent load, leaving one fully loaded, efficiently operating CT instead of having any CTs operating at an inefficient 50 percent load.

The MBPP includes HRSG duct burners, partially to replace heat to the ST cycle during high ambient temperatures when CT capacity drops, and partially as added power. Duct firing also provides a number of operational benefits, such as balancing and optimizing the operation of the ST cycle. Staff believes that inclusion of HRSG duct burners, while less

efficient than overall operation of the combined cycle technology, does provide additional benefit for capacity, and is more efficient than other technology for providing energy during peak conditions.

### **Equipment Selection**

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The 7FA-class gas turbines to be employed in the MBPP represent some of the most modern and efficient such machines now available. The applicant will employ a General Electric model PG7241 combined cycle power train (DENA 2000a, AFC §§ 1.1.1, 2.1, 2.2.3, 2.2.5.1, 2.2.5.1.2, 6.6; Figures 2-14, 2-15). The F-class CTs selected by Duke, along with the triple-pressure HRSGs, are the most efficient, sufficiently proven natural gas power generation technology to meet the MBPP's objectives.

### **Efficiency of Alternatives to the Project**

The project objective is to be able to compete on the spot market. A number of technologies considered by DENA may have slightly higher efficiencies, but such technologies are either not commercially proven, not available at a large enough scale, or are much more expensive than the combined cycle technology selected by Duke. Staff believes that combined cycle technology using F-class CTs is the most efficient technology for large power plants wishing to compete on the spot market.

### ***Alternative Generating Technologies***

Alternative generating technologies for the MBMP are considered in the AFC (DENA 2000a, AFC §§ 5.9, 5.9.1, 5.9.2). Non-gas options considered include integrated-coal-gasification combined cycle, conventional coal-fired boiler, coal-fired pressurized-fluidized-bed, direct-coal-fired and indirect-coal-fired turbines, nuclear reactors, hydroelectric, geothermal, ocean energy, biomass fuel, municipal waste fuel, solar thermal, solar photovoltaic and wind generation. One of the project's stated objectives is to compete as a merchant plant (DENA 2000a, AFC § 2.1.1.2). Given the project objectives, location, and air pollution control requirements, staff agrees that only natural gas-burning technologies are feasible.

### ***Natural Gas-Burning Technologies***

Alternative natural gas-burning technologies were also considered in the AFC (DENA 2000a, AFC §§ 5.9, 5.9.1, 5.9.2). Initially rejected were Kalina combined cycle, advanced gas turbine cycles, and fuel cells, all on the basis of lack of commercial availability and/or non-competitive on a scale necessary to the goals of the project (DENA 2000a, AFC § 5.9.2.2.1). More seriously considered were conventional gas-fired boiler/steam turbine (rejected because the efficiency is too low to compete), supercritical gas-fired boiler/steam turbine (rejected because of high capital cost and non-competitive efficiency), simple-cycle combustion turbine (rejected because of low efficiency compared to the reference combustion turbine combined cycle technology), and cogeneration (rejected because there are no nearby steam customers) (DENA 2000a, AFC § 5.9.2.1.1).

## **CUMULATIVE IMPACTS**

Staff knows of no other projects that could result in cumulative energy impacts. There are no nearby power plant projects that hold the potential for cumulative impacts when aggregated with the MBMP. The operation of the proposed MBMP at any generating capacity level will result in significantly less natural gas being consumed than currently for the four existing units at the site because the new units are much more efficient than the existing units they will replace. Even without the proposed MBPP, other power plants would be required to burn the natural gas required to meet California's electricity needs. Since natural gas will be burned by the power plants that are most competitive on the spot market, the most efficient plants will run the most. The high efficiency of the proposed MBMP should allow it to compete very favorably, running at a high capacity factor, therefore reducing the cumulative amount of natural gas consumed for power generation.

## **FACILITY CLOSURE**

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A planned or unplanned closure of the facility will not affect, nor will it be affected by, project efficiency. Any efficiency impacts due to closure of the project would be on the entire California electric system. The large size of the electric system serving California, the number of generating plants offering to sell power contracts to the State and competitively to the California Independent System Operator (CalISO) will ensure the efficient management of the system and lend assurance that closure of this facility will not produce significant adverse impacts on efficiency.

## **CONCLUSIONS**

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The MBMP, if constructed and operated as proposed with duct firing, would generate a nominal 1200 MW of electric power at an overall project fuel efficiency approaching 52.8 percent (LHV). The unfired combined cycle operated without duct firing would produce a nominal 1032 MW of power at an even higher efficiency of 55.0 percent (LHV), and firing the duct burners could add another 168 MW at an incremental efficiency of 42 percent (LHV). While duct firing is not as efficient as the MBMP unfired base combined cycle, it represents a low-cost and very reliable source of peaking power at an efficiency that is competitive with other existing peaking units. And, because duct firing will need to compete on the spot market against other units, when it is operating it will be the most efficient peaking unit supplying the Cal-ISO.

No energy efficiency standards apply to the project. 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. Staff concludes that the MBMP would present no significant adverse impacts upon energy resources. No cumulative impacts on energy resources are likely. Facility closure would not likely present significant adverse impacts on electric system efficiency. No Conditions of Certification are proposed.

## REFERENCES

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DENA (Duke Energy Morro Bay LLC). 2000 a. Application for Certification, Volumes 1a-1b, II-IV, Morro Bay Power Plant Project (00-AFC-12). Submitted to the California Energy Commission on October 23, 2000.

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# POWER PLANT RELIABILITY

Testimony of Dr. Hamid Rastegar and Richard Minetto P.E.

## INTRODUCTION

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The Power Plant Reliability (PPR) analysis provides the basis for the findings in the Energy Commission's decision. This Final Staff Assessment (FSA) indicates whether or not the proposed power plant project conforms to all applicable laws, ordinances, regulations and standards (LORS) required for reliability, and provides conditions of certification for compliance if required. This analysis by the Energy Commission staff examines reliability issues to determine if the proposed power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric transmission system it serves (see **Setting** below).

Duke Energy North America, LLC (DENA), the applicant, proposes to modernize the Morro Bay Power Plant (MBPP) with a new combined-cycle generating facility. The property and project are referred to as the Morro Bay Modernization Project (MBMP).

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 DENA has predicted a better than 90 percent availability for the power plant (see below), staff uses the benchmark identified above, rather than DENA's projection, to evaluate the project's reliability.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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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's reliability is acceptable if it does not degrade the reliability of the utility transmission system to which it is connected. This is considered to be likely if the power plant's reliability is at least equal to that of other power plants on that transmission system (see **Setting** below).

## SETTING

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According to the North American Reliability Council's Reliability Assessment–2000-2009 (NERC 2000a), the Western Systems Coordinating Council's (WSCC) self-assessment for the period 2000-2009 projects adequate capacity margins (assuming the construction of 30,200 MW of net new generation) and fuel supplies under normal weather conditions for all regions, including the California-Mexico Power Area (adverse weather conditions are predicted to require some non-firm load shedding in California). Peak demand requirements in this region are projected to grow at an annual rate of 2 percent from 1999 through 2009; projected reserve margins in this region range between 9.3 and 17.8 percent of firm peak demand for the next ten years. The California transmission system is also projected to be adequate assuming the completion of planned electric power transfer capacity south of San Onofre.

The recent restructuring of the electric power industry in California has added much uncertainty in predicting both future added capacity and customer demand. In the regulated monopoly electric industry of past decades, the utility companies augmented overall system reliability, in part, by maintaining a "reserve margin" of power plant capacity and power plants run at part-load as running (spinning) reserve. Reserve margin amounted to having available, at all times, sufficient generating capacity, in the form of standby power plants, to handle unplanned outages of generating or transmission facilities. The utilities generally maintained adequate reserve margin based on the proven availability and reliability of the power plants and transmission facilities that constituted the system. Reserve units could be on cold standby for slow startup or hot standby for faster startup. Running reserve was maintained as needed for very rapid power increases to absorb the shock of a sudden unplanned outage of a power plant or transmission line that could cause other operating power plant units to trip due a sudden, large load spike.

The newly restructured competitive electric power industry in California shifted this responsibility for maintaining system reliability to the California Independent System Operator (Cal-ISO) on March 31, 1998. The Cal-ISO is responsible for purchasing, dispatching and selling electric power throughout the state. Protocols are being developed and implemented by the Cal-ISO that are intended to achieve an acceptable level of reliability in the new competitive market system. However, if significant numbers of power plants exhibit individual reliability sufficiently lower than expected historical levels, the assumptions used by Cal-ISO to ensure system reliability could prove invalid, with potentially disappointing results. It is therefore important that new power plants achieve their predicted levels of availability if CalISO's planned use of ancillary services is to maintain transmission system reliability.

DENA proposes to begin commercial operation of the nominal 1200 MW Morro Bay Modernization Project (MBMP) in the fall of 2003 (DENA 2000a, AFC §§ 1.1, 1.2) selling competitive power on the spot market (DENA 2000a, AFC § 2.1.1.2). The sale of ancillary services to the CalISO is also possible, especially because the MBMP is well located to provide reactive power support to the local transmission system (DENA 2000a, AFC § 2.1.1.4). The project expects to achieve a minimum overall availability of over 90 percent (DENA 2000a, AFC § 2.2.3.5).

## **ANALYSIS**

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The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages.

For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (DENA 2000a, AFC § 4.2.2), the MBPP will be expected to perform reliably in baseload, load-following duty, and duct-fired peaking operation. To operate for extended periods of time without planned maintenance or repair downtime, the plant must be maintainable with scheduled maintenance outages and have adequate levels of equipment availability, fuel and water availability, and resistance to natural hazards.

These factors for the project are compared to industry norms by staff in the reliability analysis. If they compare favorably, staff can conclude that the MBPP will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

### **EQUIPMENT AVAILABILITY**

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

#### **Quality Control Program**

The MBMP has a detailed quality control program for design, construction, testing, and record keeping typical of the power industry (DENA 2000a, AFC §§ 8.5.2.2.5, 8.5.2.2.5). Staff expects implementation of this program to yield typical reliability of design and construction.

### **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 redundancy for those pieces of equipment most likely to require service or repair. DENA plans to provide appropriate redundancy of equipment so that no single rotating equipment failure in the balance-of-plant and no single point control system failure can cause a combustion turbine HRSG "train" to go offline; in addition, no single switchyard circuit breaker or step-up transformer failure will isolate the plant from the transmission system (DENA 2000a, AFC §§ 8.3.4, 8.5.2.2.2). In addition, the project will consist of two redundant two-on-one configurations with two combustion turbine (CT)/heat recovery steam generator (HRSG) trains providing steam to a single steam turbine (ST). These new units will typically not include CT bypass stacks that would allow CT operation with the HRSGs offline, nor will they include a steam dump/condenser system to allow CT operation with the ST offline. This

operational limitation is not a serious reliability issue, however, because the ST system technology is the most proven and reliable major component. The two trains of the less proven newer General Electric (GE) 7FA CT and the larger, higher-temperature, multi-pressure HRSG it requires provide an adequate degree of major component redundancy. Four (4) trains of combined cycle units (gas turbine generators, HRSGs) provide inherent reliability. Failure of a non-redundant component of one train should not cause any other train to fail, thus allowing the plant to continue to generate (at ¼ reduced output for each train on planned maintenance outage or unplanned failure). In addition, continual improvements to both the GE 7FA CT and large HRSGs are bringing these technologies to a high level of reliability. For example, the EPRI ([www.epri.com](http://www.epri.com)) has member programs to address both F-Class CT and HRSG reliability issues. EPRI Science and Technology Solutions, Power Generation, Target 072.0 addresses the following F-Class CT issues:

- Competitive pressures require project developers to adopt the latest, most aggressive combustion turbine designs. Although advanced models promise unprecedented efficiency, as new, unproven technologies they also pose greater reliability risks. Indeed, industry experience with F-class machines has raised concerns that premature wear or failure of high-temperature components could offset thermal efficiency savings.

Multi-pressure HRSG issues are addressed as follows in Target 065.2:

- Heat recovery steam generators (HRSGs), particularly multi-pressure-level units, are not designed in the same manner as more familiar larger fossil-fired boilers. In addition, water treatment systems and associated plant operating practices have led to a high frequency of tube failures. Flow-assisted corrosion, repetitive exhaust duct expansion joint failure, burner duct thermal barrier coating spallation, economizer acid dew point corrosion, and gas side flow maldistribution are among the problems experienced by combined-cycle operators.

A decade of commercial operation of GE 7F CTs has provided sufficient experience to identify adequate fixes for the above reliability issues and to make the reliability of these F-class CTs predictable and acceptable.

Further, the plant's distributed control system (DCS) will be built with typical redundancy. Redundant batteries, chargers and inverters will supply emergency DC and AC power systems. Other balance of plant equipment will be provided with some level of redundancy (DENA 2000a, AFC § 8.5.2.1, Table 8-2). Staff believes that equipment redundancy will be sufficient for this project.

### **Maintenance Program**

DENA proposes to establish a plant maintenance program typical of the industry (DENA 2000a, AFC §§ 8.5.2, 8.5.2.1). Equipment manufacturers provide maintenance recommendations with their products, and all major power plant engineering companies offer standard off-the-shelf maintenance programs. In light of this easily available advice, and of the financial incentives to properly maintain the facility for reliable operation, staff expects that this will ensure that the project will be adequately maintained to ensure acceptable reliability.

## **FUEL AND WATER AVAILABILITY**

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

### **Fuel Availability**

The MBMP will burn natural gas from the Pacific Gas & Electric (PG&E) system via PG&E's Line 306 from Kettleman Compressor Station, approximately 70 miles from the MBMP. This natural gas system, which provides access to gas from the Southwest through the Topock compressor station and from the North through Malin, Oregon (DENA 2000a, AFC §§ 2.2.3.12, 8.5.1, 8.5.1.1, 8.5.1.2), represents a resource of considerable capacity. These systems offer access to far more gas than the plant would require (DENA 2000a, AFC §§ 2.2.8, 8.3.1). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

### **Water Supply Reliability**

The MBMP will obtain water for cooling and other plant uses from the existing power plant's sea water intake and discharge system; water from on-site wells will only be used for maintenance, fire protection, landscaping, and potable water (DENA 2000a, AFC §§ 2.1.1.8, 2.2.3.6, 2.2.3.7, 6.5). In fact, the MBPP will reduce the maximum requirement for seawater cooling from the existing 464,000 gpm to 330,000 gpm (DENA 2000a, AFC §§ 2.1.1.9, 2.2.3.12, 6.5, TABLE 6.5-1, 8.3.1.1, 8.3.2). To further reduce cooling water intake the MBPP proposes a new efficient multiple pump system that operates on load requirements (DENA 2000a, AFC § 1.2). Staff believes these sources yield sufficient likelihood of a reliable supply of both seawater cooling and fresh water. (For further discussion of water supply, see that portion of this document entitled **Soil and Water Resources**.)

## **POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS**

Natural forces can threaten the reliable operation of a power plant. Local flooding, high winds, and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but seismic shaking (earthquake) and tsunamis (tidal waves) represent credible threats to reliable operation (DENA 2000a, AFC § 6.3).

### **Seismic Shaking**

The site lies within CBC Seismic Zone 4 and approximately 8 km from a Type B seismic source; no active earthquake faults lie near the plant site (DENA 2000a, AFC §§ 2.2.3.11, 6.3.1.5.1, 6.3.1.5.2, 7.2.1.2.2, 8.2.3, Appendix 3.1.4, Appendix 8-4), but the PG&E Line 306 supplying gas to the power plant crosses the San Andreas Fault near the middle of its approximately 70-mile length. See that portion of this document entitled **Geology and Paleontology**.

The project will be designed and constructed to the latest appropriate LORS. Since LORS have been periodically and continually upgraded, the required compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking, compared to older facilities. This power plant will likely perform at least as well as, and

perhaps better than, existing plants in the electric power system because it will be built to the latest seismic design LORS. In light of the acceptable historical performance of California power plants, gas transmission pipelines, and the electrical system during seismic events, staff believes there is no special concern with overall power plant reliability that would adversely affect the electric system's reliability due to seismic events.

## **Tsunami**

Four (4) historically reported tsunamis have occurred in the Morro Bay area. Morro Rock, the narrow harbor entrance, and the existing sand spit minimize any tsunami danger to the MBMP. The reported tsunamis in 1878, 1953, 1960, and 1964 damaged piers, wharves and buoys in Morro Bay Harbor, but no flooding or damage has occurred at the existing MBPP due to earthquake-induced tsunamis (DENA 2000a, AFC §§ 6.3.1.5.3). In a worst-case tsunami scenario, the emergency response agencies might require a very temporary evacuation of the plant site, but no significant damage to the power plant would be expected. Staff believes that tsunamis do not pose a significant threat to the proposed MBPP. For more discussion see the **Geology and Paleontology** section of this PSA.

## **COMPARISON WITH EXISTING FACILITIES**

The first combined cycle power plants based on the GE 7FA-class gas turbine have been in operation since the early 1990s. These newer combined cycle plants represent a departure in operating practice from earlier, less efficient, combined cycle power plants because they are typically operated at a much higher capacity factor than has been the experience with the older units that have more years of collected reliability data. Since the plant will consist of four (4) parallel gas turbine generating trains, the adverse effect on availability of major maintenance operations is typically minimized by scheduling major maintenance operations during those times of year when the full plant output is not required to meet market demand. The applicant's estimate of 90 percent plant availability therefore appears to be a safe prediction. 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**

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Closure of the facility, whether planned or unplanned, cannot impact power plant reliability (DENA 2000a, AFC §§ 4.2, 4.2.1, 4.2.2). Reliability impacts on the electric system from facility closure, if any, could be slightly adverse because the project's location relative to the transmission system serves to reduce losses and provides added reactive power (DENA 2000a, AFC §§ 2.1.1.2, 2.1.1.4).

## **CONCLUSION**

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The applicant predicts an equivalent availability factor of over 90 percent, which staff believes is achievable in light of the industry norm of 90.87 percent for all combined cycle plants. 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. Based on Staff's review there are no conditions for certification recommended.

## **REFERENCES**

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# TRANSMISSION SYSTEM ENGINEERING

Testimony of Richard Minetto, P.E. and Laiping Ng

## INTRODUCTION

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The Transmission System Engineering (TSE) review determines whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations and standards (LORS), to ensure safe and reliable electric power transmission. The analysis includes conditions of certification for compliance.

Duke Energy North America (DENA) proposes to interconnect the generating facility to the electrical grid through Pacific Gas and Electric Company's (PG&E) 230 kV bus at the Morro Bay 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 findings related to applicable reliability standards and the need for additional transmission facilities. The Cal-ISO will also provide testimony at the Energy Commission's hearings.

Staff also evaluated the power plant switchyard, outlet line, termination facilities and outlet alternatives, if applicable, 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 (CCR, tit. 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effects of construction and operation of any new or modified transmission facilities, beyond the project's interconnection with the existing transmission system, that result from the power plant's addition to the California transmission system.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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- 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 Grid Planning 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 Grid Planning Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Grid Planning Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Planning 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 project. Also of major importance to projects, which may sell power to the California deregulated wholesale market, 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 requires 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 so that if congestion is anticipated, the highest bids are not selected. The Transmission System

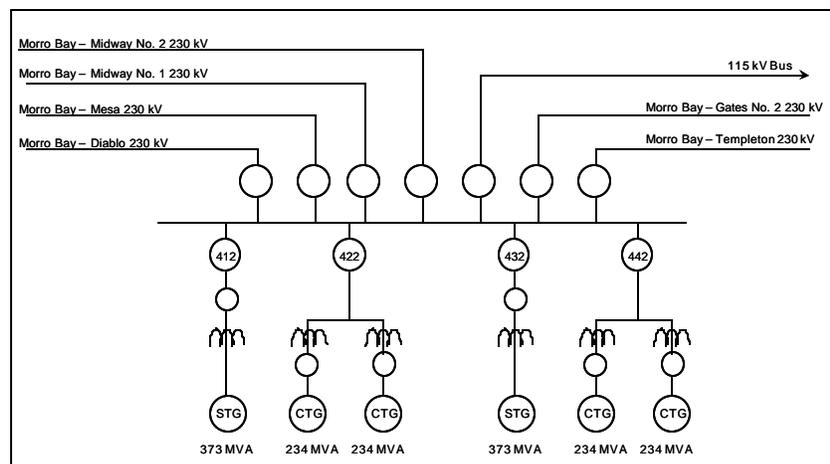
Loss Management Scheduling Protocol uses the Cal-ISO power flow model to identify total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine the actual net power output required by the generating units to meet their scheduled obligations. (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 below shows an overall one-line diagram for MBMP. The MBMP provides a nominal output of 1,200 megawatts (MW) to the PG&E 230 kV grid. While the overall site contains existing power generating units, DENA has proposed the demolition of the existing power facilities subsequent to operation of the new facility. The proposed generation will be located in an area that previously was used to store on site fuel oil. The proposed project site is located in San Luis Obispo County within the City of Morro Bay.

**Figure 1 – One Line Diagram**



The generation addition has been proposed to consist of four 234 MVA gas combustion turbine generators (CTG), and two 373 MVA steam turbine generators (STG). The CTGs will be fueled by natural gas and air, and the STGs 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 <sup>1</sup>.

<sup>1</sup> Draft Morro Bay Modernization Project, System Impact/Facilities Study Report, Page 2, April 9, 2001

## **PROJECT SWITCHYARD**

The existing switchyard is proposed for interconnection of the plant output. Four existing circuit breakers (CB412, 422, 432, 442) are proposed for protection of the interconnection. The Final System Impact/ Facilities Study (Final SI/FS) completed by PG&E concluded that the addition of the MBMP creates no adverse effects on these circuit breakers. 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 transmission line from the generation plant to the existing switchyard will consist of transmission structures using bundled 1113 ACSR conductor. The size of the conductor is adequate for the proposed generator output.

## **EXISTING FACILITIES AND RELATED SYSTEMS**

The MBMP replaces four existing units with a new facility as described above. The project includes the demolition of the existing Units 1 through 4 and their respective stacks. A variety of site improvement initiatives including landscaping, and various pedestrian, bikeway, and vehicle paths are also being proposed as part of the project. The existing units 1 through 4 currently generate 1002 MW. The output of the new station will tie directly to the PG&E 230 kV switchyard through existing breakers.

## **ANALYSIS AND IMPACTS**

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### **SYSTEM RELIABILITY**

#### **Introduction**

A DRAFT System Impact / Facilities Study was prepared by PG&E for the MBMP and was submitted to the Commission on April 12, 2001. The FINAL SI/FS was submitted to the Commission on May 4, 2001. This study determined the effects of connecting the new power plant to the existing electric grid. The study identified impacts and also ways in which impacts can be minimized or avoided. Any new transmission facilities such as the power plant switchyard, the outlet line, and, downstream facilities required for connecting a project to the grid are considered part of the project and are subject to the full AFC review process.

#### **Final System Impact/Facilities Study Summary**

The general method for identifying thermal overloads includes transmission system power flow simulation modeling under normal (i.e. all elements in service) and emergency (i.e. one or more system elements out of service) conditions. The Cal-ISO Grid Planning Criteria indicates that normal overloads are identified as any transmission facility (i.e., transformer bank, transmission line) exceeding 100% of its normal rating. Likewise, contingency (emergency) overloads are identified as any transmission facility exceeding 100% of its emergency rating. The following components were studied in the System Impact/Facilities study.

- Steady State Power Flow studies: These studies were conducted using PG&E's 2003 Winter, 2004 Spring, and 2004 Summer WSCC Full Loop Base Cases. These studies analyze adverse impacts to normal operating conditions. Further studies were conducted taking single and multiple lines out of service for contingency analysis.
- Post Transient Power Flow Studies: Studies were conducted for 500 kV double line outages on Path 26 and Path 15 in addition to a few critical 230 kV double line outages.
- Dynamic Stability Study: This study was conducted to ascertain any instability effects of the MBMP following outages of certain other facilities.
- System Protection Study: This study was conducted to ascertain any equipment overloads as a result of the MBMP.
- Substation and Transmission Line Upgrades: Projects associated with the MBMP impacts were identified. These projects may be necessary to mitigate impacts of the interconnection of the MBMP.
- Study Generation Assumptions: Interconnection assumptions were finalized with input and concurrence from DENA, the Cal-ISO, and PG&E. These assumptions provided the basis for the modeling of expected generation and transmission improvement projects for impact assessment.

The intent of the Final SI/FS is to analyze the potential impacts of the MBMP on the transmission grid. These studies provide the basis for determining any system modifications, Remedial Action Schemes (RAS) or congestion management necessary to prevent criteria violations due to the interconnection of MBMP to the transmission grid.

The Final SI/FS identifies the following points:

1. Steady State and Contingency Power Flows MBMP:
  - a. The Morro Bay-Templeton 230 kV line is 16% above its normal rating with all lines in service in the summer base case. Prior to MBMP, this line was loaded up to 96% of its normal rating.
  - b. The Morro Bay-Templeton 230 kV had a 25% overload following the outage of the Morro Bay-Gates 230 kV line for the Summer Base Case. Prior to MBMP, this overload was 4%.
  - c. The San Luis Obispo-Atascadero 70 kV line had a 29% overload following the outage of the Morro Bay-Templeton 230 kV line for the Summer Base Case. Prior to MBMP, this overload was 9%.
  - d. The loss of either the Midway 500/230 kV transformer bank for the Summer or Spring Base Cases showed that the remaining parallel 500/230 kV bank overloads beyond its emergency rating during single or multiple contingencies.

2. Post Transient Power Flow Studies:
  - a. The double line outage of the Midway-Vincent #1 and #2 500 kV lines overloaded the PG&E portion of the Midway-Vincent #3 500 kV line beyond its emergency rating. This condition was present prior to MBMP and is not the applicant's responsibility.
3. Dynamic Stability Study:
  - a. No adverse system impact on the stable operation of the transmission system following selected outages was present for the MBMP.
4. System Protection Study:
  - a. No adverse equipment impacts for fault interruption facilities were present for the MBMP.

### **Cal-ISO Summary**

On May 11, 2001, the Cal-ISO issued a preliminary approval to connect the MBMP to the ISO controlled grid. The final approval will be granted once the final mitigation alternative is selected and submitted to the Cal-ISO. The preliminary approval letter stated that:

- The Cal-ISO concurs with the study assumptions, conclusions and recommendations in the Final System Impact/Facilities Study.
- The Cal-ISO concurs with the proposed mitigation alternatives of the Morro Bay – Templeton 230 kV line to mitigate line overloads under normal conditions. Both rerating or reconductoring of the line would remove transmission line constraints and allow DENA to provide maximum generation output under normal peak load conditions. However, an alternative to line reconductoring and rerating is congestion management. With congestion management, generation output would be curtailed at times to maintain line loading within its rating.
- The Cal-ISO approves the recommendation of using Remedial Action Schemes (RAS) or Special Protection Schemes (SPS) to mitigate facility overloads caused by MBMP under various contingency conditions. DENA should only be responsible for mitigating the impacts of the incremental generation from the MBMP (190 MW). Per the Cal-ISO Grid Planning Criteria, a consideration of RAS/SPS failure should be included in the design of the RAS/SPS.

### **System Impact / Facilities Study Sequence**

The final version of the PG&E System Impact / Facilities Study dated May 4, 2001 identified the transmission impacts as a result of the MBMP. On May 14, 2001, staff received a letter from the applicant (dated May 10, 2001) which stated the applicant's selection of the mitigation alternatives for line overloads. Staff received a letter (dated July 23, 2001) from PG&E to the applicant and copied to Cal-ISO. The letter indicated that "DENA must execute the Generator Special Facilities Agreement (GSFA) within 45 business day in order to maintain its position in the interconnection queue. Please execute this GSFA by September 25, 2001." On September 28, 2001, PG&E informed staff that DENA signed the GSFA on

September 25, 2001. Staff is concerned that DENA waited to sign the GSFA because this agreement initiates mitigation required for the project interconnection. The specific mitigation approved is needed to identify the complete project including whether there are “downstream facilities” such as a reconducted line. This must be known to avoid uncertainty regarding project interconnection facilities.

## **Study Conclusions**

The Final SI/FS indicates that there are transmission impacts as a result of the MBMP. Specific alternatives are identified in the Final SI/FS to mitigate negative impacts. Table 1 below shows the proposed mitigation alternatives as outlined in the PG&E SI/FS (Duke 2001b). The mitigation measure the Applicant selected was to re-rate the overloaded lines. However, the PG&E GSFA (PG&E 2001c) concluded that if the engineering results indicate the re-rating of the Morro Bay – Templeton 230 kV lines is not possible, the applicant must choose one of the other mitigation measures identified in the SI/FS dated May 4, 2001. These include RAS or re-conducting of the overloaded lines (PG&E 2001c).

The Cal-ISO has concurred with the PG&E study assumptions, conclusions, and recommendations in the System Impact / Facilities Study. The Cal-ISO granted preliminary approval to connect the project to the ISO grid. Final approval from the Cal-ISO will be granted once the final mitigation alternative is selected.

### **Morro Bay – Templeton 230 kV Line Rerate**

The maximum current rating for a transmission line is dependent ultimately on the conductor temperature. This temperature determines the sag of the conductor and is applied to ensure appropriate clearance codes are not violated. The two primary factors that determine the allowable conductor ampacity are ambient temperature and wind speed. The current ampacity rating for the Morro Bay – Templeton 230 kV is based on a wind speed of 2 feet per second. The allowable ampacity may be increased if the wind speed is assumed to be 4 feet per second. With a higher wind speed, the likely result is that the line re-rating would be adequate to mitigate the normal overload of 16% identified in the SI/FS. The process of determining if 4 feet per second is an acceptable wind speed will require measuring wind speed and ambient temperatures for a period of time to determine actual allowable maximum ampacity.

The average wind speed in the Morro Bay area can be determined using the Wind Energy Resource Atlas for the United States (Elliott et al, 1986, Figure 3-55, Table 1-1). This guide assesses the average wind speed for particular areas. For Morro Bay, the area just off the coastline is listed as a Class 3 wind area. As you move inland, the area is listed as either a Class 1 or Class 2 location. The wind densities are actually provided by class for season. Because it would be expected that the worst case condition for Morro Bay would be summer, the following provides details on the average density for these classes during summer conditions:

- Class 3 – Between 17 and 18 feet per second – at 33 feet from surface
- Class 2 – Between 14 and 17 feet per second – at 33 feet from surface
- Class 1 – Between 0 and 14 feet per second – at 33 feet from surface

- Class 3 – Between 21 and 23 feet per second – at 164 feet from surface
- Class 2 – Between 18 and 21 feet per second – at 164 feet from surface
- Class 1 – Between 0 and 18 feet per second – at 164 feet from surface

The research work proposed to be conducted during the summer of 2002 would determine the appropriate Class for the specific transmission line and assess the actual average wind speed during the peak conditions for re-rating. Given that the line may be in a Class 2 or 3 zone, it is likely that the re-rating process will yield adequate ampacity for mitigation of the line overload condition.

Another type of technology related to transmission line ratings is the “dynamic” rating of facilities. Because the calculation of the “maximum” ampacity is based on a specified ambient and specified wind speed, there is a great probability that one of these two variables will be different during real time operations (Douglass et al, 2000). Dynamic systems utilize technology that actually measures conductor core temperatures to determine real time ampacity rating for the transmission line. Studies have pointed to increases of up to 40 percent in line ampacity during real time operations (Seppa et al, 2000). This type of approach with a RAS may also offer acceptable mitigation for the normal system overload.

Several studies have been completed regarding “dynamic” transmission line ratings where the assumed wind speed was 2 ft./sec in the case. Staff concurs with the Cal-ISO’s assessment and believes that re-rating to a 4 feet per second wind speed for the Morro Bay – Templeton 230 kV line would mitigate the overload and has a good chance of being feasible. PG&E will provide the engineering assessment results for the re-rating and will perform tests in the summer of 2002 to assess the feasibility of the re-rating. This information will be provided for Commission review per Condition of Certification TSE-5. If study results indicate the re-rating is not feasible, all potential mitigation measures will be reassessed.

**TABLE 1 – MITIGATION PROPOSALS**

<i><b>Description of Impact</b></i>	<i><b>Mitigation</b></i>
Morro Bay-Templeton 230 kV line Normal Overload	1.Re-conductor Morro Bay-Templeton 230 kV line 2. Re-rate approximately 15 miles of the 230 kV circuit 3. Morro Bay generation re-dispatch
Morro Bay-Templeton 230 kV line Emergency Overload	1. Re-conductor Morro Bay-Templeton 230 kV line 2. Re-rate approximately 15 miles of the 230 kV circuit and install a Special Protection Scheme (SPS) 3. Install SPS to drop Morro Bay generation
San Luis Obispo-Atascadero 70 kV line Emergency Overload	1. Re-conductor the line 70 kV line 2. Install a SPS that opens the line 3. Install a SPS to drop Morro Bay generation

## CUMULATIVE IMPACTS

The Morro Bay Modernization Plant provides a nominal output of 1,200 MW to the PG&E 230 kV transmission grid. The existing Morro Bay power plant is currently providing 1000 MW; therefore, the project adds 200 MW to the grid. New generation in the area has been included in the power flow study. There are no new cumulative environmental impacts resulting from the MBMP relative to transmission connection and operation.

## FACILITY CLOSURE

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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 requirement for the owner to provide a closure plan 12 months prior to closure, in conjunction with applicable LORS, is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the participating transmission owner (PTO)<sup>2</sup> 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.<sup>3</sup>

This unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishment of an on-site contingency plan (see General Conditions Including Compliance Monitoring and Closure Plan).

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).

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<sup>2</sup> The PTO, in this instance, is Pacific Gas and Electric, e.g., the system owner to which the project is interconnected.

<sup>3</sup> These are mere examples, many more exist.

## CONCLUSIONS AND RECOMMENDATIONS

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Subject to review of the Final SI/FS, the Cal-ISO has granted preliminary approval to connect the MBMP to the grid. Staff's findings indicate that:

1. With the mitigation measures proposed by the applicant, the project will meet NERC, WSCC, and Cal-ISO Grid Planning Criteria.
2. The Cal-ISO confirmed staff's conclusion upon review of the Final SI/FS.
3. The transmission interconnection as proposed is adequate to interconnect the proposed generation with the existing switchyard.
4. The power plant and switchyard are acceptable and will comply with LORS assuming the conditions of certification are implemented.
5. The issuance of the Cal-ISO's final interconnection approval will assure conformance with NERC, WSCC and Cal-ISO Grid Planning Criteria. A condition of certification TSE-5f and TSE-5g provide for Energy Commission review of the Cal-ISO final interconnection approval letter and the PG&E/applicant Facility Interconnection Agreement and reassessment of mitigation measures.

Staff proposes the following conditions of certification to ensure system reliability and conformance with LORS.

## CONDITIONS OF CERTIFICATION

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**TSE-1** The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

**Verification:** At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of power plant switchyard or transmission construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 2: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

<b>Table 2: Major Equipment List</b>
Breakers
Step-up transformer
Switchyard
Busses
Surge Arrestors
Disconnects
Take off facilities
Electrical Control Building
Switchyard control building
Transmission Pole/Tower

**TSE-2** Prior to the start of rough grading, the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. [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.]

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, switchyard structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**TSE-3** The project owner shall keep the CBO informed regarding the status of engineering design and construction. If any discrepancy in design and/or construction is discovered, the project owner shall document the discrepancy and recommend the corrective action required. The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification.

**Verification:** The project owner shall submit monthly construction progress reports to the CBO and CPM to be included in response to **TSE-3**. 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.

**TSE-4** For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- a) receipt or delay of major electrical equipment;
- b) testing or energization of major electrical equipment; and
- c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

**TSE-5** The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements TSE-5 a through g listed below. The substitution of Compliance Project Manager (CPM) and CBO approved “equivalent” equipment and equivalent substation configurations is acceptable. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

- a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, National Electric Code (NEC) and related industry standards.
- b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
- c) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner’s standards.
- d) Termination facilities shall comply with CPUC Rule 21 and applicable PG&E interconnection standards.
- e) The project conductors shall be sized to accommodate the full output from the project.
- f) The project owner shall mitigate the overload of the Morro Bay - Templeton line by ensuring that the evaluation and implementation of “rerating” the subject line conductors is completed. The acceptability of rerating shall be determined by PG&E and the Cal-ISO subject to applicable tariffs.
- g) The project owner shall provide:
  - i) A description of facility upgrades, operational mitigation measures, and/or Remedial Action Scheme (RAS) sequencing and timing if applicable,
  - ii) Executed Generator Special Facilities Agreement,
  - iii) Verification of Cal-ISO Notice of Synchronization.
  - iv) A report, analysis and proposal for alternative reliability criteria mitigation providing the results of the applicant’s proposed “rerating” of approximately 15 miles of the Morro Bay-Templeton 230 kV line. This analysis shall provide the results, including study conditions, of PG&E’s engineering assessment of the feasibility of rerating the subject line and the results of the PG&E summer 2002 tests of the line in the applicable setting.

**Verification 1):** At least 60 days prior to the start of construction of transmission facilities, the project owner shall submit to the CBO for approval:

- a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, NEC, CPUC Rule 21, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.
- b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation

method(s), a sample calculation based on “worst case conditions”<sup>4</sup> and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, “High Voltage Electric Safety Orders”, NEC, CPUC Rule 21, applicable interconnection standards, and related industry standards.

- c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5 a)** through g) above.

**Verification 2):** At least 60 days prior to the start of construction of transmission facilities including the power plant switchyard, the project owner shall submit to the CPM for approval:  
a) The above items for approval, TSE-5 g) i, ii, iii, and iv.

**TSE-6** The project owner shall inform the CPM and CBO of any impending changes, that may not conform to the requirements **TSE-5 a)** through g), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

**Verification:** At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to requirements of **TSE-5** and request approval to implement such changes.

**TSE-7** The applicant shall provide the following Notice to the California Independent System Operator (Cal-ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one (1) week prior to synchronizing the facility with the grid for testing, provide the Cal-ISO a letter stating the proposed date of synchronization; and
2. At least one (1) business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 to 1530 at (916) 351-2300.

**Verification:** The applicant shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one (1) week prior to initial synchronization with the grid. A report of conversation with the Cal-ISO shall be provided electronically to the CPM one (1) day before synchronizing the facility with the California transmission system for the first time.

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<sup>4</sup> Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

**TSE-8** The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, “High Voltage Electric Safety Orders”, applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

**Verification:** Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

- a) “As built” engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, “High Voltage Electric Safety Orders”, CPUC GO-21, and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.
- b) An “as built” engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. “As built” drawings of the mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the “Compliance Monitoring Plan”.

A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

## REFERENCES

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- PG&E (Pacific Gas and Electric) 2001b. Final System Impact/Facilities Study. Submitted to the California Energy Commission on May 14, 2001.
- PG&E (Pacific Gas and Electric) 2001c. Generator Special Facilities Agreement. Transmitted to California Energy Commission on September 28, 2001.
- SEPPA ET AL (T.O. Seppa, S. Damsgaard-Mikkelesen, M. Clements, R. Payne, N. Coad) 2000. Application of Real Time Thermal Ratings for Optimizing Transmission Line Investment and Operating Decisions.
- WSCC (Western Systems Coordinating Council) 1997. Reliability Criteria, August 1998.

## **DEFINITION OF TERMS**

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AAC	All Aluminum conductor.
ACSR	Aluminum conductor steel reinforced
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.
Downstream Facilities	Transmission lines, substations, switching stations and related equipment required to reliably accommodate the project that are beyond the point where the outlet line joins with the existing interconnected system.
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.
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.
Re-rate	Change the wind speed or other factor to provide a higher rating for the transmission line.
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.

# **GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN**

Testimony of Connie Bruins

## **INTRODUCTION**

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The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in conjunction with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of the following elements:

1. General conditions that:
  - a) set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
  - b) set forth the requirements for handling confidential records and maintaining the compliance record;
  - c) state procedures for settling disputes and making post-certification changes;
  - d) 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
  - e) establish requirements for facility closure plans.

2. 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**

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### **DEFINITIONS**

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification:

#### **SITE MOBILIZATION:**

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for the occupants. Site mobilization is for temporary facilities and is therefore not considered construction.

#### **GROUND DISTURBANCE:**

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

#### **GRADING:**

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

#### **CONSTRUCTION:**

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

- a. The installation of environmental monitoring equipment.
- b. A soil or geological investigation.
- c. A topographical survey.
- d. Any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility.
- e. Any work to provide access to the site for any of the purposes specified in a., b., c., or d.

## **START OF COMMERCIAL OPERATION**

- a. The project startup team has completed work.
- b. The plant manager accepts control from the construction manager.
- c. Expenses for the project are switched from construction to operation.
- d. The facility has reached steady state with reliability at the rated capacity.
- e. Financing accounting switches from construction (capital costs) to operations (Income-producing expenses) financing.

## **COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES**

A CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
4. documenting and tracking compliance filings; and,
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, it should be understood that the approval would involve all appropriate staff and management.

The Commission has established a toll free 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. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements and milestones contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight or inadvertence and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

## **Energy Commission Record**

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
2. all monthly and annual compliance reports filed by the project owner;
3. all complaints of noncompliance filed with the Energy Commission; and,
4. all petitions for project or condition changes and the resulting staff or Energy Commission action taken.

## **PROJECT OWNER RESPONSIBILITIES**

It is the responsibility of the project owner 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, upon request to the project owner, be given unrestricted access to the files.

### **Compliance Verifications**

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified, as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. appropriate letters from delegate agencies verifying compliance;
3. Energy Commission staff audits of project records; and/or
4. Energy Commission staff inspections 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  
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 or annual compliance reports.

## **Compliance Matrix**

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area,
2. the condition number,
3. a brief description of the verification action or submittal required by the condition,
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.),
5. the expected or actual submittal date,
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable,
7. the compliance status for each condition (e.g., “not started”, “in progress” or “completed date”), and
8. the project’s preconstruction and construction milestones, including dates and status.

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.

## **Tasks Prior to Start of Construction**

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. 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 for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that pre-construction activities that are initiated prior to certification are performed at the owner’s own risk. Failure to allow specified lead-time may cause delays in start of construction.

Various lead times for verification submittals to the CPM for conditions of certification are established to allow sufficient staff time to review and comment, and if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

## Monthly Compliance Report

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date on which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the Key Events List. The Key Events List is found at the end of this section.

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain at a minimum:

1. a summary of the current project construction and milestones status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification and preconstruction and construction milestones (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
4. a list of conditions and milestones that have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;
5. a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings with, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification or milestones;
9. a listing of the month's additions to the on-site compliance file; and
10. any requests to dispose of items that are required to be maintained in the project owner's compliance file.
11. a listing of complaints, notices of violation, official warnings, and citations received during the month; 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:

1. an updated compliance matrix which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings made to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file, and
9. an evaluation of the on-site contingency plan for unexpected facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section].
10. a listing of complaints, notices of violation, official warnings, and citations received during the year; a description of the resolution of any complaints which have been resolved, and the status of any unresolved complaints.

## **Confidential Information**

Any information, which the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, which is determined to be confidential, shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

## **Department of Fish and Game Filing Fee**

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner 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 on the following page.

# COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
<b>COMPLAINT LOG NUMBER</b> _____ 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.)

## **CONSTRUCTION MILESTONES**

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The following is the procedure for establishing and enforcing milestones, which include milestone dates for pre-construction and construction phases of the project.

Milestones, and method of verification must be established and agreed upon by the project owner and the CPM no later than 30 days after project approval, the date of docketing. If this deadline is not met, the CPM will establish the milestones.

### **I. ESTABLISH PRE-CONSTRUCTION MILESTONES TO ENABLE START OF CONSTRUCTION WITHIN ONE YEAR OF CERTIFICATION**

1. Obtain site control.
2. Obtain financing.
3. Mobilize site.
4. Begin rough grading for permanent structures (start of construction).

### **II. ESTABLISH CONSTRUCTION MILESTONES FROM DATE OF START OF CONSTRUCTION**

1. Begin pouring major foundation concrete.
2. Begin installation of major equipment.
3. Complete installation of major equipment.
4. Begin gas pipeline construction.
5. Complete gas pipeline interconnection.
6. Begin T-line construction.
7. Complete T-line interconnection.
8. Begin commercial operation.

The CPM will negotiate the above-cited pre-construction and construction milestones with the project owner based on an expected schedule of construction. The CPM may agree to modify the final milestones from those listed above at any time prior to or during construction if the project owner demonstrates good-cause for not meeting the originally-established milestones. Otherwise, failure to meet milestone dates without a finding of good cause is considered cause for possible forfeiture of certification or other penalties.

III. A finding that there is good cause for failure to meet milestones will be made if any of the following criteria are met:

1. The change in any milestone does not change the established commercial operation date milestone.
2. The milestone is changed due to circumstances beyond the project owner's control.
3. The milestone will be missed, but the project owner demonstrates a good-faith effort to meet the project milestone.
4. The milestone is missed due to unforeseen natural disasters or acts of God which prevent timely completion of the milestones.

If a milestone date cannot be met, the CPM will make a determination whether the project owner has demonstrated good cause for failure to meet the milestone. If the determination is that good cause exists, the CPM will negotiate revised milestones.

If the project owner fails to meet one or more of the established milestones, and the CPM determines that good cause does not exist, the CPM will make a recommendation to the Executive Director. Upon receiving such recommendation, the Executive Director will take one of the following actions.

1. Conclude that good cause exists and direct that revised milestones be established; or
2. Issue a reprimand, impose a fine, or take other appropriate remedial action and direct that revised milestones be established; or
3. Recommend, after consulting with the Energy Facility Siting and Environmental Committee, that the Commission issue a finding that the project owner has forfeited the project's certification.

The project owner has the right to appeal a finding of no good cause, or any recommended remedial action, to the Energy Facility Siting and Environmental Committee, and to the full Commission.

## **FACILITY CLOSURE**

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At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting which that 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**

A 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**

An unplanned 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.

## **UNEXPECTED PERMANENT CLOSURE**

An unplanned 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.

## **GENERAL CONDITIONS FOR FACILITY CLOSURE**

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### **PLANNED CLOSURE**

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least twelve months prior to commencement of closure activities (or other period of time agreed to by the CPM). The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site.
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

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.

In addition, prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Commission CPM for the purpose of discussing the specific contents of the plan.

As necessary, prior to, or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the

environment, but shall not commence any other closure activities, until Commission approval of the facility closure plan is obtained.

## **UNEXPECTED TEMPORARY CLOSURE**

In order to ensure that public health and safety and the environment are protected in the event of an unexpected temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days (unless other arrangements are agreed to by the CPM), the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment (also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management).

In addition, consistent with requirements under 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 the circumstances and expected duration of the closure.

If the CPM determines 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 CPM's determination (or other period of time agreed to by the CPM).

## **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.

In the event of an unexpected permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan consistent with that for a planned closure shall be developed and submitted to the CPM within 90 days of the permanent closure (or other period of time agreed to by the CPM).

## **DELEGATE AGENCIES**

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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**

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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, whether the cause of the incident involves willful disregard of LORS, inadvertence, unforeseeable events, and other factors the Commission may consider.

Moreover, to ensure compliance with the terms and conditions of certification and applicable laws, ordinances, regulations, and standards, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

## **NONCOMPLIANCE COMPLAINT PROCEDURES**

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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:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and,
4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum which fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et. seq.

### **FORMAL DISPUTE RESOLUTION PROCEDURE-COMPLAINTS AND INVESTIGATIONS**

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's 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.

The Chairman, upon receipt of a written request stating the basis of the dispute, 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**

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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; and 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, and cause the project to violate laws, ordinances, regulations or standards.

### **VERIFICATION CHANGE**

The proposed change will be processed as a verification change if it involves only the language in the verification portion of the condition of certification. This procedure can only be used to change verification requirements that are of an administrative nature, usually the timing of a required action. In the unlikely event that verification language contains technical requirements, the proposed change must be processed as an amendment.

# KEY EVENT LIST

PROJECT: \_\_\_\_\_

DOCKET #: \_\_\_\_\_

COMPLIANCE PROJECT MANAGER: \_\_\_\_\_

EVENT DESCRIPTION	DATE
Certification Date	
Online Date	
<b>POWER PLANT SITE ACTIVITIES</b>	
Start Site Mobilization	
Start Ground Disturbance	
Start Rough Grading	
Start Construction	
First Combustion of Gas Turbine	
Start Commercial Operation	
Complete All Construction	
<b>TRANSMISSION LINE ACTIVITIES</b>	
Start T/L Construction	
SYNCHRONIZATION WITH GRID	
COMPLETE T/L CONSTRUCTION	
<b>FUEL SUPPLY LINE ACTIVITIES</b>	
Start Fuel Supply Line Construction	
COMPLETE FUEL SUPPLY LINE CONSTRUCTION	
<b>WATER SUPPLY LINE ACTIVITIES</b>	
START WATER SUPPLY LINE CONSTRUCTION	
COMPLETE WATER SUPPLY LINE CONSTRUCTION	

# Appendix

This Appendix contains an index to the comments on the Preliminary Staff Assessment (PSA), along with copies of the actual comments.

The comment index and comments related to the following topics will be completed in Part II of the FSA: Project Description, Alternatives, Biological Resources, Cultural Resources, Land Use and Soil and Water Resources.

MORRO BAY (00-AFC-12) PSA COMMENTS INDEX

Comment #	Comment	FSA Section
	<b>State Agencies</b>	
	<b>California Coastal Commission (CCC) – Letter dated July 10, 2001</b>	
CCC – 1	The construction of the new discharge pipeline should be analyzed in the FSA.	Soils and Water  Biological Resources
CCC – 2	Clarify the permitting and CEQA jurisdiction of the demolition portion of the project.	Project Description
CCC – 3	Identify potential construction impacts (e.g., noise, traffic, aesthetics) to public access/recreation at Morro Strand State Beach, Morro Rock, Coleman Park etc.	Noise & Vibration, Visual Resources, Traffic & Trans.
CCC – 4	FSA needs to make findings consistency with the following sections of the Coastal Act, § 30211, 30212, 30220, 30230, 30231, 30240, 30251, and 30253.	Land Use
CCC – 5	FSA should analyze the impacts to coastal resources to the proposed lay-down area at Camp San Luis.	Land Use
CCC – 6	How would modification to the seawater intake structure be consistent with the Coastal Act?	Land Use
CCC – 7	Include information on the proposed realignment of Embarcadero Road and Coleman Drive.	Traffic & Trans.
CCC – 8	What project features will result in “limited pedestrian traffic within wetland areas...” (pg. 4.5-33)	Project Description
CCC – 9	Condition LAND-2 should also require Duke to create a funding source to provide for long-term management of the easement for the life of the project.	Land Use

CCC – 10	Condition LAND-3 should clarify amount of land needed to satisfy condition. How will suitability of land be determined? Suggests that CEC consult with the Executive Director of the Coastal Commission prior to making a determination.	Land Use
CCC – 11	Modify LAND-3 to read as “...for security, public safety, <u>and protection of Environmentally Sensitive Habitat Areas.</u> ”	Land Use
CCC – 12	Modify LAND-3 to include land dedication language from the draft agreement require Duke to record a deed restriction limiting future uses of dedicated land to public access and recreation uses consistent with the Coastal Act.	Land Use
CCC – 13	Include in LAND-7 a requirement to send the Coastal Commission copies of approved permits for any project activities in wetlands or estuaries.	Land Use
CCC-14	Include in LAND-8 a requirement for the new façade for the intake structure to be consistent with Section 30251 of the Coastal Act. Also requests that the design and building plans for the new façade be approved by the City of Morro Bay in consultation with the Coastal Commission.	Land Use
CCC-15	Without a final response from USFWS, the CEC’s finding on page 4.2-14 of the PSA may be premature and unsubstantiated.	Biological Resources
CCC-16	Due to the sensitive habitat near the Embarcadero Road extension, public access may need to be reconsidered or redesigned. Please consider the Coastal Act’s policies in the evaluation of Duke’s proposal to extend Embarcadero Road.	Biological Resources Land Use
CCC-17	Include an evaluation of alternative cooling technologies that may reduce the adverse impacts to coastal resources in the FSA.	Biological Resources

CCC-18	Incorporate the following principles in a condition of certification: <ul style="list-style-type: none"> <li>- specific objectives to establish a nexus and proportionality between project impacts and the proposed mitigation measures.</li> <li>- clear objectives and performance standards for mitigation.</li> <li>- Key mitigation costs, such as land acquisition costs, reasonable restoration costs, projected and quantified administrative and overhead costs for overseeing mitigation measures.</li> <li>- Enforceable implementation and completion timeframes, and</li> <li>- Remedial measures or recourse to address potential shortcomings in the performance standards or overall mitigation measure.</li> </ul>	Biological Resources
CCC-19	Consider fish collection, removal, and conveyance systems or other Best Technology in order to reduce impingement and thermal discharge impacts to reduce or eliminate impingement impacts.	Biological Resources
CCC-20	Require a detailed directional drilling fluid monitoring plan as a condition of certification of the construction of the stormwater and natural gas pipelines.	Biological Resources
CCC-21	Require a geotechnical report for the directional drilling activities proposed under Morro Creek and to incorporate the recommendations as part of a condition of certification of the construction.	Biological Resources
CCC-22	Revise BIO-3 to state that the biological monitor be given the authority to stop construction activities that have the potential to impact biological resources not previously identified.	Biological Resources
CCC-23	Include in BIO-4, that the Biological Resources Mitigation Implementation and Monitoring Plan quantify impacts to terrestrial biological resources -- to serve as the basis for proper restoration or remediation.	Biological Resources
CCC-24	Request that the BRMIMP be reviewed and approved by the Coastal Commission Executive Director.	Biological Resources
CCC-25	Require that Duke's Dune Restoration and Enhancement Plan be required as a condition of certification. The Plan should be reviewed by the Coastal Commission Executive Director prior to CEC approval.	Biological Resources

CCC-26	VIS-1 and VIS-2 may not reduce impacts to less than significant levels at Key Observation Points 5 and 6, additional conditions should be considered.	Visual Resources
CCC-27	The Coastal Commission requests that the treatment and landscaping plan required for VIS-1 and VIS-2 be reviewed and approved by the CEC in consultation with the Coastal Commission Executive Director.	Visual Resources
CCC-28	Photosimulations of alternative design treatments are necessary to assess their ability to soften the industrial character of the power plant. The Coastal Commission requests the public be able to review and comment on the treatments prior to release of the FSA.	Visual Resources
CCC-29	The Coastal Commission requests photosimulations of a fully enclosed facility and a facility with combined stacks. Also, clarify why significant portions of the plant are not enclosed.	Visual Resources
CCC-30	To minimize adverse es impacts from KOPs 5 and 6, Duke should explore other feasible and effective design features similar to what is being proposed by the Metcalf Energy Center.	Visual Resources
CCC-31	Due to the 5-6 year demolition/construction schedule, all feasible mitigation measures should be explored in the FSA to reduce visual impacts (e.g., expediting the demolition schedule, enforcing timely demolition, requiring the performance guarantees to ensure timely demolition, requiring removal of Units 1 and 2 concurrently with new plant construction, requiring early installation of any perimeter walls and landscaping, and strictly limiting on-site storage of stack rubble and other demolition debris).	Visual Resources
CCC-32	Consider requiring Duke to demolish the offsite tank farm in San Luis Obispo County to possibly mitigate adverse visual impacts.	Visual Resources
CCC-33	Because the proposed bridge over Morro Creek will be located in a highly scenic and environmentally sensitive habitat area, located in the Coastal Commission's original permit jurisdiction, we request that its design be reviewed and approved by the CEC in consultation with the Executive Director of the Coastal Commission.	Visual Resources

	<b>California Dept. of Fish and Game (CDFG) – Letter dated June 25, 2001</b>	
CDFG – 1	Provide correct volume of water to be used for once-through cooling throughout the document (330,000 or 757,000 gpm).	Project Description
CDFG – 2	CDFG recommends that the Air Quality section be revised to include an analysis of the affected air quality on terrestrial and aquatic species.	Biological Resources
CDFG – 3	CDFG recommends that Fish and Game Codes Section 5521 and 30.10 (protection for black abalone and eel grass) be included in the description of State laws.	Biological Resources
CDFG – 4	CDFG recommends that all areas surveyed in the AFC be expanded and include new surveys to be consistent with the PSA delineation of 1-mile from the plant. Revise Table 1 accordingly.	Biological Resources
CDFG – 5	Revise Table 1 to reflect the data in Figure 6.6 B-1.	Biological Resources
CDFG – 6	Add a section to Table 2 that lists species that are fully protected under Fish and Game Code Sections. Correct errors in Table 2. CDFG recommends new analysis be conducted to determine potential effects to the revised list of species.	Biological Resources
CDFG – 7	Pg. 4.2-13 states no habitat will be disturbed by plant construction, however there is inadequate information on the footprint of the new road, bridge, sound wall, and bike/pedestrian path to support the conclusion. CDFG recommends that a full description of the construction and operation features be provided and potential effect to species and habitat be addressed.	Biological Resources
CDFG – 8	The bridge crossing discussion in the PSA fails to address impact to riparian and steelhead habitats due to increased storm runoff from the new bridge, increased debris and pollutants, and increased noise, emission, vehicle exhaust, and illumination from vehicles.	Biological Resources
CDFG – 9	Alternative construction vehicle traffic routes to the plant site and the effects are not fully disclosed nor described, CDFG does not recommend the development of the construction road, bike path, and bridge crossing over Morro Creek.	Biological Resources

CDFG – 10	CDFG considers the Morro shoulder band dune snail habitat north of Morro Bay to be very significant and it may very well be more significant than the habitat of southern Morro Bay.	Biological Resources
CDFG – 11	Impacts to cormorants and nesting peregrine falcons on Morro Rock should be addressed (pg. 4.2-15).	Biological Resources
CDFG – 12	Calculation of Fecundity Hindcast, Adult Equivalent Loss, and Empirical Transport Model do not provide all necessary analytical tools to determine effects to the listed commercial fish and crab species on Tables 5 and 6. CDFG recommends that Maximum Sustained Yield and Optimal Yield also be calculated for those species to aid in the impact analysis.	Biological Resources
CDFG – 13	CDFG recommends that Maximum Sustained Yield and Optimal Yield be calculated on the commercial fish and crab species prior to determining the level of significance for the impingement rate (pg. 4.2-21).	Biological Resources
CDFG – 14	CDFG cannot determine the effectiveness of the proposed mitigation due to lack of necessary information. When the information is available, then CDFG will provide comments on the effectiveness of efforts to protect State resources.	Biological Resources
CDFG – 15	CDFG recommends discussion of an alternative that places traveling screen on the east side of Embarcadero Road in a new building with enough space to angle the screens. Angled traveling screens are the best technology to reduce impingement for the Moss Landing power plant. CDFG does not support the CEC conclusion that using traveling screen for best technology to solely reduce impingement is not applicable. CDFG recommends that best technology be incorporated into the plant design to ameliorate effects to commercial and recreational fish harvesters. CDFG recommends that Table 9 be revised to indicate that traveling screens are applicable to this plant. (pg. 4.2-32)	Biological Resources

CDFG – 16	CDFG recommends the FSA addresses two additional alternatives: 1.) construction of a managed marsh, which would cool a portion of the heated discharge water prior to discharge into Estero Bay and 2.) divert a portion of the heated discharge water to the sewage treatment plant's outfall. These alternatives may decrease discharge temperatures below levels documented for deleterious effects. (pg. 4.2-41)	Biological Resources
CDFG – 17	CDFG does not concur with CEC conclusions that the applicant's Coastal Dune Scrub Restoration/Conservation Plan may adequately mitigate the terrestrial effect. CDFG finds the analysis incomplete and the effects of the construction road and bridge crossing of Morro Creek render the CEC conclusion unsupportable. (pg. 4.2-41)	Biological Resources
CDFG – 18	LORS section needs to reference Fish and Game Code § 5650 regarding pollution effects to State waters (pg. 4.4-2)	Hazardous Mat. Mgmt.
CDFG – 19	Hazardous Materials Management section fails to address the potential effects of transporting hazardous materials on the construction road and bridge crossing habitats and species. Nor does the section address the potential effects of an accidental spill of sodium hypochlorite into Morro Bay. (pg 4.4-8).	Hazardous Mat. Mgmt.
CDFG – 20	CDFG does not recommend the construction road, bike path, and bridge crossing of Morro Creek because the bridge does not protect coastal dune scrub or riparian habitat to the maximum extent feasible. (pg. 4.5-21)	Land Use, Biological Resources
CDFG – 21	Project is not consistent with Policy 5.20 that no dunes areas should be disrupted unless there are no other less environmentally damaging alternatives. Less environmentally damaging alternative roads are available to provide for construction traffic. CEC staff statement that dune habitat is avoided conflicts with terrestrial section.	Land Use, Biological Resources
CDFG – 22	Placement of the construction road and bridge crossing violates Policies 11.01 and 11.02. (pg. 4.5-28, -29)	Land Use, Biological Resources

CDFG – 23	Preliminary location of the road and bridge crossing appear to conflict with Policy 11.06. (pg. 4.5-30)	Land Use, Biological Resources
CDFG – 24	The proposed road and bike path conflict with Policy 11.20. The bike/pedestrian path does not prevent users from traversing the dune habitats and potentially trampling on sensitive species or habitat. (pg. 4.5-33)	Land Use, Biological Resources
CDFG – 25	Noise section (pg. 4.6-1) fails to address the increase in noise during construction to nesting birds on Morro Rock, effects of increased noise and vibration to terrestrial species, and the potential vibrations to affect aquatic species such as the red-legged frog.	Noise & Vibration, Biological Resources
CDFG – 26	The Socioeconomic Resources section (pg. 4.8-1) fails to address potential effects to commercial and recreational fish harvesters from the loss of target species due to impingement and entrainment. There is no analysis on potential effects to businesses that support fish harvesters (e.g., bait shops, restaurant, boat repair facilities, etc.).	Socioeconomics
CDFG – 27	LORS (pg. 4.9-2) should include reference to Fish and Game Code § 5650 regarding the prevention of pollutants from entering State waters.	Traffic & Trans.
CDFG – 28	The Traffic and Transportation section (pg. 4.9-8) fails to address the increases in noise and fugitive light from nighttime traffic on terrestrial species (e.g., disturbance to roosting birds may be a significant impact).	Traffic & Trans., Biological Resources
CDFG - 29	There is no analysis of the effect of additional nitrogen from cars on the riparian ecosystem (pg. 4.9-8)	Traffic & Trans., Biological Resources
CDFG – 30	LORS (pg. 4.13-8) should include reference to Fish and Game Code § 5650.	Soils and Water Resources
	<b>Native American Heritage Commission (NAHC)</b> – letter dated October 5, 2001	
NAHC – 1		Cultural Resources
NAHC – 2	BAHC agrees that destructive testing of human remains is not appropriate.	Cultural Resources

NAHC – 3		Cultural Resources
NAHC – 4		Cultural Resources
	<b>(CA) State Water Resources Control Board (SWRCB)</b> – email dated June 29, 2001	
SWRCB – 1	Conditions of certification should include a discussion of soil and groundwater investigations	Soils and Water Resources, Hazardous Mat. Mgmt.
SWRCB – 2	Conditions of certification should include a discussion of investigation of hazardous materials under the current generation plant and any other facility to be demolished for which Duke or PG&E seeks “clean closure” approval.	Soils and Water Resources, Hazardous Mat. Mgmt.
SWRCB – 3	Clarify whether the AGT farm would be demolished and which conditions of certifications would apply.	Soils and Water Resources, Hazardous Mat. Mgmt.
	<b>Local Agencies</b>	
	<b>City of Morro Bay</b> – letter dated June 19, 2001	
CMB – 1	Carbon Monoxide: Please verify whether CO <sub>2</sub> “hot spot” modeling was done (i.e., “caline” analysis). The area of concern is the Atascadero Road corridor in front of Morro Bay High School and at the intersection of Highway 1 and Main Street. If results show potential for significant impact, please provide a list of all feasible mitigation measures to address this impact and describe the measures that will be implemented to ensure compliance.	Air Quality

CMB – 2	Nitrogen Dioxide: Please comment on the feasibility of using a non-ammonia based system for reducing NOx emissions from the project (such as Sconox). Explain the advantages and disadvantages of such a system including the feasibility of modifying the plant to use non-ammonia technology post-construction.	Air Quality
CMB – 3	Particulates: Please explain what local mitigations are under consideration to reduce the impact of increases in local particulate emissions.	Air Quality
CMB – 4	Ammonia: Please explain why an Ammonia on Demand system is not proposed for the project since it would substantially reduce potential impacts associated with ammonia handling/transport throughout the area.	Air Quality
CMB – 5	Ground Level Concentrations in Morro Bay: Please provide analysis of the significance of increases to local ground level pollutant concentrations under typical plant operating conditions. Include a comparison with ground level emissions from the existing plant under similar operating assumptions. Address whether the increase in ground level concentrations of certain pollutants should be considered to be a significant environmental impact.	Air Quality
CMB – 6	Greenhouse Gases: Please provide an analysis of the project's emissions of CO <sub>2</sub> and a comparison of such emissions from the existing plant under typical operating conditions.	Air Quality
CMB – 7	Construction Period Impacts: Please identify all feasible mitigation's that can be applied to the project to reduce construction period impacts and describe the measures that will be implemented to ensure compliance. Include an analysis of emission reductions that can be achieved through transportation demand management measures (e.g. ride share, busing, carpools, etc). Include use of reclaimed wastewater for dust suppression where feasible.	Air Quality
CMB – 8	Permit Vesting: Please explain for what period of time the project will be vested with respect to emission control measures/equipment once an FDOC is issued by the APCD. Does this vesting period conform to APCD rules and regulations or is a variance/exception proposed? Confirm that the proposed conditions of certification accurately reflect the appropriate vesting period.	Air Quality

CMB – 9	Resources Inventory Section should be revised to mention the medicine plant Indian Pink.	Cultural Resources
CMB – 10	The PSA recognizes that impacts to SLO-16 cannot be assessed until previous studies (Greenwood 1973a, 1973b, 1976) are reviewed to determine the spatial extent and methods used to determine subsurface site boundaries. The PSA indicates that the Resources Inventory Section would be revised to include a discussion of the adequacy of site boundaries adjacent to the proposed facility. The City would like the opportunity to review and comment on such studies prior to finalizing the impact assessment.	Cultural Resources
CMB – 11	Resources Inventory Section (and other relevant sections) should be revised to include results of John Parker's recent test excavations and evaluation discovery of archaeological deposits between Tanks 1, and the City would like the opportunity to review and comment on such studies prior to finalizing the FSA.	Cultural Resources
CMB – 12	The PSA acknowledges that the FSA will incorporate results of the forthcoming architectural survey of the power plant. The City would like the opportunity to review and comment on the report prior to finalizing the FSA.	Cultural Resources
CMB – 13	The PSA (pg. 4.3-11, fourth para.) states that CEQA sets limits to applicant's costs of archaeological mitigation. The Characterization of Identified Resources section should clarify that costs of survey and testing (evaluation) are not included in the limitations.	Cultural Resources
CMB – 14	The City assumes the Characterization of Identified Resources section would be revised to reflect forthcoming information about the SLO-16 site boundaries, the newly discovered archaeological deposit between Tanks 1 and 3, and the architectural significance of the power plant. The City would like to review and comment on the new information before the FSA is completed.	Cultural Resources

CMB – 15	The PSA and CEC comments make it clear that the Project-Related Impacts section would be revised to reflect forthcoming information about Indian Pink, SLO-16 site boundaries, the newly discovered archaeological deposit between Tanks 1 and 3, and the architectural significance of the power plant. The City would like to review and comment on the impact assessments of these resources before the FSA is completed.	Cultural Resources
CMB – 16	The PSA (pg. 4.3-13, para four, last sentence) indicates that Parker would conduct data recovery at the newly discovered deposit between Tanks 1 and 3 if the site proves to be significant. Prior to such an investigation, a data recovery plan should be provided to the CEC for review and approval. The City would like the opportunity to review and comment on such a plan.	Cultural Resources
CMB – 17	CUL-1. At the workshop CEC distributed a handout that indicated that the CEC would like to fine-tune this condition or add a new condition to have a cultural anthropologist help assist with differences between the views of Native Americans. The CEC also indicated that it would recommend the addition of a human osteologist to the cultural resources team. The City agrees these additions would be beneficial. The CEC and Duke agreed with the City that this measure would be revised to require the submittal of the names and qualifications of monitors. There was no discussion at the workshop of the exact qualifications, but we feel that the monitors should have an undergraduate degree in anthropology and have demonstrated archaeological monitoring experience. The City requests informational copies of all resumes and qualifications submitted in compliance with Cul-1.	Cultural Resources
CMB – 18	CUL-2. This section should be augmented to indicate that construction maps and drawings should show the locations of Archaeologically Sensitive Areas that shall be fenced and avoided during construction. At present, these areas are defined as SLO-16 and SLO-239. To further reduce the potential for impacts, a buffer zone (avoidance zone) could be established around the site boundaries. The maps and drawings would be labeled Confidential and would not be available to the general public. The City requests informational copies of such construction maps and drawings.	Cultural Resources

CMB – 19	CUL-3. The CEC verbally agreed at the workshop to modify this condition to require full-time monitoring within all Archaeologically Sensitive Areas. A reduction to part-time monitoring or spot-checking would require CEC approval. The City believes the CRMMP would be most effective and useful if it incorporated and logically integrated all cultural resource Conditions of Certification and verifications required by the FSA. The City would like the opportunity to review and comment on the CRMMP before it is finalized.	Cultural Resources
CMB – 20	CUL-4 AND CUL-5. The CEC indicated it would require new hires to receive personal training from a qualified archaeologist within two weeks of beginning work on the job-site. The City also recommends videotaping the initial workshop (lecture), so that it can be shown to new construction personnel before the entering the job-site. The City would like to review and comment on the proposed employee training plan and script of the video if one is proposed. The City would like a copy of the final training program and any supporting materials. The Verification discussion is worded in such a way that suggests that only after all ground disturbance is completed could the project owner apply to discontinue training (and presumably monitoring) because no further impacts are expected. It is quite possible that the CRS could justify such a determination before all ground disturbances is completed. The City suggests the CEC may want to consider adding some flexibility to this verification requirement.	Cultural Resources
CMB – 21	CUL-6. To verify and implement Cul-6, the City recommends that the CRMMP include a section that details standard procedures that would be implemented when unanticipated cultural resources or unanticipated impacts are discovered during the project. In addition to the items enumerated in the PSA, this section should specify: (5 items listed)	Cultural Resources
CMB – 22	CUL-8. The term "vicinity" should be quantified.	Cultural Resources

CMB – 23	CUL-10. The CEC should consider revising this condition to reflect that, once all artifact classes have been adequately analyzed and documented, it is common practice to curate only a sample of some bulk materials like fire-cracked rock or large quantities of shellfish fragments. Also, the condition should be revised to address issues regarding human remains and associated grave goods.	Cultural Resources
CMB – 24	CUL-11. The City would like the opportunity to review and comment on the CRR.	Cultural Resources
CMB – 25	CUL-13. See comment on Cul-10.	Cultural Resources
CMB – 34	Alternatives: Visual simulations for any alternative plant design/cooling system should be provided for public review if such systems are likely to be recommended for further consideration.	Visual Resources
CMB – 35	Site Restoration: A site restoration plan should be required for review and approval by the City for the site of the demolished plant, as well as for the site of the new plant once it is decommissioned and demolished. Appropriate standards relating to grading, compaction, landscaping, erosion control, drainage, lighting, security, aesthetics, etc., should be included in the site restoration plan.	Visual Resources
CMB – 39	Bridge Design: Prior to commencement of construction, the design for the proposed bridge over Morro Creek should be submitted to the City for review and approval as the bridge would be located on City-owned property. The bridge design should take into consideration the design guidelines in the City's Waterfront Master Plan.	Visual Resources
CMB – 40	Soundwall: The design, color, and material of the sound wall should be subject to City review and approval. An explanation of the need for the soundwall should also be provided including an evaluation of alternative techniques for addressing noise concerns (e.g. buffers, setbacks, facility enclosures, etc.)	Visual Resources

CMB – 41	Comparison with Metcalf Conditions of Certification: Finally, we urge your staff to revisit the conditions of certification proposed for the Metcalf project in the Final Staff Assessment dated October 10, 2000 and consider the applicability of similar conditions of certification to the Morro Bay project. Surely, the scenic value of the Morro Bay site is at least equal to that of the Metcalf site and should warrant similar consideration.	Visual Resources
CMB – 42	The City recommends that more specific conditions of certification regarding investigation and remediation of any contamination under the existing power plant structure be provided, including a specific language requiring diligent prosecution and completion of any required remediation activities with a role for City review and approval of any remediation plans.	Waste Mgmt
CMB – 43	The City is also concerned that unsightly storage of rubble from the stacks and plant demolition on-site for extended periods of time during remediation activities could have significant adverse visual and socio-economic impacts on tourism and property values. Contingency plans addressing disposition of these waste materials in the event that a prolonged remediation effort is necessary should be required subject to the review and approval of the City. Temporary screening of waste storage sites and City review and approval of such sites should also be required.	Waste Mgmt, Socioeconomics

CMB – 44	<p>The Worker Safety and Fire Protection section includes some unsupported assumptions that the project will not impact the Morro Bay Fire Department. During the PSA workshop on June 12, the City of Morro Bay Fire Chief Jeff Jones made it clear for the record that there are current and future impacts upon the Fire Department, which can only be mitigated if all Fire Department requests and requirements are complied with, including the necessary funding requested by the Fire Department. The MBFD maintains the following concerns that were presented at the June 12 workshops:</p> <ol style="list-style-type: none"> <li>1. Hydrazine poses significant risks and the MBFD prefers that a substitute material be used for Hydrazine.</li> <li>2. The MBFD requests a feasibility study for the replacement of Aqueous Ammonia with a Urea Pellet system.</li> <li>3. The risk presented by the thousands of gallons of lube and hydraulic oils on site during operations was not addressed</li> </ol>	Worker Safety & Fire Protection, Hazardous Mat. Mgmt
CMB – 45	<p>Table 6.15-5 " Proposed Hazardous Materials" does not list oils. It should. The Oil hazards and their impacts upon the MBFD must be clearly discussed in any staff assessments. The risks presented by the oils can be mitigated to a reasonable degree if the Fire Code, NFPA 850, the industry standard, and other safeguards are implemented to Fire Department approval. ... In the Fire Chief's opinion, a major oil fire creates an impact upon, and would be beyond the current capability of, the MBFD unless all the mitigations required by the Fire Chief are implemented, and unless NFPA 850 and the Fire and Building Codes are followed.</p>	Worker Safety & Fire Protection, Hazardous Mat. Mgmt
CMB – 51	<p>Responses to the CEC's request for a list of plans and submittals to be reviewed and approved by the Morro Bay Fire Department: The authority for such requests is found in several sections of the State Fire Code, which is also law in Morro Bay for any existing and new occupancy (see comment letter for list of codes, and for a list of all plans and submittals that require Fire Department review or approval).</p>	Worker Safety & Fire Protection, Hazardous Mat. Mgmt

CMB – 52	The PSA failed to recognize the historic problem with the Main/Route 41/Route 1 intersection. The CEC staff indicated that they had communicated with City Staff and Penfield & Smith on the methodologies, issues, and analysis of the intersection operation and potential impact of the Duke project. The City's Traffic Engineer states that to the best of his knowledge, no one from the CEC staff has discussed these issues with Penfield & Smith.	Traffic & Trans.
CMB – 53	In June of 2000, the City of Morro Bay, CALTRANS, San Luis Obispo Council of Governments, Duke Energy and Penfield & Smith initiated the first step in developing a solution for the existing congestion and future congestion at the Main/Route 41/Route 1 intersections. A Project Study Report or PSR has been prepared to evaluate the operation of the intersection and to develop potential improvements to the intersection to improve the safety and operation of the intersection. ... The entire PSR process was not disclosed in the PSA.	Traffic & Trans.
CMB – 54	The PSA analysis has incorrect notations for how intersections operate. ... Several of the intersections are listed as unsignalized, which would normally be acceptable if the criteria was signalized or unsignalized. However, the PSA indicates signalized, All-way STOP, and unsignalized. This is confusing and does not provide any indication of the methodology used to analyze the impacts of the Duke Project. No supporting data was provided to Penfield & Smith. The unclear methodology and no supporting information lead us to question the results of the analysis. These questions are further supported by the indications that the PSA noted that the existing level of service and delay for the NB Route 1 Ramp intersection with Route 41 operates with 2.7 seconds of delay per vehicle during the AM peak hour. The existing queue of vehicles currently waiting to turn left off of the ramp to go toward the High School exceeds 30 vehicles on a regular basis. The queue of traffic on northbound Main Street exceeds 30 vehicles during peak days as well. The vehicular delays associated with these queues greatly exceed the levels of service noted in the PSA.	Traffic & Trans.

CMB – 55	<p>Duke Energy provided a traffic analysis last fall that was supposed to address the traffic impacts of the proposed project. The City of Morro Bay, CALTRANS, and others provided comments on that analysis that pointed out several inconsistencies, inaccuracies, missing data, and the need for more information. To date, Duke has not provided any additional information to the City to address these issues. One key significant issue is the timing and number of employees expected to come to the site. The last information provided to the City indicated that approximately 800 employees would be expected to travel through the Main Street/Route 41/Route 1 intersection each day. A Transportation Demand Management Plan was not provided, nor was the timing, time of day, day of week, and month of year when the employees were expected to impact the City road system. The City of Morro Bay has significant seasonal variations of traffic flow due to their tourist-based industry. This information has a tremendous impact on the operation of the road system for Morro Bay. None of these issues have been addressed or specifically shared with the City of Morro Bay. Consequently, the City of Morro Bay requests that a condition of certification be added requiring that Duke complete a Transportation Demand Management Plan for City review and approval. A sample TDM condition is provided in the comment letter.</p>	Traffic & Trans.
CMB – 56	<p>Another point that was not addressed in the PSA is the existing safety of the Main/Route 41/Route 1 intersection. The most recent three-year accident history is significantly above the average or expected rate for similar intersections. The City has indicated that this intersection has been getting more and more congested based on the Cuesta Grade (Highway 101) improvement project in San Luis Obispo. The Cuesta Grade project will continue to impact area circulation over the next couple of years concurrently with the Duke Energy project. The PSA did not address or acknowledge either of these points.</p>	Traffic & Trans.
CMB – 57	<p>The City recommends that the conditions of certification include a requirement to implement the traffic program in the draft “Agreement to Lease” between the City of Morro Bay and Duke Energy.</p>	Traffic & Trans.

CMB – 58	The City requests that a condition of certification be added requiring that any proposed improvements to public roads and/or for improvements intended to be offered to the City for dedication must be constructed in conformance with applicable City of Morro Bay standards and specifications pursuant to public improvement plans submitted to the City for its review and approval prior to commencement of construction.	Traffic & Trans.
CMB – 59	The City requests that special consideration be given to the Coast Route Class I bike path that will traverse Atascadero Road west of Highway One.	Traffic & Trans.
CMB – 60	The City requests that the CEC take note of the fact that Morro Bay High School is adjacent to Atascadero Road and is an open campus, with students allowed to leave during lunch hour. Also, sidewalks currently do not exist along the entire pedestrian route along Atascadero Road leading to the High School main entrance.	Traffic & Trans.
CMB – 61	The City requests that the project applicant provide evidence of coordination with the regional transportation planning agency for San Luis Obispo County (SLOCOG) and SLO Regional Rideshare concerning regional transportation/traffic issues related to the project.	Traffic & Trans.
CMB – 62	The role of the City traffic officer that will be funded by Duke should be clarified to indicate that this officer is not responsible for directing traffic and otherwise performing the duties of a flagman.	Traffic & Trans.
CMB – 63	The funding noted in Socio-2 does not include any City approved transportation improvements.	Traffic & Trans.
CMB – 64	On page 4.13-9, under the paragraph entitled “MORRO CREEK,” it should be noted that the Applicant has submitted to the City a Draft Morro Creek Flood Hazard Evaluation dated February 21, 2001. The City has reviewed this draft document and prepared review comments, which are contained in correspondence dated May 16, 2001 to Robert E. Cochran II. The City received a revised study in mid-June and is beginning its review.	Soil and Water Resources

CMB – 65	On page 4.13-12, under the paragraph entitled “FLOODING,” reference is again made to the draft Flood Hazard Evaluation prepared by the applicant and the City’s review letter of May 16, 2001. The draft report concludes that the proposed MBPP units are not located within the 100-year flood plain subject to verification of the suitability of the existing tank farm berms. The City concurs with this finding and will require that the applicant submit an application for a conditional letter of map revision to FEMA in order to update the 1985 flood zone map. Additional recommendations with regard to the proposed project relative to berm reconstruction and construction of the proposed Morro Creek Bridge are contained in the May 16, 2001 review letter.	Soil and Water Reosurces
CMB – 66	On page 4.13-21, under the paragraph entitled “STORMWATER RUNOFF,” please note that City standards require on-site drainage facilities be designed for a minimum 25-year frequency runoff event with safe overland flow or system capacity for the 100-year frequency event. The City just received a draft Stormwater Prevention Plan for review, and will provide comments on the plan.	Soil and Water Resources
CMB – 67	Condition Soil & Water 1 and 2 should be amended to provide for City review and approval of the referenced plans/measures. Soil & Water 4 should be amended to include obtaining a Development Permit pursuant to the City's Flood Damage Prevention Ordinance.	Soil and Water Resources
CMB – 68	Condition Soil & Water 5 should acknowledge that construction of the bridge and any other proposed public improvements must be constructed to City standards and specifications and be subject to the review and approval of the City of Morro Bay prior to commencement of construction.	Soil and Water Resources
CMB – 69	Soil & Water 6, 7 & 8 should address the potential for contamination under the existing Power Plant and provide for an appropriate role for the City to review investigation plans and review and approve any remediation plans. A standard for diligently prosecuting and completing any investigation and remediation activities should be included.	Soil and Water Resources

CMB – 70	Soil & Water 9 & 10 should remain and in addition the requirements discussed on 4.13-28 should be incorporated into conditions of certification. In addition, a contingency plan should be required in the event that it is determined that use of the on-site Duke wells would have a detrimental effect on the MtBE plume affecting the City's wells.	Soil and Water Resources
CMB – 71	GEN-3 should remain as proposed by staff.	Facility Design
CMB – 72	GEN-9 should be corrected to replace references to the City of El Segundo, Los Angeles County, to the City of Morro Bay, San Luis Obispo County.	Facility Design
CMB – 73	The analysis should take into consideration the preference expressed by the City for replacement of the existing facility.	Alternatives
CMB – 74	NOISE-4: Duke suggested an 8:00 a.m. to 5:00 p.m. restriction for steam blows in their 7 May correspondence to the CEC. That restriction would be better than the 7:00 a.m. to 6:00 p.m. restriction suggested by the CEC.	Noise & Vibration
CMB – 75	NOISE-6: It would be helpful if the CEC would define and establish who will be responsible for determining "legitimate" noise complaints.	Noise & Vibration
CMB – 82	LAND-2: The City of Morro Bay should not be the only entity listed for receipt of permanent conservation easements. A non-governmental agency with qualifications in land management may be more appropriate. The City is interested in the long-term management plans for the site. How will long term management be addressed, funded, and monitored? Also, all copies of mapped areas and recorded conservation easements should be submitted prior to the start of construction.	Land Use
CMB – 83	LAND-3: Include all of the specific dedications referenced in the draft Agreement to Lease including the Den Dulk property, second intake area, frontage strip, and onsite lands. Include the following text modification to the condition: "Said land shall be maintained by the project owner and shall be available for public access and use, subject to restrictions required for security, and public safety, and protection of sensitive natural resources."	Land Use

CMB – 84	LAND-4 requires the project owner to demolish the existing facility within 36 months after the "start date of commercial power generation" by the new generation facility. No definition of "start date of commercial power generation" is provided, so it is not clear when the 36 month demolition obligation begins. In addition, the project owner should be required to begin demolition within six months of the start of commercial power generation (and complete it within 36 months). The schedule for demolition included in the draft "Agreement to Lease" should be incorporated by reference into this condition. Also, provisions should be made for requiring completion of site remediation and site restoration following any remediation with a timeline for completion of these activities to the satisfaction of the City and other applicable regulatory agencies.	Land Use
CMB – 85	LAND-5: Define a "detailed site plan" and include other plans, including but not limited to a demolition plan, a remediation plan, a restoration plan, grading/drainage plan, landscaping plan, lighting plan, colors/materials plan. The condition states that the site plan shall comply with the City's Planned Development (PD) overlay zone regulations. The PD overlay zone requires a concept plan and a precise plan. The required contents of each are detailed in the table called "17.40.030 Planned Development, (PD) Overlay Zone," which is provided in the comment letter.	Land Use
CMB – 86	On page 4.2-6, burrowing owls and suitable habitat for the Morro Bay blue butterfly are identified as present on or adjacent to the project site. Silvery legless lizard and the Morro shoulderband snail are not discussed in the setting (except for the species list in Table 2), yet mitigation measures for these species are identified on page 4.2-6.	Biological Resources

CMB – 87	The AFC identified Monarch butterfly habitat (a stand of eucalyptus trees) as present within the project site. Although this species has no federal or state special status (and not included on Table 2), monarch butterfly roosts are considered Environmentally Sensitive Habitats (ESH) on a local level. A discussion of the eucalyptus trees present within or adjacent to the project area, their potential to support monarch butterflies during roosting season, and whether these trees are considered ESH is not included in the PSA. [The LORS Section, pages 4.2-2 and 4.2-3 includes local plans and ordinances.]	Biological Resources
CMB – 88	Impacts to peregrine falcons or other sensitive species at Morro Rock was identified as a concern. Page 1.2 – 15 states: “The CEC staff does not anticipate any adverse effects to peregrine falcons from MBPP construction, demolition and operation.” The basis for this conclusion is not provided.	Biological Resources
CMB – 89	The AFC stated removal, thinning, or disturbance of trees used the monarch butterflies would have an adverse impact on this species. There is no discussion on tree thinning or removal activities, the potential for impacts to monarch butterflies, or whether mitigation measures are required in the PSA.	Biological Resources
CMB – 90	Applicant’s proposed mitigation #1 and #2. Page 4.2 – 25 and 26, Mitigation Measures #1 (appoint a designated biologist) and #2 (pre-construction surveys) are vague. The requirement for an approved biologist with relevant experience needs to be clearly stated (refer to page 4.2-28, paragraph 3 under CEC proposed mitigation). Pre-construction surveys in native habitats or potential sensitive species habitats should be clearly defined, including a schedule for implementation (i.e., within # days prior to construction). The mitigation measures do not state whether USFWS or CDFG protocol surveys will be required for sensitive species potentially occurring on the property (i.e., Morro shoulderband snail, silvery legless lizard).	Biological Resources
CMB – 91	Exclusionary fencing to restrict access in native habitats or other environmentally sensitive areas (Page 4.2-27, second paragraph from bottom) should be included under pre-construction surveys as part of pre-project activities.	Biological Resources

CMB – 92	An Environmental Training Program for construction personnel should be developed by the project biologist and environmental training conducted prior to the beginning of construction. The program should include information to ensure construction or other personnel are aware of sensitive resources, protection measures, access restrictions, and other constraints. Mitigation Measure #6, on page 4.2-27 (and discussed below), refers to an Employee Environmental Awareness program, but does not indicate if this program applies to construction personnel.	Biological Resources
CMB – 93	Applicant’s proposed mitigation # 3: Page 4.2-28 states: “Energy Commission staff finds the applicant’s proposed mitigation for impacts to terrestrial biological resources to be incomplete and therefore inadequate.” The Coastal Dune Scrub Restoration/ Conservation Plan concept for the potential loss of Morro shoulderband dune snail, silvery legless lizard, and burrowing owl, has not been submitted to CEC staff for review. It is not likely that this plan will adequately address potential impact to the Morro shoulderband dune snail, a federally listed endangered species. Mitigation measures will need to include surveys and avoidance measures, if the species is found. Mitigation measures for silvery legless lizard will need to include appropriate pre-construction surveys and protocols for construction monitoring relocation of silvery legless lizard during construction. The Restoration Plan, if determined to be adequate, will likely be appropriate mitigation for loss of sensitive species habitat.	Biological Resources
CMB – 94	Applicant’s proposed mitigation # 4: Avoiding the nesting and breeding season for burrowing owls is the preferred mitigation measure. The CEC staff notes that they do not prefer construction of new burrows because this mitigation may not be successful (page 4.2-28, paragraph 4 under CEC Staff proposed Mitigation). However, the applicant proposed mitigation measures follow the CDFG staff report on burrowing owl mitigation (stated on page 4.2-26).	Biological Resources

CMB – 95	Applicant’s proposed mitigation # 5: It is not clear that potential habitat for Morro Bay blue butterfly can be avoided. However, studies conducted to date have not identified this in the project site so no impacts to the species are expected. Incorporating silver dune lupine, the species preferred host food plant, into dune restoration is appropriate.	Biological Resources
CMB – 96	Applicant’s proposed mitigation #6: It is not clear what impacts will be mitigated by the development and administration of the proposed Employee Environmental Awareness Program. More information is needed to determine if this is appropriate as a mitigation measure.	Biological Resources
CMB – 97	Applicant’s proposed mitigation #7: Is quieter technology to reduce noise impacts available?	Biological Resources
	<b>SLO County Integrated Waste Management Authority (IWMA) – letter dated June 12, 2001</b>	
IWMA – 1	Even though ~83% of the demolition waste would be recycled or reused onsite, still 23,000 tons would be disposed of, which is approximately two years of waste from the City of Morro Bay.	Waste Mgmt
IWMA – 2	Would like to see at least ~83% of construction waste also be recycled or reused.	Waste Mgmt
IWMA – 3	Would like to see Duke fully participate in the local recycling program.	Waste Mgmt
IWMA – 4	Requests that as part of WASTE-2, that Duke also submit their Waste Management Plan to IWMA for review and comment. The City of Morro Bay should have final approval of the Waste Management Plan to ensure project recycling rates can be met.	Waste Mgmt
IWMA – 5	Expand WASTE-2 to include demolition waste as well.	Waste Mgmt
IWMA – 6	The Annual Compliance Report should include a report of the actual tonnage of material recycled and disposed.	Waste Mgmt
	<b>SLO County Chumash Council (Tarren Collins) – letter dated July 17, 2001</b>	
SLOCCC-1		Cultural Resources

SLOCCC-2		Cultural Resources
SLOCCC-3		Cultural Resources
SLOCCC-4		Cultural Resources
SLOCCC-5		Cultural Resources
<b>Public Comments</b>		
	<b>SLO County Green Party (SLOGP)</b> – letter dated June 21, 2001	
SLOGP – 1	PM10 and other emissions must be reduced by applying state of the art pollution controls during construction and operation.	Air Quality
SLOGP – 2	Operation of the proposed unit must be conditional with the phase out of the Hunter’s Point Power Plant.	Air Quality
SLOGP – 3	Emission reduction credits should not be allowed outside the impact area.	Air Quality
SLOGP – 4	CEC should provide a detailed feasibility study and cost analysis for transporting aqueous ammonia via tanker/barge.	Traffic & Trans.
	<b>SLO County/Morro Bay citizens (POST)</b> – compilation of postcards received with suggestions on improving project -	
POST – 1	Make the Morro Bay power plant better and cleaner for the estuary by requiring an alternative cooling system, such as dry-cooling.	Biological Resources
POST – 2	Improve air emissions by eliminating duct firing, using SCONOx.	Air Quality
POST – 3	If improvements are not incorporated, then do not approve Duke’s application.	General comment
<b>Public Comments</b>		
	<b>Bonita Churney &amp; Pamela Soderbeck (BCPS)</b> – letter dated May 15, 2001	
BCPS – 1	We have very grave concerns about the health effects of the new plant on all residents of the County and Morro Bay, particularly potential air pollution impacts on infants and children.	Public Health

BCPS – 2	The proposed plant's lower stack height, lower exhaust velocity, and lower exhaust temperature will assure that more pollutants, not fewer, will remain in Morro Bay and deteriorate the air quality.	Public Health
BCPS – 3	Believe that comparing the proposed project with the existing project (no-project alternative) is very relevant to the air quality health impact analysis.	Public Health
	<b>Public Support of MBPP ((CARD) – compilation of postcards in support of the project</b>	
CARD – 1	Supports the Duke Energy Morro Bay project. Opposes air cooled system.	General Comment
	<b>Walter H. Wolf (WHW) – Comment Form</b>	
WHW – 1	Lower stack height and more stacks with an increased load would result in more hazards to nearby residents.	Air Quality
WHW – 2	Chemicals from open air evaporation ponds will create dangerous fumes that will affect the residents located 50 feet east of the ponds.	Waste Mgmt
WHW – 3	The returned ocean water used for cooling should be monitored to prevent permanent damage to sea life and ecosystem.	Biological Resources
	<b>Don Boatman (DB) – Letter dated June 12, 2001</b>	
DB – 1	Duke should not be allowed to use the lines as re-rated during the summer months, only the winter months. Re-rated lines in the summer could cause downed power lines and injury.	Transmission
DB – 2	Duct firing is poor practice due to the relative inefficiency of producing the last 100 MW of power. Duct firing uses 150% more gas per 100 MW than the base 500 MW unit, increasing global warming frivolously. Duct firing will produce 150% more air pollutants to produce the 100 mw between 500 MW and 600 MW.	Air Quality

DB – 3	The mitigation measures proposed by Duke do not meet the mitigation proposed by Cal-ISO, it only re-rates the line, not reconductors the line as proposed by Cal-ISO.	Transmission
DB – 4	Congestion management should be reconsidered by CEC staff as mitigation, as proposed by Cal-ISO.	Treansmission
	<b>Dale Howell (DH) – Comment Form</b>	
DH – 1	How will the reduced stack heights and plant renovations affect the air quality and the amount of pollutants that would fall on my property and affect the air I breathe? Please state the best and worst-case scenario, taking into consideration the northwest prevailing winds into the response.	Air Quality
	<b>John &amp; Terry McDonald (JTM) – Comment Form</b>	
JTM – 1	Project is good for community. Energy is needed. Those that support the project should speak out. Enough delay and obstructionism.	General Comment
	<b>F. Harry Rogers (FHR) – Comment Form</b>	
FHR – 1	Supports project.	General Comment
	<b>Harold Tune (HT) – Comment Form</b>	
HT – 1	Stop exterminating our estuary fish and invertebrates with sump pumps, thermal shock, and a ¾-mile journey through the outfall. Simply return the screen wash water and critters into the bay via a water slide as described on page 42 of the PG&E study.	Biological Resources
HT – 2	A more effective way to reduce screen impingement than what is being proposed by Duke Energy would be to run the screen wash pumps continually instead of periodically. Bypass the ¾-mile trip through the sump pumps and discharge the critters down a water slide and return them to the bay. Hundreds of thousands of animals would be saved each year, some of which are candidates for endangered species.	Biological Resources

	<b>Cindy Wallace, co-chariman of O'Connor Way/West Foothills Residents Assoc. (CW)</b> – email received October 2, 2001	
CW – 1	Concerned about use of O'Connor Way for construction traffic for the laydown area. Approximately 4,500 cars per day travel on O'Connor Way already.	Traffic & Trans.
CW – 2	Would like to appeal to the CEC to move the location of the laydown area.	Traffic & Trans.

# MORRO BAY POWER PLANT PROJECT PREPARATION TEAM

Executive Summary.....	Kae C.Lewis
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